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CURRENT ISSUES AND DEVELOPMENT PROSPECTS OF NATURAL SCIENCES

POLISULFID OLIGOMERLARINING MODIFIKATSIYASI VA ULARNING QO‘LLANILISHI

Abdurashidova T. E

Termiz davlat unversiteti

toxtagulabdurashidova2002@gmail.com

Anotatsiya. *Polisulfid oligomerlarining modifikatsiyasi ularning mexanik, elastik va o‘zini tiklash xususiyatlarini yaxshilashga imkon beradi va zamonaviy polimer kimyosi hamda materialshunoslikda muhim ahamiyatga ega. Ushbu ishda polisulfidlar kondensatsion, ion va erkin radikal polimerizatsiya, shuningdek teskari vulkanizatsiya orqali sintez qilinadi. Modifikatsiya strategiyalari — epoksi qatronlar, geterofunksional monomerlar, biofunksional tiollar va nanokompozitlar kiritish — materiallarning elastiklik, cho‘zilish kuchi va mexanik barqarorligini oshiradi. Olingan polisulfidlar sanoat plomba moddalarida, yopishtiruvchilar, qoplamalar, Li–S batareyalari va infraqizil qurilmalarda muvaffaqiyatli qo‘llanilishi mumkin. Ushbu tahlil polisulfidlar sintezi, modifikatsiyasi va qo‘llanilishi bo‘yicha ilmiy va amaliy asos yaratadi.*

Kalit so’zlar: *Polisulfid oligomerlar, modifikatsiya, teskari vulkanizatsiya, epoksi qatronlar, nanokompozitlar, yopishtiruvchilar.*

Abstract*. Modification of polysulfide oligomers allows to improve their mechanical, elastic and self-healing properties and is of great importance in modern polymer chemistry and materials science. In this work, polysulfides are synthesized by condensation, ionic and free radical polymerization, as well as reverse vulcanization. Modification strategies — the introduction of epoxy resins, heterofunctional monomers, biofunctional thiols and nanocomposites — increase the elasticity, tensile strength and mechanical stability of the materials. The resulting polysulfides can be successfully used in industrial sealants, adhesives,*

coatings, Li–S batteries and infrared devices. This analysis provides a scientific and practical basis for the synthesis, modification and application of polysulfides.

Keywords: *Polysulfide oligomers, modification, reverse vulcanization, epoxy resins, nanocomposites, adhesives.*

Kirish. Polimerlarning muhim sinfi sifatida polisulfid polimerlari turli sohalarda germetiklar, yopishtiruvchi moddalar va boshqalar sifatida qo'llaniladi. Ular odatda disodiy polisulfidlarini digalo birikmalari bilan reaksiyaga kirishib, suyuq yoki qattiq polimerlarni hosil qilish orqali sintez qilinadi. Ularning eng muhim afzalliklari turli sirtlarga ajoyib yopishish, stress va bosim ostida germetikda nuqson hosil qilmaslik, yoqilg'i va erituvchilarga chidamlilik, juda past gaz va bug’ o'tkazuvchanligi va ozon va ultrabinafsha nurlariga yuqori qarshiligidir [1]. Elementar oltingugurt polimerizatsiyasi orqali yuqori oltingugurt miqdoriga ega polimerlarni sintez qilishning turli usullariga e'tibor qaratiladi. Ushbu metodologiyalar kondensatsiya, ion va erkin radikal polimerizatsiyalarni o'z ichiga oladi. Teskari vulkanizatsiya deb nomlanuvchi keng muhokama qilinadigan erkin radikal polimerizatsiya turi alohida qiziqish uyg'otadi. Polisulfidlar optik, termo-javob beruvchi, mexanik va elektrokimyoviy xususiyatlarni o'z ichiga olgan o'ziga xos xususiyatlarni namoyish etadi [2]. Oltingugurt (S) atomlarini polimer asosiy zanjirlariga qo'shish bu materiallarga yuqori sinish ko'rsatkichi, mexanik xususiyatlar, elektrokimyoviy xususiyatlar va og'ir metall ionlariga yopishish qobiliyati kabi ko'plab jozibali xususiyatlarni beradi. S-o'z ichiga olgan monomerlarni o'z ichiga olgan kopolimerizatsiya turli xil tuzilmalar, osongina sozlanadigan ketma-ketliklar va topologik tuzilmalarga ega. S-o'z ichiga olgan polimerlarni samarali qurish uchun oson usul hisoblanadi. Ushbu sharhda ditiollar, uglerod disulfid, karbonil sulfid, tsiklik tioangidridlar, episulfidlar va elementar oltingugurt (S8) kabi turli xil S-o'z ichiga olgan monomerlarga nisbatan sopolimerizatsiya yoki ko'pkomponentli polimerizatsiya texnikasi orqali S-o'z ichiga olgan polimerlarni sintez qilishdagi so'nggi yutuqlarni tasvirlangan . Xususan, yuqori qiymatli qo'llanmalarga erishish uchun asosiy zanjir ketma-ketligini,

stereokimyoni va topologik tuzilishni aniq boshqarishga katta e'tibor qaratiladi [3]. Polisulfidli plomba moddalari ko'plab sanoat sohalarida tijorat maqsadlarida qo'llanilgan. Olingan plomba moddalari turli polisulfid oligomerlariga mos keladigan 157–478% moslashuvchan cho'zilish diapazonini va 1,02–0,75 MPa cho'zilish kuchini ko'rsatdi. Disulfid bog'lanishlarining dinamik qaytar almashinuvidan foydalanib, polisulfidli plomba moddalari o'rtacha issiqlik stimuli ostida yaxshi o'z-o'zini tiklash qobiliyatini namoyish etdi. Yuqori molekulyar og'irlik va polisulfid oligomerining pastroq o'zaro bog'lanishi polisulfidli plomba moddalarining cho'zilish va tiklanish samaradorligini oshirishda foydali bo'ldi. 60 daqiqa davomida 75 °C haroratda ushlab turilgandan so'ng, to'liq kesilgan namunaning, LP55-F, ham cho'zilish kuchi, ham cho'zilish kuchi asl qiymatlarning 91% ga tiklandi, bu esa muhrlanish xususiyatiga ta'sir qilmadi. Bundan tashqari, namunalar ajoyib qayta shakllantirish va qayta ishlash qobiliyatlarini namoyish etdi. Ushbu natijalar polisulfid asosidagi plomba moddalarini barqaror sanoat qo'llanilishi uchun paradigma taqdim etadi [4]. **Ushbu maqolada natriy polisulfid, gidrolizlangan ED-20 epoksi qatroni va 1,1,2-trikloretan asosida oligomer sintezi jarayoni o'rganiladi. Olingan natriy polisulfid oligomerining (UV-Vis spektrometr diapazoni 350–800 nm, maksimal aks ettirish – 67,02 %, yorug'lik yutilishi – 323 nm) UB-spektral tahlili, IQ spektrlari, elementar tahlil o'tkazildi. B3LYP/6-31G(d) darajasida optimallashtirilgan natriy polisulfid, gidrolizlangan ED-20 va 1,1,2-trikloretan asosida sintezlangan oligomerning elektron zichlik yuzasi (ESP) GAUSSIAN 16 dasturida keltirilgan. Sintezlangan oligomerlarning barqarorligi, fizik-kimyoviy xususiyatlari va funktsional imkoniyatlari ularning sanoat ishlab chiqarish jarayonlarida, ayniqsa germetik materiallar, qoplamalar va kompozitlarni tayyorlashda, shuningdek, ilmiy tadqiqotlarda yangi materiallar yaratishda yuqori istiqbolga ega ekanligini ko'rsatadi [5].** Ushbu ishning maqsadi natriy sulfid va natriy gidrosulfat yordamida modifikatsiyalangan tiokol sintez usuli bilan olingan kompozitlarni o'rganish. Tarkibga tiokol matritsasiga nanotubalarni kiritish elastiklik-mustahkamlik xususiyatlarining sezilarli darajada o'zgarishiga olib

kelishi, bu esa cho'zilish kuchining 16% ga oshishiga olib kelishi aniqlandi. Shu bilan birga, uzilish paytidagi cho'zilish 15% ga kamayadi. Shunday qilib, ushbu ishda tiokollarni qoniqarli fizik-mexanik xususiyatlarga ega yangi usulda olish imkoniyati namoyish etildi. Shuningdek, ishda kompozitlarning turli muhitlarda (benzin, benzol, konsentrlangan kislotalar) kompozitlarga ta'sir qilgandan so'ng agressiv moddalar ta'siriga chidamliligi baholandi va MWCNT ning kiritilishi bu ko'rsatkichni oshirishi ta'kidlandi [6]. Ushbu maqolada teskari vulkanizatsiya asosida mexanik xususiyatlari yaxshilangan funksional polisulfidlar sintezi uchun oddiy bir idishli tandem usul taklif etiladi. Ushbu yondashuv orqali erituvchi va metall katalizatorsiz turli tarkibli polisulfidlar olinib, ularning elastikligi va mustahkamligi sezilarli darajada oshirilgan. Olingan materiallar yuqori choʻziluvchanlik, yaxshi mexanik mustahkamlik va 50 °C da tez oʻz-oʻzini tiklash xususiyatini namoyon etadi. Shuningdek, bu polisulfidlar qoʻshimcha qotirishsiz yopishtiruvchi sifatida qoʻllanib, turli sirtlarda yuqori yopishqoqlik beradi. Ular bir necha marta qayta ishlanib va qayta ishlatilishi mumkinligi bilan ham ahamiyatli boʻlib, ekologik toza va samarali yopishtiruvchi materiallar yaratishda istiqbolli hisoblanadi [7].

Xulosa. Polisulfid oligomerlari yuqori yopishqoqlik, kimyoviy barqarorlik va past gaz oʻtkazuvchanligi kabi xususiyatlari tufayli muhim sanoat materiallari hisoblanadi. Ularni turli polimerizatsiya usullari, ayniqsa teskari vulkanizatsiya orqali samarali sintez qilish mumkin. Modifikatsiya jarayonlari, jumladan epoksi qatronlar, nanotoʻldirgichlar va funksional monomerlar kiritish, ularning mexanik va elastik xususiyatlarini sezilarli darajada yaxshilaydi. Shuningdek, disulfid bogʻlari tufayli oʻzini tiklash xususiyati materiallarning xizmat muddatini uzaytiradi. Polisulfid asosidagi kompozitlar agressiv muhitlarga chidamliligi va qayta ishlanish imkoniyati bilan ajralib turadi. Shu sababli ular germetiklar, yopishtiruvchilar, qoplamalar va energiya saqlash qurilmalarida keng qoʻllaniladigan istiqbolli materiallar hisoblanadi.

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ANALYSIS OF THE VARIABILITY OF FIBER LENGTH INDICATORS IN F_5B_1 HYBRID COTTON FAMILIES

Achilov Sanjar Geldiyorovich

Institute of Cotton Breeding, Seed Production and Growing Agrotechnologies, UZ

Amanturdiyev Alisher Balkibayevich

Doctor of Agricultural Sciences, Head of Laboratory at PSUYEAITI

Abstract. *Fiber length is one of the most critical technological traits determining the quality and industrial value of cotton products. Improving this trait is a priority in modern cotton breeding due to its direct influence on yarn strength, spinning performance, and textile efficiency.*

F_5B_1 families are located in the variation series on the left and right sides of the variation series compared to the control variety. In this case, transgressive separation was observed. The fiber length indicator in the F_5B_1 families was 33.8-37.3 mm, while in the Gulistan control variety it was 36.0 mm. The coefficient of variability in the F_5B_1 families ranged from 2.86% to 5.49%, and in the Gulistan variety, taken as a standard, it was 3.41%.

Keywords. *Family, fiber length, variation series, hybrid, cotton, coefficient of variability.*

Introduction. As is known, irrigated lands are the gold fund of our country's agriculture. Therefore, if every inch of them is used productively and efficiently, along with the health of the population, the vital task of consistently and timely meeting its annual need for food products will be accomplished. One of the urgent tasks of plant growing and agriculture in Uzbekistan and the world is the involvement of simple, convenient, and inexpensive breeding methods in breeding work, the creation of varieties resistant to saline and saline soil conditions, possessing high germination capacity, high yield, early maturity, and preserving other qualitative traits. One of the primary objectives is to enhance and harmonize the characteristics of new cotton selection varieties that are early maturing, high-yielding, and meet world-class fiber quality standards.

Literature review. In the studies of O. Quchqarov [1], it was demonstrated that hybrids obtained through complex crosses exhibit both salt tolerance and superior fiber quality. Given the increasing salinization of agricultural soils in cotton-growing regions, the utilization of wild and semi-wild species from the cotton gene pool represents an important strategy for introducing novel alleles associated

with stress resistance. Such approaches, involving the use of wild relatives of cotton, have proven effective in broadening the genetic base and enhancing tolerance to various abiotic stresses, including salinity and drought. Therefore, conducting selection within the obtained hybrids and populations under saline conditions is considered an effective approach for the development of new cotton varieties with improved adaptability and fiber traits.

In the studies conducted by S.S. Alikhodzhaeva, S.A. Usmanov, A.K. Kushaliyev, O.E. Kuchkarov, Sh. Ibragimov, and R.A. Abrorova [2], it was revealed that many of the achievements in cotton breeding were manifested in varieties developed through crosses involving genotypes of distant intraspecific origin. Therefore, numerous researchers have carried out scientific investigations aimed at improving valuable agronomic traits by hybridizing ecologically and geographically distant forms of cotton.

Based on the research conducted by A. Rakhimov, G. Mirkhamidova, J. Akhmedov, and A. Nuriddinov [3], the development of early-maturing, high-yielding cotton varieties with superior fiber quality and lint percentage should primarily rely on the selection of parental lines with enhanced fiber length rather than focusing exclusively on earliness. This conclusion is drawn from the observation that most of the remaining agronomic traits exhibit relatively limited variability due to their closer genealogical relatedness.

Kimsanbayev O.Kh. [4] notes that an average number of bolls and seed weight characterizes a high-yielding variety. In the breeding process, the close relationship between these two traits and other valuable economic traits, such as fiber yield and fiber length, creates negative correlations in plant heredity.

According to the scientific data of M.F. Abzalov [5], the formation of fiber in the species *G. hirsutum* L. is a complex trait controlled by the interaction of genes.

Kh. Ashurbekov and E. Mukimov [6] emphasized that fiber length is not only an inherent characteristic of a given variety, determined by the transmission of hereditary traits across generations, but is also strongly influenced by the agricultural practices applied during the experiments, making it a trait of considerable

importance in cotton breeding. Fiber length is a key determinant of cotton quality and, similar to many other economically important traits, exhibits a polygenic mode of inheritance. The genetic basis of this trait has been extensively investigated by numerous researchers, including P.Ya. Popova [7], P.V. Popov [8], S.M. Mirakhmedov [9], Kh. Saydaliyev, V.M. Bocharova, A.A. Abdullayev [10], among others.

Research methodology. The study was conducted in accordance with the guidelines outlined in Methods of Conducting Field Experiments (2007), approved by the Uzbek Research Institute of Irrigation and Agricultural Machinery [3]. For each plant, variation series were generated based on fiber length parameters in hybrid families and standard varieties derived from local varieties and breeding lines. The resulting data were subjected to statistical analysis following the methodology of B.A. Dospekhov (1985).

Analysis and results. The length of cotton fiber is an important indicator that determines the industrial type of cotton fiber. Fiber length is a hereditary trait and a valuable indicator for the textile industry. At the bottom of the fiber is lint, which is less than 20 mm long, and at the bottom of the fiber (delint) is less than 5 mm, and as the fiber of the cultivated cotton variety matures, it curls like a drill, which is an important technological advantage that distinguishes them from the fiber of wild forms. By fiber length, all varieties are divided into short-fiber (27-30 mm), medium-fiber (32-33 mm), long-fiber (34-36 mm), and fine-fiber (37-42 mm) types. The average length of the longest fibers, which make up half the mass of the tested sample, is expressed in inches or mm. Since fiber length is one of the main indicators of fiber quality and is one of the important indicators determining the type and price of fiber, much attention is paid to the study of fiber length. In most varieties of medium-fiber cotton grown in our country, the length of cotton fiber is 30-35 mm, and in some even longer. Along with good other properties of the fiber, the longer the fiber, the higher its value.

In the fiber length experiment, an essential parameter for assessing fiber quality, the coefficient of variation was determined for both the control variety and

the F5B1 families. The control variety was classified into 6 fiber length classes, whereas the F5B1 families showed a broader distribution, ranging from 5 to 10 classes (Table 1).

The distribution of F5B1 families across both the lower and upper ends of the variation series, relative to the control variety, clearly demonstrated the occurrence of transgressive segregation. Fiber length among F5B1 families ranged from 33.8 to 37.3 mm, compared with 36.0 mm in the control variety *Gulistan*. Several families, including F-630 (36.5 mm), F-656 (36.2 mm), F-610 (36.6 mm), F-597 (36.2 mm), F-707 (36.4 mm), F-620 (37.3 mm), and F-615 (36.1 mm), exhibited marginally superior fiber lengths relative to the control. Conversely, families such as F-628, F-629, F-604, F-662, F-681, F-592, F-664, F-668, F-669, F-598, F-716, and F-640 displayed comparatively shorter fibers, ranging from 33.8 to 35.9 mm.

The detection of both upward and downward shifts in fiber length relative to the control indicates the presence of allelic combinations exceeding the parental values, a hallmark of transgressive segregation. Such families represent valuable genetic resources, as they harbor novel allele interactions that may contribute to fiber quality improvement in future breeding programs.

The coefficient of variation for fiber length among the F5B1 families ranged from 2.86% to 5.49%, whereas in the standard variety Gulistan it was 3.41%. Notably, several families—specifically F-662, F-707, F-714, and F-620—harbored a greater proportion of long-fiber plants compared to both the control and the majority of other families. This elevated frequency of superior phenotypes suggests the presence of favorable allelic combinations contributing to fiber elongation. Such families represent promising breeding material, as their reduced variability alongside an enrichment of long-fiber genotypes provides a valuable genetic basis for enhancing fiber quality in cotton improvement programs.

Table 1

№	Parental forms and F_5B_1 hybrid combinations	n	Class boundaries (k-1 mm)											X±Sx	S	V%
			31,0-31,9	32,0-32,9	33,0-33,9	34,0-34,9	35,0-35,9	36,0-36,9	37,0-37,9	38,0-38,9	39,0-39,9	40,0-40,9	41,0-41,9			
1	Гулистон	193	-	-	10	32	47	64	30	10	-	-	-	36,0±0,08	1,23	3,41
2	F-628	104	-	25	42	23	7	6	1	-	-	-	-	33,8±0,11	1,14	3,37
3	F-629	92	-	4	13	30	16	16	12	1	-	-	-	35,2±0,14	1,42	4,03
4	F -630	49	-	-	-	4	12	16	11	6	-	-	-	36,5±0,16	1,14	3,12
5	F -643	73	-	-	4	11	20	18	18	2	-	-	-	36,0±0,14	1,24	3,44
6	F -655	60	-	1	4	11	16	10	10	8	-	-	-	36,0±0,20	1,54	4,27
7	F -656	82	-	-	7	11	13	25	15	11	-	-	-	36,2±0,16	1,46	4,03
8	F -604	43	-	1	5	14	12	7	3	1	-	-	-	35,2±0,19	1,27	3,60
9	F -662	204	-	1	3	10	21	42	52	58	13	3	1	35,3±0,10	1,46	3,91
10	F -681	179	1	13	26	38	43	34	20	2	2	-	-	35,2±0,11	1,54	4,37
11	F -592	96	2	2	9	35	28	13	4	2	1	-	-	35,1±0,13	1,33	3,78
12	F -610	118	-	-	7	9	13	39	30	16	4	-	-	36,6±0,13	1,42	3,87

13	F -570	66	-	-	1	8	24	21	10	2	-	-	-	36,0±0,12	1,03	2,86
14	F -664	100	-	5	17	21	28	17	9	2	1	-	-	35,2±0,14	1,46	4,14
15	F -668	86	-	-	-	4	10	29	19	17	7	-	-	35,1±0,13	1,28	3,45
16	F -669	75	1	3	6	13	15	21	12	3	1	-	-	35,7±0,18	1,58	4,42
17	F -597	63	2	2	5	8	9	10	12	13	2	-	-	36,2±0,25	1,99	5,49
18	F -598	91	-	6	18	24	15	11	11	4	2	-	-	35,2±0,18	1,71	4,85
19	F -707	70	-	1	2	11	15	15	12	10	2	2	-	36,4±0,20	1,67	4,58
20	F -714	84	-	4	10	12	14	16	18	4	3	3	-	36,0±0,21	1,92	5,33
21	F -716	82	1	10	14	16	16	12	6	4	3	-	-	35,1±0,20	1,88	5,35
22	F -620	77	-	-	4	5	6	13	19	21	8	1	-	37,3±0,18	1,64	4,39
23	F -640	87	-	-	3	19	22	30	6	6	1	-	-	35,9±0,13	1,26	3,50
24	F -615	72	-	-	1	13	17	24	14	3	-	-	-	36,1±0,13	1,15	3,18

Indicators of F_5B_1 hybrid cotton families by fiber length

Conclusion. This study revealed considerable variation in fiber length among the F5B1 hybrid families, with values ranging from 33.8 to 37.3 mm compared to 36.0 mm in the control variety Gulistan. Several families, including F-630, F-610, F-620, and F-707, consistently exhibited fiber lengths exceeding the standard, whereas others (e.g., F-628, F-629, and F-662) displayed slightly shorter fibers. Importantly, families such as F-662, F-707, F-714, and F-620 demonstrated a higher frequency of long-fiber plants relative to the control, suggesting the presence of transgressive segregants with favorable allelic combinations.

The observed phenotypic diversity and the identification of families enriched with superior fiber quality highlight the potential of these hybrid lines as valuable genetic resources for cotton improvement. The reduced variability in certain families, coupled with an enrichment of long-fiber phenotypes, provides a strong foundation for targeted selection in breeding programs. Overall, these findings underscore the utility of advanced hybrid populations in broadening the genetic base and accelerating the development of new cotton cultivars with enhanced fiber quality and adaptability.

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SYNTHESIS AND CHARACTERIZATION OF CARBAMIDE–B-CYCLODEXTRIN INHIBITORS

Berdimuradov Khasan Tukhli ogli

Karshi State Technical University

E-mail address: khasanberdimuradov@gmail.com

Abstract: *This paper presents the synthesis of corrosion inhibitors based on carbamide $(NH_2)_2CO$ and beta cyclodextrin (β-CD), as well as the investigation of their properties. The synthesis process involves dissolving*

carbamide and β-CD in distilled water, adding phosphoric acid, and mixing at 70°C. The solution is then cooled, and the precipitate is separated and dried. The inhibitor is purified in three stages. Scanning electron microscopy (SEM) and energy-dispersive spectroscopy (EDS) were used to analyze the corrosion process on steel surfaces and the effectiveness of the inhibitor. SEM results indicate that the inhibitor forms a protective layer on the steel surface, significantly improving the metal's resistance to corrosion. The findings suggest that the synthesized inhibitor could serve as an effective tool for corrosion control in industrial applications.

Keywords: *Corrosion inhibitor, carbamide, beta cyclodextrin, synthesis, scanning electron microscopy (SEM), energy-dispersive spectroscopy (EDS), steel surface.*

Introduction. Corrosion is the process of material degradation, especially metals, resulting from chemical reactions with the surrounding environment. Steel, widely used in various industries such as construction, petrochemicals, shipbuilding, and mechanical engineering, is particularly vulnerable to corrosion [1,177-267]. Corrosion not only weakens the mechanical properties of metals but also leads to the failure of structures, which incurs significant economic losses. Therefore, developing effective methods for protecting materials from corrosion remains a critical issue [2,1476-1521].

One approach to prevent corrosion is the use of corrosion inhibitors—chemicals that slow down or stop the degradation of metals. Various types of inhibitors are available, with organic inhibitors, such as carbamide and its derivatives, and cyclic molecules like beta-cyclodextrin (β-CD), showing high corrosion resistance properties.

This research focuses on the synthesis and characterization of corrosion inhibitors based on carbamide $(NH_2)_2CO$ and beta-cyclodextrin (β-CD) [3,93]. The paper outlines the synthesis process and purification stages of these inhibitors. Additionally, the results obtained using scanning electron microscopy (SEM) and energy-dispersive spectroscopy (EDS) demonstrate that these

inhibitors form a protective layer on steel surfaces, significantly enhancing the metal's corrosion resistance [4,537-551]. The findings suggest that carbamide and β-CD-based inhibitors are promising for industrial applications in corrosion control.

Materials and Methods. This section outlines the materials and methods used to synthesize, purify, and characterize the corrosion inhibitors based on carbamide $(NH_2)_2CO$ and beta-cyclodextrin (β-CD). The experimental procedures include the synthesis, purification stages, and characterization techniques employed to analyze the inhibitor's effectiveness in preventing corrosion on steel surfaces.

The materials used in this study include carbamide $(NH_2)_2CO$ as the primary raw material, which provides the nitrogen source for the corrosion inhibitor. Beta-cyclodextrin (β-CD), a cyclic oligosaccharide, was chosen for its ability to form complexes with various substances and enhance the inhibitor's efficacy. Phosphoric acid (H_3PO_4) was used to create ionized solutions that aid in the formation of the corrosion inhibitor complex. Distilled water served as the solvent for dissolving carbamide and β-CD in the initial synthesis stage, while ethanol (C_2H_5OH) and acetone were used during the purification process to remove impurities from the inhibitor and clean the steel samples.

The synthesis of the corrosion inhibitor began by preparing a 1 molar solution of carbamide $(NH_2)_2CO$ by dissolving 1 mole of carbamide in 100 mL of distilled water. The solution was stirred to ensure complete dissolution. Then, an equal molar quantity of β-CD was added to the carbamide solution. This mixture was further treated with 1 mole of phosphoric acid (H3PO4), which was dissolved in distilled water to form an acidic medium conducive to the formation of ionized complexes. The resulting mixture was heated to 70°C and stirred continuously at 900 rpm for 3 hours. This allowed the carbamide and β-CD to form a stable complex. Following the reaction, the solution was cooled to room temperature and placed in a refrigerator at 5°C for 24 hours. During this period, the corrosion inhibitor complex precipitated out of the solution.

The precipitate was then separated from the liquid using a vacuum filtration system with filter paper. The collected precipitate was dried at 40°C for 24 hours to remove any residual moisture. To ensure the inhibitor's purity and maximize its corrosion resistance, the purified corrosion inhibitor was subjected to three purification stages. In the first purification stage, the precipitate was dissolved in a 70% water and 30% ethanol mixture and heated at 60°C for 3 hours using a magnetic stirrer at 900 rpm. After stirring, the solution was cooled to 5°C and allowed to rest for 24 hours. The resulting precipitate was separated by vacuum filtration and dried at 40°C for 24 hours. In the second purification stage, a similar procedure was followed, but the solution was made with 60% water and 40% ethanol. After the same treatment, the precipitate was filtered and dried again. The final purification stage involved dissolving the solid in a 50% water and 50% ethanol mixture, stirring at 60°C for 3 hours, and cooling to 5°C for 24 hours. After vacuum filtration, the solid was dried at 40°C for 24 hours. The final product was a highly purified carbamide-β-CD-based corrosion inhibitor.

The purified corrosion inhibitor was characterized using several techniques to assess its physical and chemical properties. Scanning electron microscopy (SEM) was used to analyze the surface morphology of steel samples before and after treatment with the corrosion inhibitor. SEM images helped identify the changes in the steel surface, such as the formation of a protective layer by the inhibitor. Energy-dispersive spectroscopy (EDS) was used to analyze the elemental composition of the steel surface, determining the presence of elements such as iron (Fe), oxygen (O), carbon (C), and chlorine (Cl), which indicate corrosion products and the effectiveness of the inhibitor. Thermal analysis was carried out using thermogravimetric analysis (TGA) and differential thermal analysis (DTA) to evaluate the thermal stability of the corrosion inhibitor. These methods provided insights into the thermal degradation behavior of the inhibitor and its stability at elevated temperatures. Finally, atomic force microscopy (AFM) was employed to examine the surface roughness of the steel samples both before and after treatment with the corrosion inhibitor. AFM images allowed for the

assessment of surface smoothness, indicating the effectiveness of the inhibitor in preventing corrosion-related pitting and roughness.

By combining these synthesis, purification, and characterization techniques, this study aimed to develop and evaluate a highly effective corrosion inhibitor for industrial applications.

Result and discussion. To obtain a corrosion inhibitor based on Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD), initially, 1 mole of carbamide is dissolved in 100 mL of distilled water (H_2O). After it completely dissolves, an equal amount, 1 mole, of Beta Cyclodextrin (β-CD) is added. To form ionic liquids (salts) in the solution, 1 mole of H_3PO_4 (phosphoric acid) is added, and the mixture is stirred for 3 hours at 70°C using a magnetic stirrer (900 rpm) until fully dissolved (figure 1).

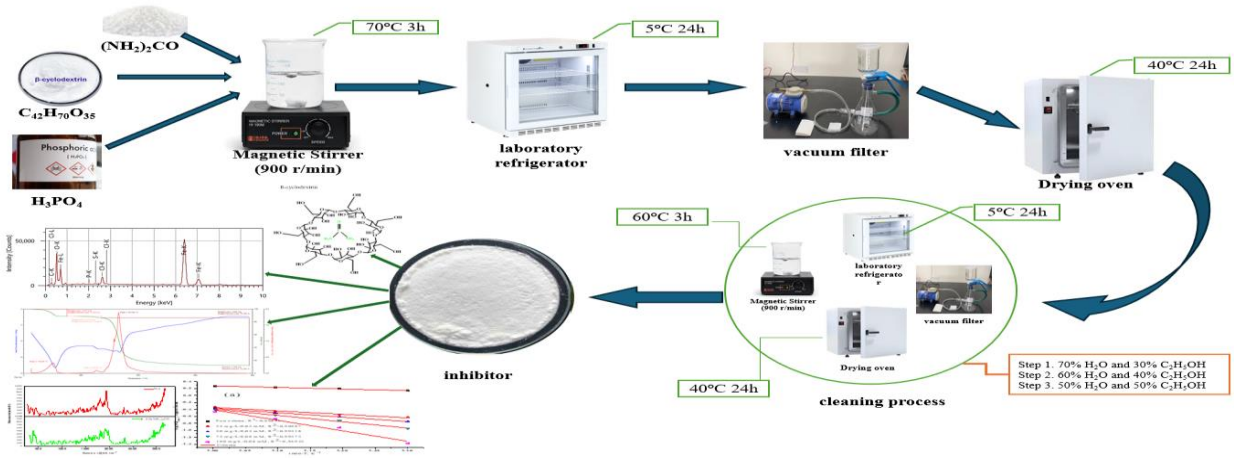


Figure 1. *Synthesis Process*

The fully dissolved solution is cooled at 5°C for 24 hours. To separate the formed precipitate, the solution is passed through filter paper using a vacuum apparatus. The separated precipitate is then dried at 40°C for 24 hours. The obtained corrosion inhibitor based on Carbamide and Beta Cyclodextrin (β-CD) undergoes a purification process in three stages.

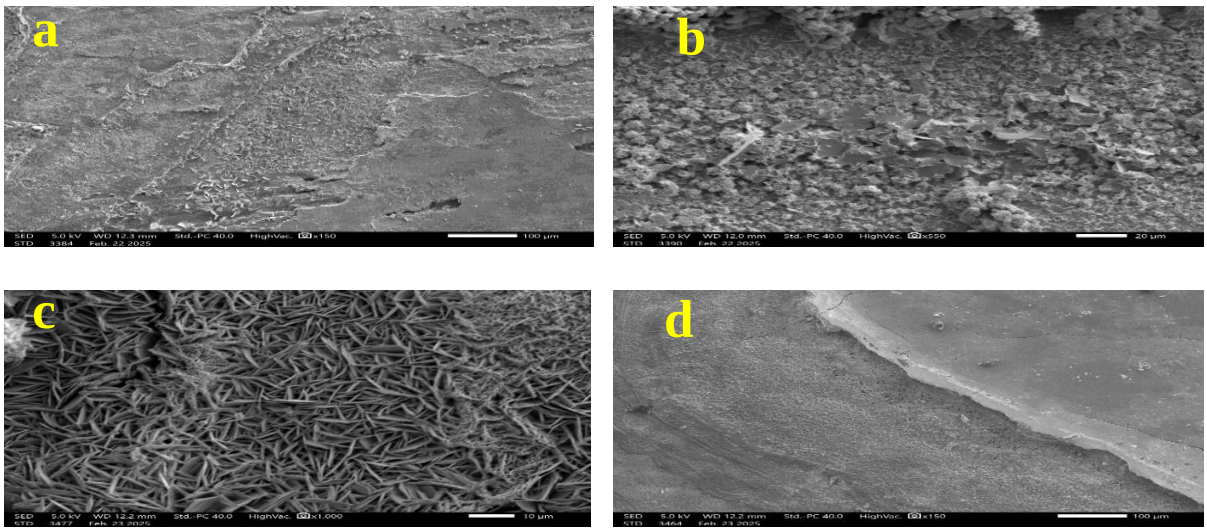
1st Stage: The obtained inhibitor is dissolved in a solution prepared with 70% H_2O (water) and 30% C_2H_5OH (ethanol) and stirred with a magnetic stirrer at 900 rpm for 3 hours at 60°C. The solution is then cooled to 5°C for 24 hours.

To separate the resulting precipitate, the solution is filtered through filter paper using a vacuum apparatus. The separated precipitate is dried at 40°C for 24 hours.

2nd Stage: The dried precipitate is further purified by dissolving it in a solution prepared with 60% H_2O and 40% C_2H_5OH. It is stirred at 900 rpm for 3 hours at 60°C and then cooled again to 5°C for 24 hours. The precipitate is separated by vacuum filtration and dried at 40°C for 24 hours. This stage is repeated to ensure thorough purification.

3rd Stage: In the final purification stage, the dried inhibitor is dissolved in a solution prepared with 50% H_2O and 50% C_2H_5OH. The solution is stirred for 3 hours at 60°C using a magnetic stirrer at 900 rpm. The resulting solution is cooled again to 5°C for 24 hours, and the precipitate is separated through vacuum filtration. The separated precipitate is dried at 40°C for 24 hours. After the final purification, the corrosion inhibitor based on Carbamide and Beta Cyclodextrin (β-CD) is obtained.

The surface of Steel 20 in its pre-corrosion, post-corrosion, and corrosion-inhibited states using Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) as the corrosion inhibitor was studied using a SEM–EVO MA 10 (Zeiss, Germany) scanning electron microscope (SEM). Before the corrosion study, the steel sample, in the form of a plate, was cleaned and washed with acetone, then dried. Using the scanning electron microscope, an image of the clean metal sample with a size of 100 μm was captured.



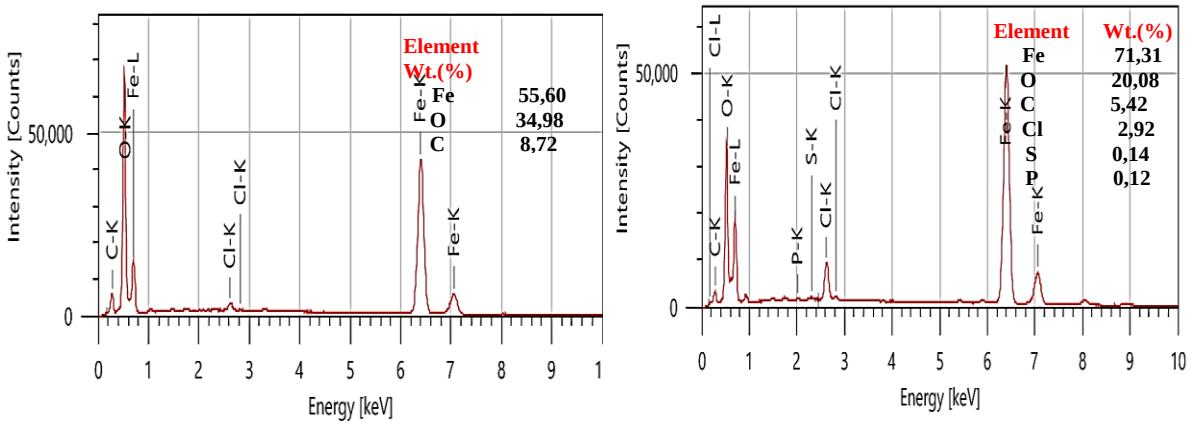
The appearance of the steel surface under corrosion conditions without the inhibitor (a,b images at 20 and 100 μm) and with the inhibitor obtained from Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) (c,d images at 10 and 100 μm) was observed using scanning electron microscopy (SEM).

The clean metal sample was placed in the background solution and kept in an inhibitor-free environment for 72 hours. Afterward, the plate was removed from the solution and dried, and its corroded surface condition was analyzed using scanning electron microscopy (SEM) (a, b images). The SEM analysis revealed the corrosion-induced degradation and corrosion products on the steel surface.

In the next stage of the experiment, an inhibitor prepared from carbamide $(NH_2)_2CO$ and β-cyclodextrin (β-CD) was added to the background solution. SEM observations (c, d images) showed the formation of coatings on the steel surface as a result of the physical and chemical adsorption of these inhibitor components. These coatings effectively protected the steel surface from the aggressive effects of the environment, significantly reducing the corroding surface area and enhancing the stability of the metal.

The obtained results demonstrate that composite inhibitors based on carbamide $(NH_2)_2CO$ and β-cyclodextrin (β-CD) form an effective protective layer on the metal surface, playing a crucial role in increasing the corrosion resistance of steel. This confirms their potential for use as an effective tool in industrial corrosion control.

Energy-dispersive spectroscopy (EDS) analysis was performed to investigate the corrosion inhibitors based on carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) adsorbed on the metal surface (a and b images).



a **b**

The EDS results for the corrosion of the metal surface (a) and the corrosion inhibitor based on Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) applied to the metal surface (b) are shown in the analysis of the plate samples.

According to the EDS (energy-dispersive spectroscopy) analysis of the metal surface in an inhibitor-free environment, the amount of oxygen (O) was significantly higher (34.98%) and the amount of iron (Fe) was considerably lower (55.60%), indicating that the steel 20 surface was heavily oxidized (a-image). After adding the corrosion inhibitor based on Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) to the corrosion solution (b-image), the Fe content significantly increased (71.31%) and the oxygen concentration decreased (20.08%). This suggests that the metal surface was nearly unoxidized, meaning it was not affected by corrosion. The presence of oxygen atoms on the surface of the steel 20 plate was due to the corrosion inhibitors made from Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD). These results demonstrate that the inhibitors based on Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) are effective in protecting the steel surface from corrosion.

The thermal stability and phase changes of the inhibitor, as well as its degradation properties under storage, processing, and heat exposure, are of

significant importance. In this analysis, the thermal changes of the β–SD$(NH_2)_2CO$ inhibitor were studied over a temperature range of 20°C to 800°C using the TA Instruments TRIOS V5.1.1.46572 apparatus (Figure 3).

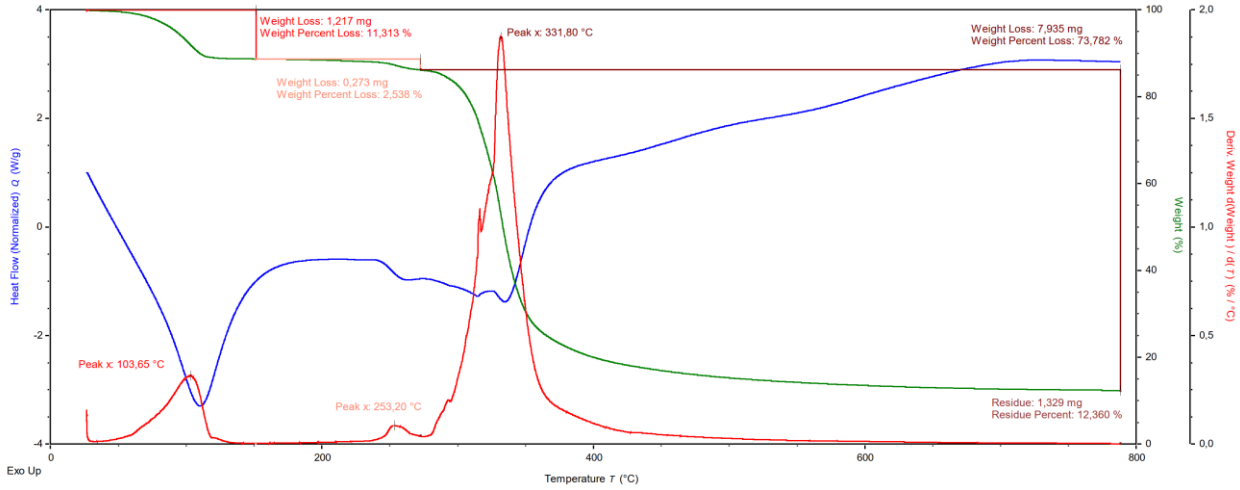


Figure 3. TGA, DTA, and DSC Thermograms of the Corrosion Inhibitor Based on Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD)

According to Figure 3, the rate of mass change (d(W)/dT) increases with rising temperature and reaches its peak between 330–340 °C. This signal indicates that the rate of degradation of the substance is maximized in this temperature range.

The thermogravimetric (TGA) curves show that the β–SD$(NH_2)_2CO$ inhibitor undergoes three main stages of mass loss with respect to temperature (see Figure 3 and Table 1). Below is the table with the identified weight loss corresponding to these stages:

Table 1

Weight Loss of β–SD$(NH_2)_2CO$ Inhibitor with Respect to Temperature

Stage	Temperature (°C)	Weight Loss (mg)	Relative Weight Loss (%)	Process Description
1	103.65	1.217 mg	11.313%	Moisture, physical volatilization

2	253.20	0.273 mg	2.538%	Intermediate temperature decomposition
3	331.80	7.935 mg	73.782%	Main chemical decomposition
Final	-	1.329 mg	12.360%	Residual mass after thermal reaction

The total weight loss is 87.64%.

Differential Thermal Analysis (DTA) and DSC Results. The heat flow curves obtained from differential thermal analysis (DTA) and differential scanning calorimetry (DSC) allowed the identification of phase transitions and reactions of the material. The first peak, observed at 103.65 °C, is endothermic, indicating that the substance may undergo melting or evaporation at this stage. The second peak, observed at 253.20 °C, is also endothermic, and at this stage, slow decomposition of the material's chemical composition begins. A strong endothermic peak at around 331.80 °C indicates the complete and main decomposition phase of the material.

The thermal analysis of the β–SD$(NH_2)_2CO$ inhibitor shows that it has multi-stage thermal degradation properties. The analysis was performed over a temperature range from 20 °C to 800 °C. The β–SD$(NH_2)_2CO$ inhibitor begins to decompose at 100 °C, and the main decomposition phase occurs at 330 °C. Finally, 12.36% of the mass remains as residual, indicating that the material does not fully decompose at high temperatures.

Conclusion. The results of this study demonstrate the effectiveness of corrosion inhibitors based on Carbamide $(NH_2)_2CO$ and Beta Cyclodextrin (β-CD) in preventing corrosion on steel surfaces. The synthesis process of the corrosion inhibitor involved the combination of Carbamide and β-CD with

phosphoric acid in distilled water, followed by a series of purification steps. The purification was carried out in three stages using different solvent mixtures, including water and ethanol, to ensure the removal of impurities and enhance the inhibitor's performance.

Scanning Electron Microscopy (SEM) and Energy-Dispersive Spectroscopy (EDS) analyses revealed that the inhibitor formed a protective layer on the steel surface, significantly reducing corrosion. SEM images of steel surfaces showed that, in the absence of the inhibitor, the metal experienced substantial corrosion, resulting in visible pits and surface degradation. However, when the inhibitor was applied, the steel surface appeared much smoother with reduced corrosion and a marked decrease in the corroding surface area. EDS analysis further supported these findings, showing a higher concentration of iron (Fe) and a decrease in oxygen (O) on the inhibited surfaces compared to the untreated ones.

Thermal analysis of the β–SD$(NH_2)_2CO$ inhibitor showed that it possesses multi-stage thermal decomposition characteristics, with a significant mass loss occurring at around 330°C. Despite thermal degradation, a small amount of residual mass (12.36%) remained, indicating the inhibitor's partial stability at higher temperatures.

Finally, Atomic Force Microscopy (AFM) results indicated that the inhibitor reduced surface roughness significantly, with the Ra value dropping from 375 nm (for corroded steel) to 0.7 nm (for treated steel). This confirms that the β–SD$(NH_2)_2CO$ and β-CD-based inhibitor effectively reduces the formation of corrosion-related pits and porosity, enhancing the metal's stability and corrosion resistance.

Overall, the findings indicate that Carbamide and Beta Cyclodextrin-based composite inhibitors offer a promising solution for corrosion control in industrial applications, providing both environmental and economic benefits by reducing corrosion damage and extending the lifespan of metal structures.

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SENZURALI TANLANMALARDA TAQSIMOT FUNKSIYASINI BAHOLASH: KAPLAN-MEIER VA NELSON-AALEN USULLARINING QIYOSIY TAHLILI

Duysenbaev Ruslan Ongarovich

duysenbaev.uit@gmail.com

Erdashov Alimjan Baxramovich

alimjan4755@gmail.com

University of Innovation Technologies

Annotatsiya. *Ushbu maqolada tibbiyot, muhandislik va sun'iy intellekt sohalarida keng tarqalgan senzurali to'liqsiz ma'lumotlar muammosi ko'rib chiqiladi. An'anaviy empirik taqsimot funksiyasining senzurali tanlanmalarga nisbatan yaroqsizligi asoslanib, uning o'rniga qo'llaniladigan Kaplan-Meier (ko'paytma-limit) va Nelson-Aalen no-parametrik baholash usullari nazariy va amaliy jihatdan tahlil qilinadi. Monte-Karlo simulyatsiyasi orqali olingan hisoblash tajribasi natijalariga ko'ra, ushbu usullarning aniqlik ko'rsatkichlari (MSE va Bias) taqqoslanadi va senzura darajasining baholash sifatiga ta'siri o'rganiladi.*

Kalit so'zlar: *senzurali tanlanmalar, yashovchanlik tahlili, Kaplan-Meier bahosi, Nelson-Aalen bahosi, Monte-Karlo simulyatsiyasi, taqsimot funksiyasi.*

Annotation. *This article examines the problem of censored incomplete data, which is prevalent in the fields of medicine, engineering, and artificial intelligence. The inadequacy of the traditional empirical distribution function for censored samples is substantiated, and the Kaplan-Meier (product-limit) and Nelson-Aalen non-parametric estimation methods, which are used as alternatives, are analyzed from both theoretical and practical perspectives. Based on the results of computational experiments conducted via Monte Carlo simulation, the accuracy metrics (MSE and Bias) of these methods are compared, and the effect of the censorship level on estimation quality is investigated.*

Keywords: *censored samples, survival analysis, Kaplan-Meier estimate, Nelson-Aalen estimate, Monte Carlo simulation, distribution function.*

KIRISH

Zamonaviy ilmiy tadqiqotlarda, ayniqsa tibbiyotdagi klinik sinovlar, muhandislikdagi ishonchlilik tahlili va sun’iy intellekt sohalaridagi modellashtirish jarayonlarida to’liqsiz ma’lumotlar bilan ishlash zaruriyati tez-tez yuzaga keladi. Bunday holatlarda tadqiqot ob’ekti haqidagi ma’lumot to’liq emas: kutilayotgan hodisa (masalan, qurilmaning ishdan chiqishi yoki bemorning sog’ayishi) kuzatuv muddati ichida sodir bo’lmasligi mumkin. Statistikada bunday hodisalar senzurali tanlanmalar (censored samples) deb ataladi [1].

To’liqsiz kuzatuvlarni tahlildan shunchaki chiqarib tashlash natijalarda jiddiy statistik siljish (bias) hosil qiladi va olingan xulosalarni noto’g’ri bo’lishiga olib keladi [2]. Shu sababli, senzurali ma’lumotlar asosida noma’lum taqsimot funksiyasini F(x) aniq va ishonchli baholash imkonini beruvchi maxsus matematik usullarni ishlab chiqish va ularni qiyosiy o’rganish bugungi kunda o’ta muhim ilmiy masala hisoblanadi.

ASOSIY QISM

1. Senzura va uning matematik modeli. Senzura - tadqiqot ob’ektidagi kutilayotgan hodisa qachon sodir bo’lganligi to’g’risida to’liq ma’lumotning

yo'qligi holatidir. Uch asosiy tur ajratiladi: o'ng senzura (Right censoring) - hodisa kuzatuv muddatidan keyin yuz beradi; chap senzura (Left censoring) - hodisa kuzatuv boshlanishidan avval sodir bo'lgan; oraliq senzura (Interval censoring) - hodisa ikki ma'lum vaqt orasida sodir bo'lgan [1].

O'ng senzura uchun matematik model: X_i - hodisaning haqiqiy vaqti, C_i - senzura vaqti bo'lsin. Tadqiqotchi faqat $T_i = \min(X_i, C_i)$ va $\delta_i = \mathbf{1}\{X_i \le C_i\}$ ni kuzatadi. Bu yerda $\delta_i = 1$ haqiqiy hodisani, $\delta_i = 0$ esa senzura bo'lganligini bildiradi.

2. Kaplan-Meier bahosi. 1958-yilda E.L. Kaplan va P. Meier tomonidan taklif etilgan ko'paytma-limit (product-limit) bahosi - senzurali tanlanmalar uchun no-parametrik maksimal haqiqatga o'xshashlik bahosi (NPMLE) hisoblanadi [1]. Aytaylik, $t_1 < t_2 < \ldots < t_k$ hodisalar sodir bo'lgan vaqtlar, d_i - t_i vaqtda kuzatilgan hodisalar soni, n_i - ushbu vaqtda "xavf ostida" bo'lgan ob'ektlar soni. Taqsimot funksiyasining Kaplan-Meier bahosi:

$$\hat{F}(x) = 1 - \prod(t_i \le x)\,(1 - d_i/n_i)$$

Bu o'ngdan uzluksiz pog'onasimon funksiya bo'lib, faqat hodisalar sodir bo'lgan nuqtalardagina sakraydi. Senzurali ob'ektlar n_i tarkibida ishtirok etadi, ammo d_i ga qo'shilmaydi. Greenwood formulasi asosida bahoning dispersiyasi hisoblanadi:

$$\widehat{\mathrm{Var}}(\hat{F}(x)) = (1 - \hat{F}(x))^2 \cdot \Sigma(t_i \le x)\, d_i / [n_i(n_i - d_i)]$$

3. Nelson-Aalen bahosi. Sanoq jarayonlari va martingallar nazariyasiga asoslangan Nelson-Aalen bahosi yig'indili xavf funksiyasini H(x) to'g'ridan-to'g'ri baholaydi [4, 5]:

$$\hat{H}(x) = \Sigma(t_i \le x)\, d_i/n_i$$

H(x) va F(x) o'rtasidagi F(x) = 1 − e^(−H(x)) bog'liqligidan foydalanib, Nelson-Aalen taqsimot bahosi olinadi: $\hat{F}_{na}(x) = 1 - \exp(-\Sigma\, d_i/n_i)$. Bu usulning asosiy ustunligi - kichik tanlanmalarda asimptotik dispersiyasi barqarorroq va statistik siljishi kichikroq bo'lishidadir [3].

4. Usullarning qiyosiy tahlili.

Usul	Asosiy afzalligi	Kamchiligi	Turi
Klassik EDF	Hisoblashning soddaligi	Senzurali ma'lumotlar uchun yaroqsiz	parametrsiz
Kaplan-Meier	To'g'ridan-to'g'ri NPMLE, intuitiv talqin	Vaqt oxirida dispersiya ortadi	parametrsiz
Nelson-Aalen	Kichik tanlanmalarda barqarorroq	Taqsimotni bilvosita ifodalaydi	Xavfga asoslangan

1-jadval. Baholash usullarining qiyosiy tahlili

5. Monte-Karlo simulyatsiyasi natijalari. Usullarning aniqligi Python dasturlash tilida (numpy, lifelines kutubxonalari) o'tkazilgan hisoblash tajribasi orqali tekshirildi. Tajribada Weibull taqsimotidan ($k=1.5$, $\lambda=50$) $n=150$ ta ob'ekt generatsiya qilindi, senzura vaqtlari Uniform(0, 80) taqsimotidan olindi (~30% senzura darajasi). Tajriba $M=1000$ marta takrorlandi va Siljish (Bias) hamda O'rtacha Kvadratik Xato (MSE) hisoblandi [1].

Natijalar shuni ko'rsatdiki: (a) vaqtning boshlanish oraliqlarida n_i katta bo'lganligi sababli ikkala usul ham yuqori aniqlik va tor ishonchlilik oralig'ini beradi; (b) vaqt oxirida senzurali ob'ektlar ko'payib, n_i kamayishi bilan Kaplan-Meier bahosining dispersiyasi ortadi - bu Greenwood formulasiga mos; (c) senzura darajasi 20% dan 50% ga oshirilganda MSE sezilarli o'sadi, ammo baholar asimptotik izchillik xossasini saqlab qoladi; (d) Nelson-Aalen bahosi kichik tanlanmalarda kichikroq siljishga ega ekanligi tasdiqlandi.

XULOSA

Ushbu tadqiqot senzurali tanlanmalarda taqsimot funksiyasini baholashning zamonaviy usullarini qiyosiy tahlil qildi. Asosiy natijalar:

1. An’anaviy empirik taqsimot funksiyasi senzurali ma’lumotlarda statistik siljish hosil qilib, yaroqsiz natijalar beradi.
2. Kaplan-Meier bahosi senzurali tanlanmalar uchun NPMLE sifatida eng keng qo’llaniladigan va intuitiv usul bo’lib, u ma’lumotlarni yo’qotmasdan ishlaydi.
3. Martingallar nazariyasiga asoslangan Nelson-Aalen bahosi kichik tanlanmalarda barqarorroq asimptotik xossalarga ega ekanligi Monte-Karlo tajribasida tasdiqlandi.
4. Kelajakda klassik usullarni sun’iy intellekt (Deep Learning) algoritmlari bilan integratsiya qilish yashovchanlik tahlilini yangi bosqichga olib chiqishi mumkin.

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SEVERE ECOLOGICAL AREAS OF UZBEKISTAN: PROBLEMS AND SCIENTIFIC ANALYSIS

Gulomova Rukhsora Buriyevna
Shahrisabz State Pedagogical Institute
E-mail:ezozasavkatova@gmail.com

Annotation. *This article analyzes the ecological situation of the Republic of Uzbekistan based on scientific sources. The ecological situation during the Timurid period, the Aral Sea crisis, ecological degradation processes in the Republic of Karakalpakstan, atmospheric pollution in the industrial zone of the Tashkent region, demographic pressure in the Fergana Valley, and the environmental consequences of mining and metallurgical activities in the Navoi region are considered. The study identifies overuse of water resources, soil salinization, air pollution, and climate change as key risk factors. The article provides scientifically based conclusions on ensuring environmental sustainability.*

Keywords: *Ecological crisis, Timurids, Aral Sea problem, atmospheric pollution, soil degradation, salinization, anthropogenic factors, industrial waste, climate change, water resources, environmental security.*

Main part. Ecological situations and crises are not processes that have emerged yesterday or today. They have existed since ancient times, and in the 21st century, the issue of ecological security has become an integral part of human development on a global scale. For example, scientists living and creating in Central Asia (Amir Temur, Ibn Sina, the Forobians) have already expressed their valuable scientific opinion about nature and the balance in it, about the flora and fauna, about

the veneration of nature at a time when the term ecology did not yet come to the world. If we look at the environmental policy of Amir Temur and the Timurid period, we can see that the activities of our ancestors, such as the development of irrigation systems and agriculture, had a positive environmental impact in their time, shown. The period of Amir Temur is characterized by "the rise of urban planning and gardening." During his reign, cities such as Samarkand, Bukhara, and Shahrisabz were not only known as military and political centers, but also for their beautiful gardens and green areas. As we enter a new era, the balance of the biosphere is being disrupted by overuse of natural resources, industrialization, urbanization, and demographic growth as a result of human population growth. Issues such as climate change, water scarcity, soil degradation, and atmospheric pollution are not only environmental, but also have a direct impact on socio-economic stability. From this perspective in view, environmental safety is considered as an important component of national security. The Republic of Uzbekistan is located in a naturally-geographically arid and semi-arid region with limited access to water resources. Most of the country's territory consists of desert and steppe zones. The reliance of agriculture on irrigation, the development of industrial sectors, and population growth are increasing anthropogenic pressure on ecological systems. As a result, the ecological situation in some regions is deteriorating, negatively affecting sustainable development processes. The drying of the Aral Sea, recognized as the largest environmental crisis in Central Asia, is the most severe manifestation of environmental problems in Uzbekistan. The sharp drop in sea level has not only led to the loss of aquatic ecosystems, but has also seriously damaged the region's climate, soil fertility, and public health. "The environmental crisis in the Aral Sea region is emerging as a transboundary problem for the entire region"[1].

In addition, air pollution in industrialized areas, emissions from mining and metallurgical complexes, and the increasing number of vehicles are also

[1] Омонов В.Н. Экологик глобаллашув ва унинг Ўзбекистон экологик сиёсатига таъсири: Фалс.ф.д. (DSc) дисс. –2022: СамДУ, 2022. –Б.149.

disrupting the ecological balance. In particular, atmospheric and soil pollution is high in industrialized regions such as the Tashkent and Navoi regions. In the densely populated Fergana Valley, demographic pressure, limited land resources, and transport emissions complicate the ecological situation. Water pollution poses a serious threat to human health causes." For example, bacteria and viruses spread through contaminated water cause intestinal infections and other diseases"[2].

Salinization of irrigated lands, rising groundwater levels, increased desertification, and reduced biodiversity are also among the pressing environmental problems. Scientific studies show that natural landscapes are affected by anthropogenic factors the transformation is accelerating, and this process is creating long-term environmental risks.

The relevance of this article lies, in the need for a comprehensive analysis of the areas, of Uzbekistan with a difficult ecological situation, the identification of the factors of their formation, and the scientific justification of strategies for environmentally sustainable development. The aim of the study is to identify areas experiencing an ecological crisis, systematically assess the main risk factors, and develop scientific conclusions on how to reduce them.

This study serves to strengthen environmental security in the country, promote the rational use of natural resources, and preserve a healthy environment for future generations through in-depth study of regional environmental problems. Analyses show that the "severe environmental situation in Uzbekistan is mainly due to the following factors:"[3]

– Excessive and inappropriate use of water resources;

– High levels of industrial and transport emissions;

– Soil degradation and salinization;

Effects of climate change. To ensure environmental sustainability:

[2] G'ulomova Ruxsora Buriyevna "Suv resurslari va ularning ifloshlanish darajasi" xotin-qizlar ilmda: tiklanish, yuksalish va taraqqiyot sari qadamlar: Namangan – 2026yil. 207-209 betlar

[3] Омонов Б. Экологик глобаллашув ва унинг Ўзбекистондаги экологик муҳитга таъсири. –Т.: 2021. –Б.12 – 15. 136 б

* Extensive introduction of water-saving technologies;

* Renewable energy development;

* Strengthening environmental standards in industrial enterprises;

* • It is necessary to continue large-scale reclamation work in the Aral Sea region.

Solving environmental problems requires government policy, scientific research, and international cooperation. The above analysis shows that environmental problems in Uzbekistan are systemic and multifaceted, closely related to natural and geographical conditions, resource use models, and increased anthropogenic pressure. In arid climates, limited water resources, high dependence on irrigated agriculture, and the acceleration of industrialization processes are emerging as key factors that are disrupting ecological balance.

In summary, ensuring environmental security in the country should become a priority of a sustainable development strategy. In this case, the rational use of resources, the improvement of the Environmental monitoring System, the introduction of the principles of "green economy" and the promotion of ecological culture are priority tasks. Only through scientifically based, systematic, and long-term environmental policies can we preserve the natural environment, ensure sustainable economic development, and provide a healthy ecological space for future generations.

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TREATMENT OF INDUSTRIAL WASTEWATER FROM OIL REFINERIES

Ibrokhimov Kh.O.
Ibadullaev A.S.
Suvankulov A.Kh.
Chorshanbiev U.R.
Aliqulova Z.A.
xayrulloibrohimov5@gmail.com
Tashkent state transport university

Abstract: *This scientific work examines the issues of treating wastewater generated at oil refining enterprises using modern treatment methods. The study highlights ways to protect the environment from harmful discharges, improve ecological conditions, and ensure the rational use of water resources through the improvement of technological equipment used in wastewater treatment processes. In addition, advanced technologies applied in international practice for wastewater treatment are analyzed, and the composition, physicochemical*

properties, and effective treatment methods of wastewater generated during oil refining processes are investigated.

Keywords: *wastewater, oil refining enterprises, water treatment, petroleum products, mechanical impurities, hydrocarbons, sulfate and chloride waters, environmental safety*

Water is one of the most widely distributed substances in nature and plays an indispensable role in sustaining life on Earth. In particular, water is an integral component of technological processes in oil refining enterprises. It is widely used as a cooling medium, solvent, washing agent, extractant, and as a technological carrier. As a result, wastewater containing petroleum products, salts, and mechanical impurities is generated during production processes (Table 1).

Table 1.

Main components of refinery wastewater.

Components	percent (approximate)
Petroleum hydrocarbons	30–40 %
Dissolved salts	20–30 %
Suspended solids	10–20 %
Other impurities	10–15 %

All living organisms on Earth, including humans and plants, are closely dependent on water. Approximately 65% of the human body and about 85% of brain tissue consist of water. Therefore, the protection of water resources, their preservation from pollution, and the rational use of water are of great importance. In particular, the effective treatment of wastewater generated in industrial enterprises has become one of the most pressing environmental challenges.

Currently, the total water reserves on Earth are estimated to be about 1,386 million km³. Of this amount, 97.5% is saline water, while only 2.5% accounts for freshwater resources. Due to the limited availability of freshwater reserves, special attention is being paid to wastewater treatment and reuse in oil refining enterprises.

Globally, an average of about 3,900 billion m³ of freshwater is consumed annually, a significant portion of which is returned to the environment in the form of wastewater.

Wastewater and natural waters are classified according to the amount of dissolved salts, that is, their mineralization, into freshwater, slightly saline water, saline water, and highly saline water (brine). Wastewater generated during oil refining processes mainly contains sulfate, chloride, and bicarbonate salts. Water hardness depends on the concentration of dissolved calcium and magnesium ions and is classified into carbonate and non-carbonate hardness. These parameters play an important role in selecting appropriate technologies for wastewater treatment.

In industrial enterprises, including oil refineries, water is widely used as a raw material, energy carrier, cooling agent, and auxiliary medium. Therefore, the physicochemical properties of water, such as density, viscosity, and the concentration of dissolved and suspended impurities, directly affect the efficiency of wastewater treatment processes. An increase in the concentration of dissolved salts leads to an increase in water density, while a rise in temperature results in a decrease in viscosity. These factors must be taken into account when designing and operating wastewater treatment facilities.

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CHEMICALLY ACTIVATED COMPLEX MIXED FERTILIZERS BASED ON PHOSPHORITES OF KARAKALPAKSTAN, PHOSPHOGYPSUM AND GLAUCONITE

Jumaboyev Rasulbek Farxod o‘g‘li

jumaboyevrasulbek99@gmail.com
Reymov Akhmed Mambetkarimovich
ahmed_ram@mail.ru
Kurbaniyazov Rashid Qalbaevich
Email: kurbaniyazov-rk@mail.ru
Karakalpak State University

Abstract. *In this work, the possibility of using large-tonnage industrial waste—phosphogypsum, phosphorite flour from the Khojakul deposit, HNO_3 (56%), and glauconite from the Krantau deposit—as raw materials in the production of complex mixed fertilizers is demonstrated. Initially, phosphorite flour from the Khojakul deposit was activated with HNO_3 (56%) in the range of 5% to 50% of the stoichiometric norm, resulting in the formation of monocalcium phosphate. The possibility of obtaining complex mixed fertilizers by adding appropriate amounts of phosphogypsum and glauconite—by-products of extraction phosphoric acid (EPA) production—to the activated phosphorite was investigated. The possibilities of granulating the obtained mass in the presence of water were also studied. Thus, the feasibility of producing complex mixed fertilizers based on phosphorites from the Khojakul deposit, as well as phosphogypsum and glauconite derived from EPA production, has been established.*

Keywords: *industrial waste—phosphogypsum, granular phosphorite flour of Karakalpakstan, glauconites, activation using nitric acid, granulation, complex mixed fertilizers.*

INTRODUCTION. Studies conducted by scientists show that one of the major environmental problems in many countries of the world is the increasing amount of large-tonnage industrial waste—phosphogypsum—generated by production enterprises. One of the modern approaches to solving this problem is the implementation of “green economy” and “circular economy” models, which make it possible to increase the efficiency of primary resource utilization and reduce negative environmental impacts [1].

According to researchers in our republic, for many years only one type of highly concentrated phosphorus-containing fertilizer—ammophos (10% N and 46% P_2O_5)—has been produced. However, its production has led to a serious drawback—the generation of large-tonnage waste in the form of phosphogypsum. In the process of obtaining 1 ton of P_2O_5 from extraction phosphoric acid, approximately 7 tons of phosphogypsum are formed. At the waste storage facilities of JSC "Ammofos-Maxam" in Almalyk, more than 76 million tons of this industrial waste have accumulated, occupying approximately 200 hectares of fertile land [2]. The utilization of this waste is an important task of national economic significance.

According to studies conducted by Allaniyazov D.O. and others, the presence of large reserves of glauconite-containing sands in the territory of Karakalpakstan, as well as their easy accessibility, creates favorable conditions for their use as raw materials in the production of local mineral fertilizers. The direct use of glauconitic sands as agronomic fertilizers, as well as the application of mixed fertilizers containing microelements produced on their basis, is of great socio-economic importance, especially for the Karakalpakstan region. The introduction of technologies for the extraction and beneficiation of glauconite, on the one hand, makes it possible to supply agriculture with complex fertilizers containing glauconite and phosphorites, and on the other hand, creates a technological basis for the exploration and development of local mineral resources, as well as for improving technologies for the production of new types of fertilizers [3].

The main factor for obtaining high and high-quality yields from agricultural crops is their adequate nutrition, primarily ensured by the supply of nitrogen, phosphorus, potassium, and calcium. One of the major problems of agriculture in the Republic of Uzbekistan is the shortage of phosphorus-containing fertilizers. For example, in 2019, chemical enterprises of Uzbekistan produced 898.3 thousand tons of nitrogen fertilizers, 119.4 thousand tons of phosphorus fertilizers, and 199.1 thousand tons of potassium fertilizers (calculated as 100% N, P_2O_5, and K_2O). However, the annual demand of agriculture amounts to 1,075.8 thousand tons of N, 759.3 thousand tons of P_2O_5, and 373.9 thousand tons of K_2O. Thus, the demand is

satisfied at the levels of 83.5%, 15.8%, and 53% for nitrogen, phosphorus, and potassium fertilizers, respectively [4].

According to sources, under conditions of a shortage of phosphorus fertilizers, the only solution is the processing and industrial implementation of low-grade local phosphorus raw materials. In Uzbekistan, a number of scientific studies are being conducted in this direction. In particular, since 2005, the technology for producing nitrophoska by processing low-grade Kyzylkum phosphorites with a low rate of nitric acid has been implemented at JSC "Samarkandkimyo" [5, 6]. In addition, several studies have been carried out on the production of simple superphosphate by processing Khojakul phosphorites using a low rate of sulfuric acid [7].

Based on the above, the task was set to conduct research on obtaining complex mixed fertilizers using industrial waste—phosphogypsum, phosphorites from the Khojakul deposit activated with HNO_3 (56%), and glauconite from the Krantau deposit. In our study, the process of obtaining complex mixed fertilizers was investigated by decomposing phosphate raw materials with an incomplete rate of nitric acid, followed by the addition of industrial waste from extraction phosphoric acid (EPA) production—phosphogypsum—and Krantau glauconite.

MATERIALS AND METHODS In this study, we aimed to obtain NPKCa-containing complex fertilizers based on the incomplete decomposition of phosphate raw materials and NPCa systems by applying a reduced rate of nitric acid. Phosphorite from the Khojakul deposit was activated with a low rate of HNO_3 (56%), after which phosphogypsum—an industrial waste from extraction phosphoric acid (EPA) production—and glauconite from the Krantau deposit were added to produce complex fertilizers.

The composition of the initial phosphate raw material (Khojakul deposit), wt.%: P_2O_5 – 10.45; CaO – 19.35; MgO – 0.30; CO_2 – 4.03; Fe_2O_3 – 3.50; Al_2O_3 – 1.54; SO_3 – 1.10; F – 1.58; SiO_2 – 28.0; insoluble residue – 1.64; H_2O – 2.62.

Krantau glauconite sands, wt.%: SiO_2 – 68.91; CaO – 1.15; P_2O_5 – 0.15; CO_2 – 0.41; Al_2O_3 – 8.95; Fe_2O_3 – 5.59; FeO – 1.15; MgO – 1.25; K_2O – 2.89; Na_2O – 1.71; SO_3 – 0.24; TiO_2 – 0.44; MnO – 0.04; ZnO – 0.011; H_2O – 2.29.

Phosphogypsum stored in the waste dumps of JSC "Ammofos-Maxam", wt.%: P_2O_5 – 1.15; SO_3 – 51.17; CaO – 36.84; Fe_2O_3 – 0.094; insoluble residue – 15.0.

The experiments were carried out as follows. A calculated amount of nitric acid with a concentration of 56% was gradually added to a glass thermostated beaker containing a weighed portion of phosphorite from the Khojakul deposit. Its rate was taken in the range of 5% to 50% of the stoichiometric norm required for the formation of monocalcium phosphate. The interaction time of the components in the reaction mass was 30 minutes.

After the decomposition of phosphorite with nitric acid, the required amounts of phosphogypsum and glauconite were added. As a result, a viscous mass was formed. Therefore, the necessary amount of water was added for the granulation process. The granulation and drying of the moist masses were carried out by intensive mixing and rolling methods.

The content of P_2O_5 and CaO in different forms in the products was determined using standard chemical analysis methods [8]. The plant-available forms of P_2O_5 and CaO were determined based on their solubility in citric acid. The pH value of the product was measured after shaking its 10% aqueous suspension for one hour. The strength of the granules was measured using an IPG-1 device in accordance with the requirements of GOST 21560.2–82.

RESULTS AND DISCUSSION The results show that with an increase in the nitric acid rate and the addition of the glauconite mineral, the total P_2O_5 content in the products decreases. Products obtained at 90% and 100% acid rates do not meet agricultural requirements in terms of free acidity. The composition of the products activated under calculated stoichiometric conditions (at 5–50% acid rate) is as follows (wt.%): total P_2O_5 – 3.53–6.8%; P_2O_5 available in citric acid – 46.03–46.68%; total CaO – 14.74–23.84%; available CaO – 53.97–92.26%. In this case, water-soluble P_2O_5 составляет 3.53–30.03%, while the water-soluble form of CaO is 26.72–68.18%. It can be observed that the granule strength increases from 1.83 to 3.79 MPa, which does not create difficulties during transportation in bags. The pH

value varies from 7.11 to 4.2 with increasing acid rate, which helps prevent rapid corrosion of equipment.

According to agrochemists and soil scientists, fertilizers are considered effective if the amount of plant-available P_2O_5 amounts to at least 50% of the total P_2O_5. In this study, 5–50% of nitric acid was used to activate the phosphorite. Based on this, the optimal rate of nitric acid for processing phosphorite flour is considered to be 20% (phosphorite flour 3.3 : HNO_3 (56%) 1 : phosphogypsum 3.3 : glauconite 3.3), since in this case the product composition is as follows: total P_2O_5 – 3.78%; P_2O_5 available in citric acid – 74.86%; total CaO – 16.33%; available CaO – 80.09%. In this case, water-soluble P_2O_5 amounts to 11.64%, while the water-soluble form of CaO is 53.52%. The granule strength is 2.58 MPa, which does not create difficulties during transportation in bags. The pH value is 5.27, which helps prevent rapid corrosion of equipment.

It should also be noted that glauconite added to the composition of mineral fertilizers contains essential microelements required for plant growth and additionally helps to neutralize the pH of fertilizers applied to acidic environments. Thus, the obtained complex fertilizers are fully suitable for application to the soil before autumn plowing as complex fertilizers. In addition, phosphogypsum—an industrial waste from extraction phosphoric acid production—was also included in the composition of the complex fertilizers. These materials can be used as ameliorants for saline soils.

CONCLUSIONS AND RECOMMENDATIONS.The results of laboratory experiments reliably confirm the fundamental possibility of obtaining complex mixed fertilizers with high granule strength by processing phosphorite flour from the Khojakul deposit with extraction phosphoric acid (EPA) and adding a mixture of phosphogypsum and glauconite. The technology for producing this type of fertilizer can be implemented on the basis of equipment used for the production of any type of phosphorus-containing fertilizers. From the above, it can be concluded that the additives used—phosphogypsum and glauconite—not only improve the physicochemical properties and ameliorative condition of the soil, but also enhance

the availability of P_2O_5 and CaO for plants, while significantly contributing to the neutralization of the fertilizer's pH. This, in turn, leads to a reduction in ammonia (NH_3) consumption and helps prevent long-term corrosion of equipment. The proposed method for obtaining a new type of complex fertilizers makes it possible to reduce the consumption of extraction phosphoric acid (EPA) in production. Most importantly, the production of complex mixed fertilizers creates opportunities for the utilization of industrial waste—phosphogypsum—as well as glauconite minerals. This contributes to reducing the accumulation of phosphogypsum waste and mitigating its negative environmental impact.

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DORIVOR SHAMBALILA O‘SIMLIGI URUG‘LARINING LABORATORYA SHAROITIDA SUV MEYORINI TAHLIL QILISH

Ko‘palova Muxlisa Rustam qizi

Toshkent kimyo-texnologiya instituti

kupalova22@gmai.com

Yuldashev Jo‘rabek Po‘lat o‘g‘li

Toshkent kimyo-texnologiya instituti

Annotatsiya. *Har bir o‘simlik urug‘ini unib chiqishi uchun talab qilinadigan suv meyyori urug‘ vazni va hajmidan kelib chiqib belgilanadi. Shundan kelib chiqqan xolda turlixil nisbatlarda namunalar tajribaga tayyorlandi va qo‘yildi. Qo‘yilgan tajriba malumotlardan kelib chiqqan xolda dorivor shambalila (Trigonella foenum graecum L.) o‘simligi urug‘lari unib chiqishi uchun talab qilinadigan suv miqdori tanlab olindi .Barcha nisbat va meyyorlar ush bu maqolada ko‘rsatib o‘tildi.*

Kalit so‘zlar*: petri idishi, shisha stakanchalar, avtoklavf, lamenar books, parafin, disterlangan suv, gipoxlorid.*

Abstract*. The amount of water required for the germination of each plant seed is determined based on the weight and size of the seed. As a result, samples in different proportions were prepared and put to the experiment. Based on the given experimental data, the amount of water required for the germination of medicinal shambalila (Trigonella foenum graecum L.) seeds was selected. All proportions and standards were shown in this article.*

Keywords*: petri dish, glass beakers, autoclave, laminar books, paraffin, distilled water, hypochlorite.*

Kirish. Trigonella foenum graecum, odatda feenugrek yoki pajitnik nomi bilan tanilgan, O‘rta yer dengizi mintaqasida tarqalgan bir yillik dukkakli o‘simlik bo‘lib, 60 sm gacha tekis o‘sishi, uch bargli barglari, oq gullari va 10-20 ta jigarrang rombsimon urug'larni o‘z ichiga olgan o‘roqsimon dukkaklilari bilan ajralib turadi. U ham oziq-ovqat, ham dorivor maqsadlarda ishlatiladi. [1]

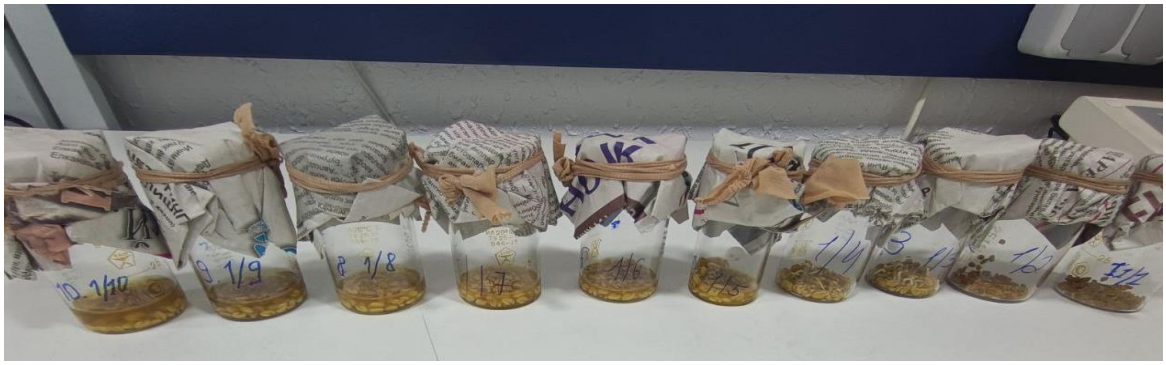
Trigonella foenum-graecum - Fabaceae oilasiga mansub muhim dorivor o‘simlik. U uzunligi 0,3–0,8 m (1–2 fut), tik, xushbo‘y, bir yillik o‘simlik. Uzun ingichka poyasi uch bargli, 20–25 mm uzunlikdagi, tishli, kulrang-yashil, obovatli barglarga ega. Uzun poyali barglar obovatlidan oblanceolategacha bo‘lgan varaqalar o‘z ichiga oladi. Gullari papilionasimon bo‘lib, oqdan sariq ranggacha

bo‘ladi. Ular yoz o‘rtalarida, ya'ni iyundan iyulgacha gullaydi. Qo‘ltiq osti, o‘tirgan, rasem gullari 10–15 sm uzunlikdagi, ingichka, ingichka, qilichsimon, sariqdan jigarranggacha bo‘lgan dukkakli, egri tumshug'imon uchli dukkaklilarni hosil qiladi. Har bir yetilgan dukkaklidan taxminan 10–20 ta jigarrang rangli, 5 mm uzunlikdagi, cho‘zinchoq yoki kvadrat shaklidagi qattiq urug'lar hosil bo‘ladi. Urug'lar katta iqtisodiy ahamiyatga ega va ziravor sifatida ishlatiladi [2]

Trigonella foenum graecumeng qadimgi dorivor va oshpazlik o‘simliklaridan biridir. Kimyoviy ma'lumotlar shuni ko‘rsatdiki, uning urug'lari tarkibida 45–60% uglevodlar, 20–30% lizin va triptofan oqsillari, 5–10% yog' (lipid), shilliq tolalar, trigonellin (0,20–0,38%), xolin (0,5%), 4-gidroksi-izoleysin (0,09%) kabi erkin aminokislotalar, arginin, gistidin va lizin, kaltsiy va temir, A1, B1, C vitaminlari va 0,015% uchuvchan yog'lar [3]. Bu o‘simliklar tarkibida 3–4% kul, 3–5% namlik, 25–30% oqsil, 7–9% lipidlar va 20–25% erimaydigan tola borligi ham xabar qilingan. Bundan tashqari, mineral tarkibini tahlil qilish shuni ko‘rsatdiki, chigitning umumiy kul miqdori 3,9 g/100 g, kaltsiy (70 mg), magniy (160 mg), temir (12,5 mg), mis (1,8 mg), rux (7,0 mg), marganets (1,0 mg) va fosfor (370 mg/100 g) Yuqori darajada to‘yinmagan chigit yog'i tarkibida atigi 15–19% to‘yingan yog 'kislotalari mavjud bo‘lib , ularda palmitin kislotasi asosiy hisoblanadi. Chuchuk yog'ida olein va erukin kislotalari bilan ifodalangan 18–27% monoto‘yinmagan kislotalar mavjud .[4]

Material va uslublar. *Trigonella foenum graecum L* ning urug‘lari ajratib olindi. Urug‘ (bir gr) va disterlangan suv (bir ml) bilan 1:1 nisbatda, 1:2 nisbatda, 1:3 nisbatda, 1:4 nisbatda, 1:5 nisbatda, 1:6 nisbatda, 1:7 nisbatda, 1:8 nisbatda, 1:9 nisbatda, 1:10 nisbatda tayyorlandi.

Tadqiqot natijalari: Olib borilgan tajribada shambalila *(Trigonella foenum graecum L*) namunasini tayyorlashda 2024-yil terib olingan urug‘laridan foydalanildi. Urug‘lar dastlab ko‘zdan kechirildi, tajribaga yaroqlilari ajratib olinib, begona o‘tlar va sifatsiz urug‘lardan tozalandi. Laboratoriya sharoitida urug‘lar grammlarga taqsimlandi, so‘ngra asbob uskunalar avtoklavfda, urug‘lar



esa gipoxlaridli eritmada (0.1%) bakteriya va zamburug‘lardan tozalandi.

1-rasm

Tayyorlangan urug‘lar bir millilitr distillangan suvga (H_2O) solingan yani 1gr:1ml nisbatda. Tajriba 1:1 nisbat, 1:2 nisbat, 1:3 nisbat, 1:4 nisbat, 1:5 nisbat, 1:6 nisbat, 1:7 nisbat, 1:8 nisbat, 1:9 nisbat, 1:10 nisbatda olib borildi. (1- rasm)

Urug‘lar 24 soat mobaynida suvni shimib namlik to‘pladi va urug‘lar murtak yorib chiqishga tayyorgarlik ko‘rdi. Birinchi murtaklar 48 soat ichida ko‘rinada , to‘liq yorilish jarayoni uchun yana 12 soat kerak bo‘ladi. So‘ngra faqat namlik yuqori bo‘lgan idishlardagina to‘liq nish urish amalga oshadi.

Olingan natijalar tahlili shuni ko‘rsatadi.

1:1 va 1:2 nisbatda qo‘yilgan tajriba nanunasiga namlik yetmaganligi sababli, urug‘lar deyarli nish urmadi va 2 kun ichida nobut bo‘lish darajasiga yetdi.(2-rasm) 1:1 nisbatdaki idishdagi urug‘larda nish urish jarayoni kuzatilmadi. 1:2 nisbatda esa 2% i nish urganligi ko‘rildi.



2-rasm

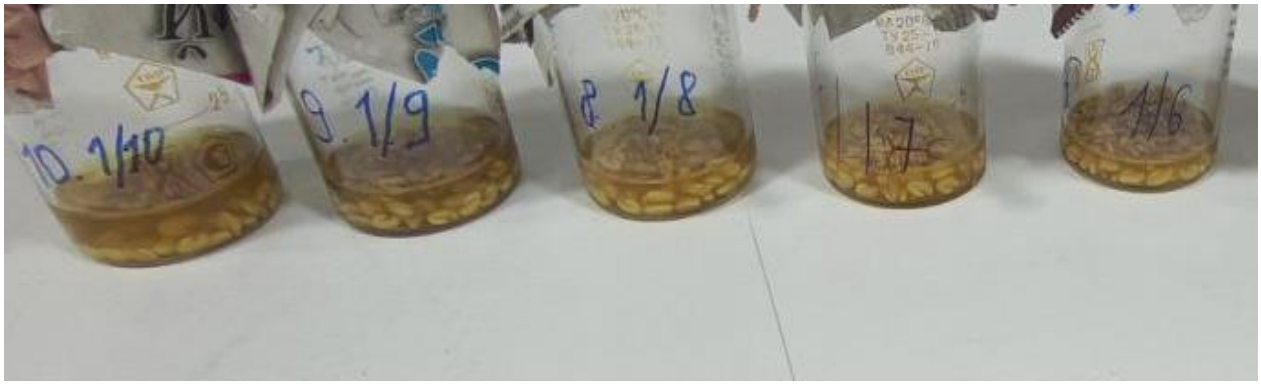
1:3 va 1:4, 1:5 nisbatdagi namunalardagi urug‘lar namnik meyyori yetarli bo‘liganligi tufayli yaxshi nish urdi.1:3 va 1:4 nisbatdagi namuna boshqa namunalarga qaragand ko‘proqva sifatliroq nish urgani ko‘rildi. Ushbu ishishda ungan urug‘lar 70-80% ni tshkil qildi. 1:5 nisbatda esa 50% ni tashkil qildi.

(3-rasm)



3-rasm

1:6, 1:7, 1:8, 1:9, 1:10 nisbatdaki numunalar uchun suv meyyori haddan ortiqligi sababli urug‘lar bo‘kib qoldi va nish urish jarayoni kuzatilmadi. (4-rasm)



4-rasm

1:6 va 1:7 nisbatdaki idishlarda ungan urug‘lar 10-15% ni tashkil qildi. Qolgan 1:8, 1:9, va 1:10 nisbatda urug‘lar unishi kuzatilmadi.

Xulosa

Xulosa qilib aytganda, labaratoriya sharaoitida Dorivor shambalila (*Trigonella foenum graecum L*)ni urug‘larini unuvchanlik va namlik meyyori bo‘yicha tajribalar olib borildi.Yuqoridaki ma’lumotlardan ko‘rinib turibdiki, Shambalila urug‘lari uchun 1:3 va 1:4 nisbat eng maqbul meyyor ekanligi ko‘rildi.

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CTS-19 KUKUNI ASOSIDAGI KOMPOZITSION POLIMER PIEZOELEMENTLARNING ELEKTROFIZIK XOSSALARINI TADQIQ QILISH

Komilov Sherzod Xoshimovich
Mirzaraximov Sardor Xabibulla o‘g‘li
Mirzo Ulug’bek nomidagi O’zbekiston Milliy universiteti,
sardorozmumagistr@gmail.com

Annotatsiya: *Mazkur ishda kompozitsion polimer piezoelementlarning elektrofizik xossalari tadqiq etilgan. Tadqiqot obyekti sifatida segnetokeramika asosidagi* ***CTS-19 kukuni*** *tanlangan bo‘lib, uning bosimga bog‘liq elektr o‘tkazuvchanligi va dielektrik xossalari o‘rganildi. Tajribalar davomida kukunsimon namunalar turli bosim qiymatlarida siqilib, ularning elektr o‘tkazuvchanlik koeffitsiyenti hamda dielektrik doimiysi o‘lchandi. Olingan natijalar bosim ortishi bilan material zarrachalari orasidagi kontaktlarning kuchayishi natijasida elektr o‘tkazuvchanlik va dielektrik doimiysi ortishini ko‘rsatdi. Shuningdek, kompozitsion tizimlarda zarrachalararo o‘zaro ta’sirlar va tunnellash mexanizmlari elektrofizik parametrlarning o‘zgarishiga sezilarli ta’sir ko‘rsatishi aniqlandi. Tadqiqot natijalari kompozitsion polimer piezoelementlarning fizik xossalarini chuqurroq tushunish hamda ularni sensorlar, aktuatorlar va zamonaviy elektron qurilmalarda qo‘llash imkoniyatlarini kengaytirishga xizmat qiladi.*

Kalit so‘zlar: *kompozitsion polimer, piezoelement, CTS-19 kukuni, elektrofizik xossalar, elektr o‘tkazuvchanlik, dielektrik doimiy, bosimga bog‘liqlik.*

Abstract: In this work, the electrophysical properties of composite polymer piezoelements are investigated. The ferroelectric ceramic powder CTS-19 was chosen as the object of study, and its electrical conductivity and dielectric properties depending on pressure were examined. During the experiments, powder samples

were compressed under different pressure values and their electrical conductivity coefficient as well as dielectric constant were measured. The obtained results show that with increasing pressure the electrical conductivity and dielectric constant increase due to the strengthening of contacts between the material particles. It was also determined that interparticle interactions and tunneling mechanisms in composite systems significantly affect the variation of electrophysical parameters. The results of this study contribute to a deeper understanding of the physical properties of composite polymer piezoelements and expand the possibilities of their application in sensors, actuators, and modern electronic devices.

Keywords: *composite polymer, piezoelement, CTS-19 powder, electrophysical properties, electrical conductivity, dielectric constant, pressure dependence*

Hozirgi kunda piezoelektrik materiallar ilm-fan va texnologiyaning turli sohalarida keng qo‘llanilmoqda. Ayniqsa, piezoelektrik xossalarga ega bo‘lgan kompozitsion polimer materiallar sensorlar, aktuatorlar, energiya yig‘uvchi qurilmalar hamda mikroelektronika tizimlarida muhim ahamiyat kasb etadi. Bunday materiallarning afzalligi ularning nisbatan yengilligi, elastikligi, ishlab chiqarish texnologiyasining soddaligi va mexanik ta’sirlarga yaxshi moslashuvchanligidadir. Shu sababli so‘nggi yillarda kompozitsion polimer piezoelementlarning elektrofizik xossalarini chuqur o‘rganishga bo‘lgan qiziqish sezilarli darajada ortib bormoqda.

Kompozitsion piezoelektrik materiallar odatda polimer matritsa va piezoaktiv keramika zarrachalaridan tashkil topadi. Bunday tizimlarda materialning umumiy elektrofizik xossalari nafaqat komponentlarning individual xususiyatlariga, balki ularning o‘zaro ta’siriga, zarrachalar o‘lchamiga, konsentratsiyasiga hamda tashqi omillarga ham bog‘liq bo‘ladi. Ayniqsa, mexanik bosim ta’siri ostida zarrachalar orasidagi kontaktlarning o‘zgarishi kompozitsion tizimning elektr o‘tkazuvchanligi va dielektrik xossalariga sezilarli ta’sir ko‘rsatishi mumkin.[1]

Segnetokeramik materiallar orasida qo‘rg‘oshin-tsirkonat-titanat (PZT) asosidagi keramika, xususan **CTS-19** materiallari yuqori piezoelektrik koeffitsiyentlari va yaxshi dielektrik xossalari bilan ajralib turadi. Shu sababli ular

turli piezoelektrik qurilmalar ishlab chiqarishda keng qo‘llaniladi. Biroq kukunsimon holatdagi CTS-19 materiallarining elektrofizik xossalarini, ayniqsa bosimga bog‘liq holda o‘rganish kompozitsion tizimlarning ishlash mexanizmlarini tushunishda muhim ahamiyatga ega.

Mazkur ishda CTS-19 segnetokeramik kukunlari asosida kompozitsion tizimlarning elektrofizik xossalari tadqiq qilindi. Tadqiqot davomida kukunsimon namunalar turli bosim qiymatlarida siqilib, ularning elektr o‘tkazuvchanligi va dielektrik doimiysining bosimga bog‘liqligi o‘rganildi. Olingan natijalar kompozitsion polimer piezoelementlarning ishlash mexanizmlarini tushunishga hamda ularning amaliy qo‘llanilish imkoniyatlarini kengaytirishga xizmat qiladi.[2]

Kompozitsion polimer piezoelementlarning elektrofizik xossalarini o‘rganish jarayonida segnetokeramik material asosidagi **CTS-19 kukuni** namunalarining elektr o‘tkazuvchanligi va dielektrik xossalarining bosimga bog‘liqligi tadqiq qilindi. Tadqiqot jarayonida kukunsimon namunalar maxsus press qurilmasi yordamida turli bosim qiymatlarida siqildi va ularning elektr parametrlari o‘lchandi.

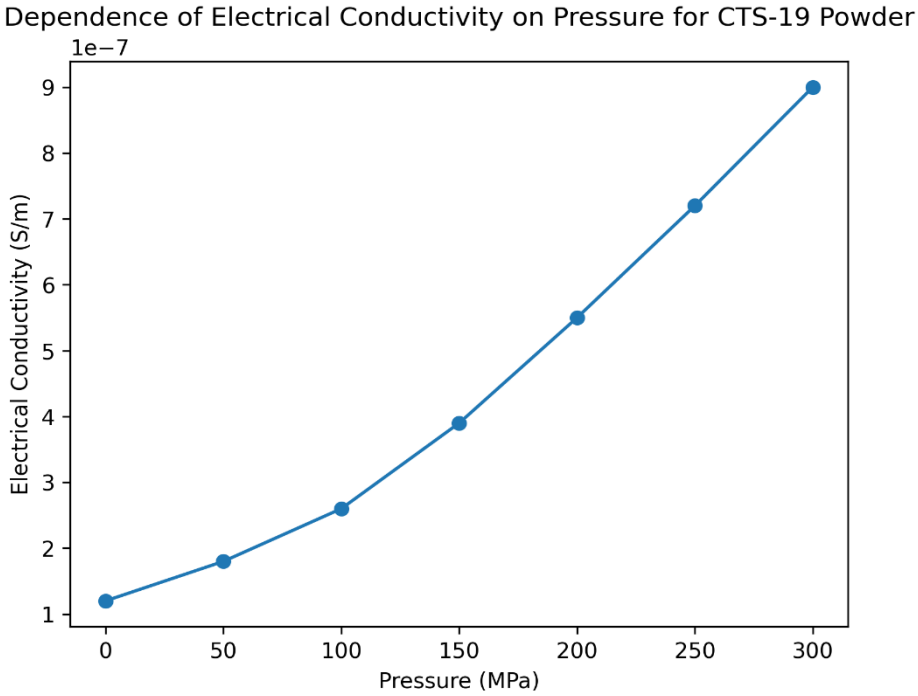
Tadqiqot jarayonida kukunsimon namunalar maxsus press qurilmasi yordamida turli bosim qiymatlarida siqildi. Bosim qiymatlari oshirilgan sari kukun zarrachalari orasidagi masofa kamayib, ularning o‘zaro mexanik kontakti kuchayadi. Natijada material ichida elektr zaryad tashuvchilarining harakatlanishi uchun qulay sharoit hosil bo‘ladi. Bu esa kompozitsion tizimning elektr o‘tkazuvchanligining oshishiga olib keladi.[3]

Elektr o‘tkazuvchanlikning bosimga bog‘liqligini o‘rganish natijalari shuni ko‘rsatadiki, past bosim qiymatlarida zarrachalar orasidagi kontaktlar yetarlicha shakllanmagan bo‘lib, elektr o‘tkazuvchanlik qiymati nisbatan kichik bo‘ladi. Bosim ortishi bilan zarrachalar orasidagi masofa qisqaradi va ular orasida qo‘shimcha kontaktlar hosil bo‘ladi. Shu bilan birga zarrachalararo **tunnellash mexanizmi** ham kuchayadi. Natijada elektr zaryad tashuvchilarining harakatlanish ehtimoli ortadi va materialning elektr o‘tkazuvchanligi sezilarli darajada oshadi.

Tajriba natijalariga ko‘ra, bosim ortishi bilan CTS-19 kukunining elektr o‘tkazuvchanligi deyarli eksponensial qonuniyat asosida oshib borishi kuzatildi. Bu

holat zarrachalar orasidagi kontaktlarning ko‘payishi hamda elektr o‘tkazuvchan kanallarning hosil bo‘lishi bilan izohlanadi. Shuningdek, zarrachalar orasidagi masofa juda kichik bo‘lgan hollarda kvant mexanik tunnellash effekti ham elektr o‘tkazuvchanlikning ortishiga sezilarli ta’sir ko‘rsatadi.[4] 1-rasm

Bosimning ortishi kukun zarrachalari orasidagi masofaning kamayishiga olib keladi. Natijada zarrachalar orasidagi kontaktlar soni ortib, elektr zaryad tashuvchilarining harakatlanishi uchun qulay sharoit yuzaga keladi. Shu sababli materialning elektr o‘tkazuvchanligi bosim ortishi bilan sezilarli darajada oshadi.[5]



1-rasmda CTS-19 kukuni uchun elektr o‘tkazuvchanlikning bosimga bog‘liqligi keltirilgan. Grafikdan ko‘rinib turibdiki, bosim oshishi bilan elektr o‘tkazuvchanlik qiymati muntazam ravishda ortib boradi.

Tadqiqot davomida materialning **dielektrik doimiysi** ham bosimga bog‘liq holda o‘rganildi. Dielektrik doimiysi materialning tashqi elektr maydonga javob reaksiyasini tavsiflovchi muhim parametr hisoblanadi. Bosim ortishi natijasida

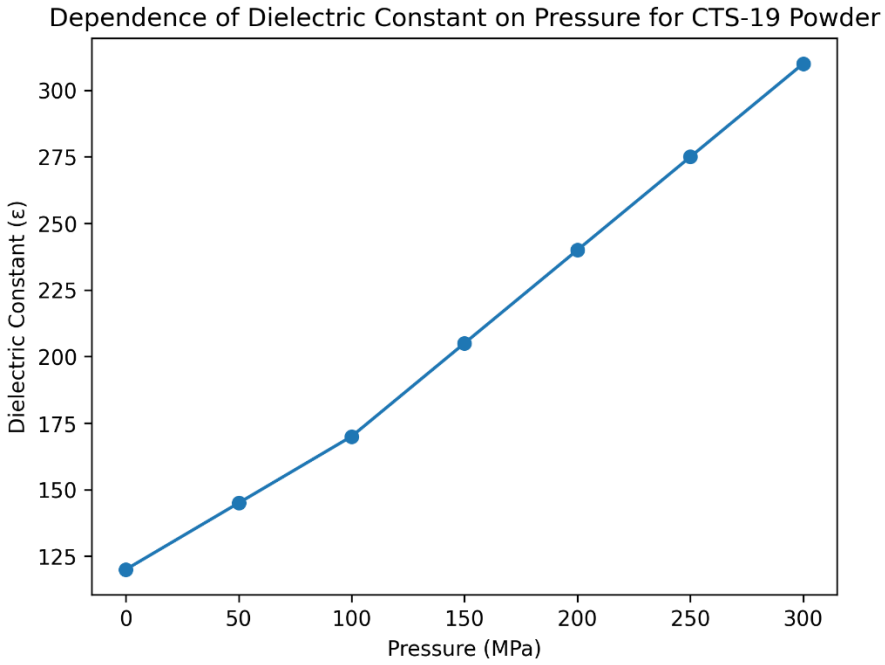
zarrachalar orasidagi masofa kamayib, dipol momentlarning o‘zaro ta’siri kuchayadi. Natijada material ichidagi qutblanish jarayoni intensivlashadi va dielektrik doimiysi qiymati ortadi.[6]

Dielektrik doimiyning bosimga bog‘liqligini tahlil qilish natijasida shuni ko‘rish mumkinki, past bosimlarda dielektrik doimiysi nisbatan kichik qiymatlarga ega bo‘ladi. Bosim ortib borishi bilan zarrachalar orasidagi kontaktlarning ortishi natijasida qutblanish jarayoni kuchayadi va dielektrik doimiysi qiymati ham oshib boradi. Bu holat kompozitsion tizimlarda dipol momentlarning tartiblanishi bilan bog‘liq bo‘lib, materialning umumiy elektrofizik xossalariga sezilarli ta’sir ko‘rsatadi.[7]

Shuningdek, tajriba natijalari CTS-19 kukuni asosidagi kompozitsion tizimlarda elektrofizik xossalar mexanik bosimga juda sezgir ekanligini ko‘rsatdi. Bu esa bunday materiallardan turli xil **bosim sensorlari, piezoelektrik datchiklar, aktuatorlar hamda energiya yig‘uvchi qurilmalar** ishlab chiqarishda samarali foydalanish mumkinligini anglatadi.[8]

Olingan natijalar shuni ko‘rsatadiki, CTS-19 kukuni asosidagi kompozitsion materiallarning elektr o‘tkazuvchanligi va dielektrik xossalari bosim ortishi bilan sezilarli darajada o‘zgaradi. Bu esa kompozitsion piezoelektrik materiallarning elektrofizik xossalarini boshqarish va ularni turli texnik qurilmalarda qo‘llash imkoniyatlarini kengaytiradi.

Mazkur tadqiqot ishida segnetokeramik material asosidagi **CTS-19 kukuni** namunalarining elektrofizik xossalari bosimga bog‘liq holda o‘rganildi. Tajriba jarayonida kukunsimon namunalar turli bosim qiymatlarida siqilib, ularning elektr o‘tkazuvchanligi hamda dielektrik doimiysi o‘lchandi va olingan natijalar tahlil qilindi.2-rasm



2-rasmda CTS-19 kukuni uchun dielektrik doimiyning bosimga bog‘liqligi keltirilgan. Grafikdan ko‘rinadiki, bosim ortishi bilan dielektrik doimiysi ham ortib boradi.

O‘tkazilgan tadqiqotlar natijasida mexanik bosimning ortishi bilan kukun zarrachalari orasidagi masofa kamayishi va ular orasidagi mexanik hamda elektr kontaktlar sonining ortishi aniqlandi. Zarrachalar orasidagi kontaktlarning kuchayishi elektr zaryad tashuvchilarining harakatlanishiga qulay sharoit yaratadi. Natijada materialning elektr o‘tkazuvchanligi sezilarli darajada ortadi. Shu bilan birga, zarrachalar orasidagi o‘zaro ta’sirning kuchayishi va dipol momentlarning tartiblanishi natijasida materialning qutblanish qobiliyati ortadi hamda dielektrik doimiysi qiymati ham oshib boradi.[9]

Tadqiqot natijalari shuni ko‘rsatdiki, CTS-19 kukuni asosidagi kompozitsion tizimlarda elektrofizik xossalarning bosimga bog‘liqligi muhim ahamiyatga ega. Bosim ortishi bilan materialning elektr o‘tkazuvchanligi hamda dielektrik xossalarining oshishi zarrachalararo kontaktlarning kuchayishi, elektr o‘tkazuvchan kanallarning hosil bo‘lishi hamda tunnellash mexanizmining faollashishi bilan izohlanadi. Bu esa kompozitsion materiallarning elektr va piezoelektrik xossalarini boshqarish imkonini beradi.[10]

Shuningdek, olingan natijalar CTS-19 kukuni asosidagi kompozitsion materiallarning mexanik ta’sirlarga yuqori sezgirlikka ega ekanligini ko‘rsatadi. Bu xususiyat bunday materiallardan turli xil texnik qurilmalar, jumladan bosim datchiklari, piezoelektrik sensorlar, aktuatorlar hamda energiya yig‘uvchi qurilmalar ishlab chiqarishda samarali foydalanish imkoniyatini yaratadi. Bunday qurilmalar zamonaviy elektronika, avtomatika va tibbiy texnika sohalarida keng qo‘llanilishi mumkin.

O‘tkazilgan tadqiqotlar natijalari kompozitsion polimer piezoelementlarning elektrofizik xossalarini chuqurroq tushunishga yordam beradi hamda ularni amaliy qurilmalarda qo‘llash imkoniyatlarini kengaytiradi. Shu bilan birga, kelgusida CTS-19 kukuni asosidagi kompozitsion tizimlarning piezoelektrik koeffitsiyenti, chastotaga bog‘liq dielektrik xossalari hamda harorat ta’siridagi elektrofizik xususiyatlarini o‘rganish ushbu yo‘nalishdagi tadqiqotlarni yanada rivojlantirishga xizmat qiladi.

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2-(3-OKSO-3,4-DIGIDRO-2H-BENZO[b][1,4]TIAZIN-2-IL) SIRKA KISLOTASINING INFRAQIZIL SPEKTRLARINI NOEMPIRIK USULDA HISOBLASH VA TAQQOSLASH

Komilova Ch.S.
Shokirov M.T.
Sayfiyev M.N.
Ziyayev D.A.
O‘zbekiston Milliy universiteti
ckomilova381@gmail.com

Annotatsiya. *Ushbu tadqiqotda 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislotasining infraqizil spektrlarini noemperik usulning Hartee-Fock metodi orqali olingan natijalarni amalda olingan infraqizil spektriga solishtirish hamda tahlil qilish natijalari keltirilgan. Navoiy viloyati sanoat zonasi yaqinidagi tuproq namunalarini elektrokimyoviy usulda tahlil qilish*

uchun 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislotasidan reagent sifatida foydalanishni ma'qul deb topildi va shu reagentdan foydalanish maqsad qilindi. Bu reagentning infraqizil spektrlarini Chem Office dasturida o'rganildi, noempirik usulda hisoblandi va amaliy olingan infraqizil spektri bilan taqqoslandi. Amalda olingan infraqizil spektrimizda turli funksianal guruhlar turli sohalarda chiqishini ko'rdik ya'ni 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislotasida 3203 sm^{-1} sohada N-H bog'i, 1333 sm^{-1} sohada C-N bog'i, 1288 sm^{-1} sohada C-O bog'i, C-S bog'I 782 sm^{-1} sohada signal berdi. Bu ishimizdan maqsad 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislotasining Chem Office dasturidan olingan infraqizil spektrini amalda olingan infraqizil spektri bilan solishtirish va amaldagiga yaqin bo'lgan metodini tanlab olish. Ushbu tanlab olingan metod orqali 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislotasi bilan tuproq namunalari tarkibidagi og'ir metallarni aniqlash uchun qo'llashni maqsad qildik.

Kalit so'zlar: *2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislotasi, infraqizil spektr, noemperik usul, Hartee-Fock, sanoat zonasi, tuproq, Chem Office.*

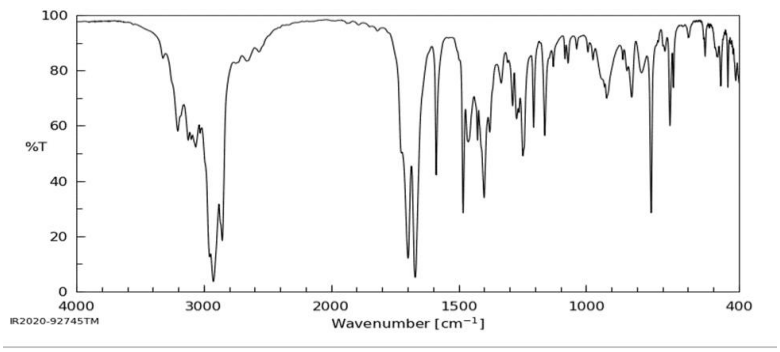
Annotation. *This study presents the results of comparing and analyzing the infrared (IR) spectra of 2-(3-oxo-3,4-dihydro-2H-benzo[b][1,4]thiazin-2-yl)acetic acid obtained using the non-empirical Hartree–Fock method with experimentally obtained infrared spectra. It was considered appropriate to use 2-(3-oxo-3,4-dihydro-2H-benzo[b][1,4]thiazin-2-yl)acetic acid as a reagent for the electrochemical analysis of soil samples collected near the industrial zone of Navoi region, and the use of this reagent was therefore selected as the objective. The infrared spectra of this reagent were studied using the ChemOffice software, calculated by a non-empirical method, and compared with the experimentally obtained infrared spectrum. In the experimentally obtained infrared spectrum, it was observed that different functional groups appeared in different regions. Specifically, for 2-(3-oxo-3,4-dihydro-2H-benzo[b][1,4]thiazin-2-yl)acetic acid, the N–H bond showed a signal at 3203 cm^{-1}, the C–N bond at 1333 cm^{-1}, the C–O bond at 1288*

cm^{-1}, and the C–S bond at 782 cm^{-1}. The aim of this work is to compare the infrared spectrum of 2-(3-oxo-3,4-dihydro-2H-benzo[b][1,4]thiazin-2-yl)acetic acid obtained using ChemOffice software with the experimentally obtained infrared spectrum, and to select the method that most closely matches the experimental results. Using the selected method, it was intended to apply 2-(3-oxo-3,4-dihydro-2H-benzo[b][1,4]thiazin-2-yl)acetic acid for the determination of heavy metals in the composition of soil samples.

Keywords: *2-(3-oxo-3,4-dihydro-2H-benzo[b][1,4]thiazin-2-yl)acetic acid, infrared spectrum, non-empirical method, Hartree–Fock, industrial zone, soil, ChemOffice.*

Kirish. Bugungi kunda dala ichidagi tuproq spektroskopiyasi tuproqni tezkor tahlil qilish uchun istiqbolli imkoniyat bo‘lib, bitta tuproq namunasini ifodalovchi bitta spektral o‘qishdan bir nechta tuproq xususiyatlarini bashorat qilish imkonini beradi. Ushbu sharh yaqin infraqizil (Vis-NIR) spektroskopiyasiga (350–2500 nm) qaratilgan bo‘lib, u tuproqlarni to‘g‘ridan-to‘g‘ri dala sharoitida proksimal sensor orqali tahlil qilishga qaratilgan.[2] Klassik tuproq tahlili ko‘p vaqt talab qiladigan va qimmat bo‘lganligi sababli, tuproq xususiyatlarini bashorat qilish uchun ko‘rinadigan, yaqin infraqizil va qisqa to‘lqinli infraqizil (Vis-NIR-SWIR, to‘lqin uzunligi 350-2500 nm) spektroskopiyasiga talab ortib bormoqda. Ushbu tadqiqotning maqsadi tuproq bog‘lamlarining asosiy tuproq xususiyatlariga ta’sirini o ‘rganish [3] Yuqoridagi tadqiqotlarni amalga oshirish uchun 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota reagentidan foydalaniladi. Yana 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota va uning hosilalari kompleks hosil qiluvchi reagentlar sifatida va tuproqdagi og‘ir metallarni(Cu, Pb, Zn, Co, Ni) spektrofotometrik aniqlashda ham ishlatiladi.

Olingan natijalar tahlili: 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota molekulasining amalda olingan IQ spektri bilan Chem Office dasturi yordamida olingan nazariy hisoblashlar orqali hisoblangan natijalar solishtirib ko‘rildi.



1-rasm. 2-(3-okso-3,4-digidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota molekulasining amalda olingan IQ spektri.

Chem Office dasturidagi HF usullarida hisoblangan natijalar ko'rib chiqilganda, ba'zi usullarda chetlanishlar, tebranish signallarining chiqish sohalari farqli ekanligini ko'rishimiz mumkin.

№	Bog'lar	Amaldagi	STO-2G	STO-3G	STO-4G	STO-5G	STO-6G	3-21G	6-21G	4-31G	6-31G	**6-311G**
1	C-H(sp^3)	2925	3532	3385	3346	3345	3499	2983	2977	2972	2940	**2948**
2	C-H(sp^2)	3063	3702	3573	3535	3533	3534	3064	3088	3065	3085	**3047**
3	C-N	1333	1334	1341	1343	1342	1341	1327	1328	1345	1354	**1342**
4	C-S	782	765	795	794	793	793	785	781	776	779	**768**
5	N-H	3203	4694	4465	4392	4401	4398	3842	3825	3756	3769	**3746**

6	C=O	1699	1717	1713	1717	1716	1715	1715	1718	1694	1700	**1682**
7	C-O	1288	1293	1297	1294	1275	1274	1255	1261	1291	1268	**1252**
8	Ar	1482	1506	1510	1513	1516	1515	1506	1506	1519	1522	**1525**

1-jadval. 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota molekulasining amalda olingan IQ spektri bilan Chem Office dasturining HF usulida nazariy hisoblangan IQ spektr siganllarining solishtirilgan tahlil natijasi.

№	Bog‘lar	Amaldagi	6-311G
1	C-H(sp^3)	2925	2948
2	C-H(sp^2)	3063	3047
3	C-N	1333	1342
4	C-S	782	768
5	N-H	3203	3746
6	C=O	1699	1682
7	C-O	1288	1252
8	Ar(-C=C-)	1482	1525

2-jadval. 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota molekulasining amalda olingan IQ spektri, Chem Office dasturining HF usuli usuli bo‘yicha nazariy hisoblangan IQ spektri, Hyuperchem dasturining RM1 usuli bo‘yicha nazariy hisoblangan signallarning solishtirilgan tahlil natijalari.

Tajriba qism: Dastlab Chemdrawda modda chizib oldik va Structure bo‘limidagi “Clean up Structure” ni tanlab chizgan moddani strukturasini to‘g‘irlab oldindi. Moddani belgilab, EDIT bo‘limidan “Get 3D Model” tanlab moddani 3D xolatga aylantirildi va ikki marta ustiga bosish orqali Chem3D ultraga o‘tkazildi.

Chem3D ultrada “MM2” bosib moddani optimizatsiya qilindi. Undan so‘ng Calculation bo‘limidan “Gamess interface” qismidan “Predict IR/Raman spectrum” ni bosib HF metodining STO-2G/sm^{-1} dan 6-3111G/sm^{-1} gacha bo‘lgan noempirik usullarini ketma-ketlikda tanlab, natijalari yig‘ildi va amalda olingan IQ spektri bilan solishtirib chiqildi va xulosa chiqarildi.

Xulosa. ChemOffice dasturida olingan IQ spektrlaridagi signallar bilan amalda olingan spektrdagi signallar orasida farqlar talaygina. Ko‘rishimiz mumkunki Chem Office dasturida hisoblangan natijalarda ba’zi signallarning chiqish sohalarida chetlanishlar mavjud. Ayrim bog‘larning chiqish sohalarida esa umuman signal yo‘q. Aniqlik darajasini solishtirish uchun HF hisoblash usuliga tayandik. Har birini chiqish sohalarining oraliqlaridagi intensivligi yuqori bo‘lgan spektrlarni yozib chiqildi, va real natijalarga taqqoslab shuni xulosa qilolamizki, noemperik usullardan HF orasida 6-311G/sm^{-1} usuli real natijaga yaqin bo‘ldi. Amalga oshirilgan hisoblash usullari orasida eng optimal usul sifatida HF 6-311G/sm^{-1} usuli tanlandi. Chunki ushbu usulda IQ spektri natijasi kam vaqt ichida hisoblandi. Bunga ko‘ra tuproq tarkibidagi ogir metall ionlarini 2-(3-okso-3,4-dihidro-2H-benzo[b][1,4]tiazin-2-il) sirka kislota reagenti bilan aniqlashda avfzal deb topdik.

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KUNGABOQAR QOBIG‘I BIOMASSA CHIQINDISIDAN OLINGAN FAOLLASHTIRILGAN KO‘MIRNING STRUKTURAVIY VA MORFOLOGIK XOSSALARINI TADQIQ QILISH

Maratov Nursultan Kayrat uli
O‘zR FA Umumiy va noorganik kimyo instituti
Email: maratovn698@gmail.com
Rahmonaliyeva Nilufar Nodirjon qizi
O‘zR FA Umumiy va noorganik kimyo instituti
Email: nilufarrahmonaliyeva1996@gmail.com
Abdikamalova Aziza Baxtiyarovna k.f.d., prof.
O‘zR FA Umumiy va noorganik kimyo instituti
aziza.abdik@gmail.com

Annotatsiya: *Ushbu tadqiqotda kungaboqar qobig‘i asosida faollashtirilgan uglerod adsorbent tayyorlash va uning fizik-kimyoviy xossalari o‘rganildi. Xomashyo 500 °C da inert muhitda karbonizatsiya qilinib, 20 % KOH yordamida kimyoviy faollashtirildi. Olingan materiallarning strukturaviy holati rentgen difraksiyasi (XRD) hamda sirt morfologiyasi skanerlovchi elektron mikroskopiya (SEM) usullari yordamida tahlil qilindi. Natijalar amorf uglerod tuzilmasining ustunligi va kimyoviy faollashtirish natijasida rivojlangan g‘ovakli struktura hosil bo‘lishini ko‘rsatdi. Tadqiqot kungaboqar qobig‘i asosida samarali adsorbent materiallar olish mumkinligini tasdiqladi.*

Kalit so‘zlar: *kungaboqar qobig‘i, adsorbent, faollashtirilgan ko‘mir, kimyoviy faollashtirish, KOH, karbonizatsiya, g‘ovakli uglerod, XRD, SEM.*

Abstract. *In this study, the preparation of a carbon adsorbent based on sunflower husk and its physicochemical properties were investigated. The raw material was carbonized at 500 °C in an inert atmosphere and subsequently chemically activated using a 20 % KOH solution. The structural characteristics of the obtained materials were determined by X-ray diffraction (XRD), and the surface morphology was examined using scanning electron microscopy (SEM). The results revealed the predominance of an amorphous carbon structure and the formation of a well-developed porous structure after chemical activation. The study confirms the potential of sunflower husk as a promising precursor for the production of efficient adsorbent materials.*

Keywords: *sunflower husk, adsorbent, activated carbon, chemical activation, KOH, carbonization, porous carbon, XRD, SEM.*

Аннотация: *В данном исследовании было изучено получение адсорбента на основе активированного углерода из шелухи подсолнечника, а также его физико-химические свойства. Исходное сырьё подвергалось карбонизации при температуре 500 °C в инертной среде и химической активации с использованием 20 % KOH. Структурное состояние полученных материалов анализировалось методом рентгеновской дифракции (XRD), а морфология поверхности — с помощью сканирующей электронной микроскопии (SEM). Результаты показали преобладание аморфной углеродной структуры и формирование развитой пористой структуры в результате химической активации. Исследование подтвердило возможность получения эффективных адсорбционных материалов на основе шелухи подсолнечника.*

Ключевые слова: *шелуха подсолнечника, адсорбент, активированный уголь, химическая активация, KOH, карбонизация, пористый углерод, XRD, SEM.*

1. Kirish

So‘nggi yillarda qishloq xo‘jaligi chiqindilaridan foydali materiallar olishga bo‘lgan qiziqish ekologik muammolarni kamaytirish hamda arzon xomashyo manbalaridan samarali foydalanish zarurati bilan bog‘liq holda ortib bormoqda [1]. Kungaboqar qobig‘i o‘simlik yog‘i ishlab chiqarish jarayonida katta miqdorda hosil bo‘ladigan va ko‘pincha utilizatsiya qilinmaydigan qishloq xo‘jaligi chiqindilaridan biri hisoblanadi [2].

Kungaboqar qobig‘i tarkibida uglerod, sellyuloza, gemitsellyuloza va lignin kabi komponentlarning mavjudligi uni uglerodli materiallar va adsorbentlar tayyorlash uchun qulay biomassa manbaiga aylantiradi [3]. Ushbu biomassa arzon, keng tarqalgan va qayta tiklanuvchi bo‘lib, undan tayyorlangan adsorbentlar an’anaviy faollashtirilgan ko‘mirlarga nisbatan iqtisodiy jihatdan samarali hisoblanadi [4]. Bunday materiallar suv va oqova suvlarni tozalash, bo‘yoqlar hamda og‘ir metall ionlarini adsorbsiya qilish jarayonlarida keng qo‘llaniladi.

Adsorbentlarning samaradorligi ularning yuzaki maydoni, g‘ovak tuzilmasi hamda uglerod strukturasiga bog‘liq [5]. Yuqori adsorbsiya qobiliyatiga ega uglerodli materiallar odatda rivojlangan mikro va mezog‘ovak tuzilishga ega bo‘ladi. Shu sababli adsorbentlarning morfologik va strukturaviy xususiyatlarini zamonaviy tahlil usullari yordamida o‘rganish muhim ahamiyatga ega.

Mazkur tadqiqotning maqsadi kungaboqar qobig‘idan uglerodli adsorbent olish hamda uning fizik-kimyoviy xossalarini XRD va SEM tahlillari yordamida o‘rganishdan iborat.

Asosiy qism

2. Materiallar va metodlar

2.1. Materiallar

Tadqiqotda xomashyo sifatida O‘zbekiston yog‘-moy sanoati korxonalarida hosil bo‘ladigan kungaboqar qobig‘i ishlatildi. Kimyoviy faollashtirish jarayonida kaliy gidroksidi (KOH) faollashtiruvchi reagent sifatida, xlorid kislotasi (HCl) esa neytrallash uchun qo‘llanildi. Barcha kimyoviy reaktivlar analitik tozalikka ega bo‘lib, qo‘shimcha tozalashsiz ishlatildi.

2.2. Metodlar

2.2.1 Karbonizatsiya

Kungaboqar qobig‘i dastlab mexanik aralashmalardan tozalandi va 105 °C da 24 soat davomida quritildi. Quritilgan namuna maydalandi va 0,5 mm elakdan o‘tkazildi. Tayyorlangan xomashyo quvurli piroliz qurilmasida argon atmosferasida 10 °C/min qizdirish tezligida 500 °C da 1 soat davomida karbonizatsiya qilindi.

2.2.2 Kimyoviy faollashtirish

Olingan karbonizat 20 % li KOH eritmasi bilan 1:10 nisbatda aralashtirildi va 110 °C da 12 soat quritildi. Keyinchalik namuna inert atmosferada 800 °C da 2 soat davomida faollashtirildi. Faollashtirilgan ko‘mir HCl eritmasi bilan neytrallanib, distillangan suv bilan yuvildi.

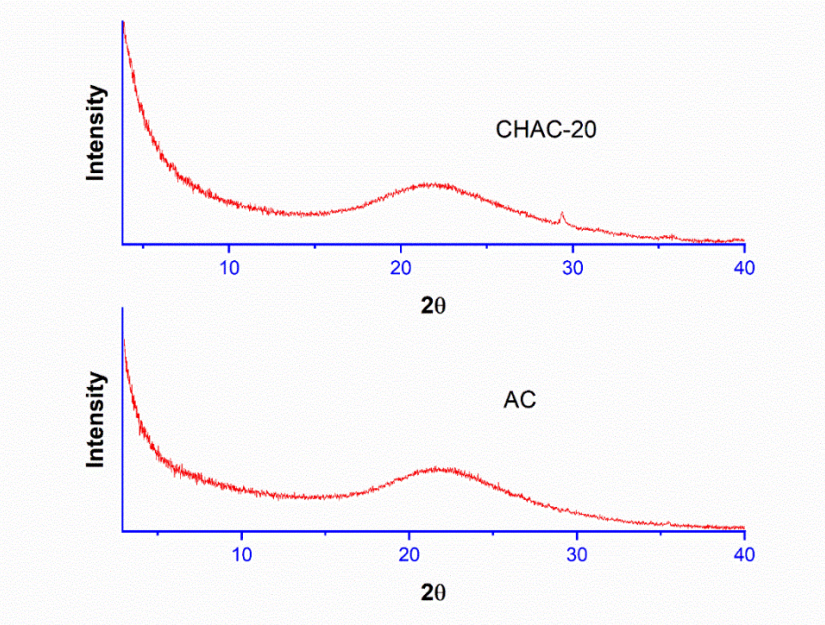
Olingan namunalarning belgilanishi:

AC–500 °C da karbonizatsiya qilingan ko‘mir

CHAC-20 – 20 % KOH bilan faollashtirilgan adsorbent

2.2.3 Fizik-kimyoviy tahlil

Kungaboqar qobig’idan termik kuydirib olingan va kimyoviy faollashtirilgan adsorbentning fazaviy tarkibi va struktura xususiyatlarini aniqlash maqsadida rentgen difraksion tahlil o‘tkazildi.



2-rasm. Termik kuydirilgan (AC) va KOH bilan kimyoviy faollashtirilgan (CHAC-20) namunalarning rentgenogrammalari.

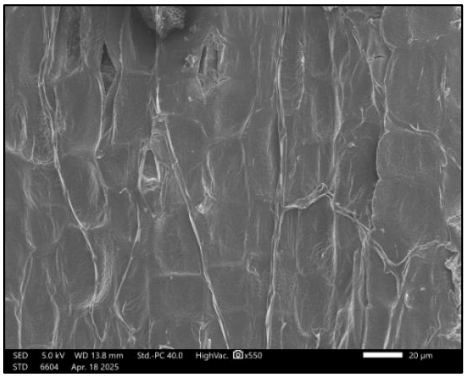
XRD tahlillari AC namunada 2θ ≈ 22–25° sohada keng diffuz maksimum mavjudligini ko‘rsatdi. Bu grafitsimon uglerodning (002) tekisligiga mos kelib, materialning amorf tuzilishga ega ekanligini bildiradi [6]. 2θ ≈ 43–45° oralig‘idagi refleksiya aromatik qatlamlarning lateral tartiblanganligini ko‘rsatadi [7].

CHAC-20 namunada piklarning kengayishi kuzatilib, bu kimyoviy faollashtirish natijasida uglerod strukturasining qisman buzilishi hamda g‘ovak tizimining shakllanishi bilan izohlanadi. Faollashtirish jarayonida quyidagi reaksiya sodir bo‘ladi:

$$6KOH + 2C \rightarrow 2K + 3H_2 + 2K_2CO_3$$

Hosil bo‘lgan kaliy uglerod qatlamlari orasiga kirib borib, keyingi yuvish jarayonida chiqib ketadi va g‘ovak tuzilma hosil qiladi.

XRD tahlil natijalari kimyoviy faollashtirish jarayonida uglerod strukturasi sezilarli darajada o‘zgarib amorf fazaning ortishini ko‘rsatdi. Strukturaviy o‘zgarishlar bilan bir qatorda yuzaning morfologik xususiyatlarini aniqlash maqsadida namunalarning skanerlovchi elektron mikroskop (SEM) yordamida amalga oshirildi. SEM tasvirlari 3-rasmda keltirilgan.



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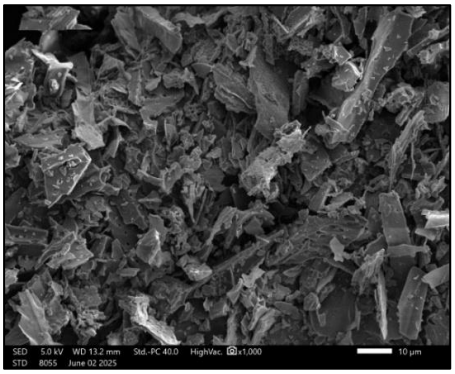

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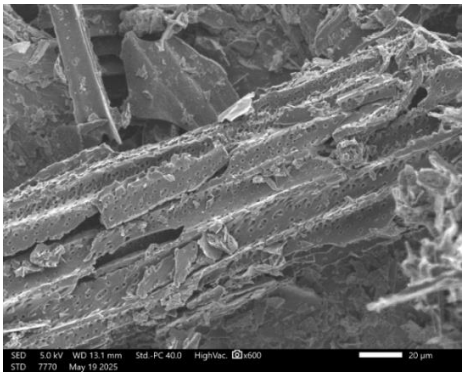

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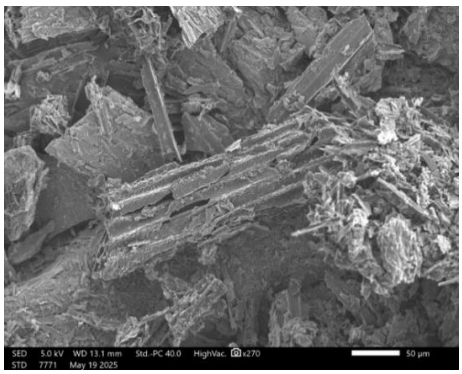

4

3-rasm.1-Kungaboqar qobig‘i, **2-**(AC), **3-4-**(CHAC-20) namunalarning sem tasvirlari.

3-rasmning 1-tasvirida kungaboqar qobig‘ining sirt morfologiyasi ko‘rsatilgan bo‘lib, material yuzasi nisbatan silliq va zich, tolali tuzilishga ega ekanligi kuzatiladi. Bu bosqichda rivojlangan g‘ovak tuzilma deyarli mavjud emas.

2-tasvirda termik ishlov berish natijasida olingan ko‘mir namunasi (AC) tasvirlangan. Karbonizatsiya jarayonida dastlabki tolali tuzilma qisman parchalanib, yuzada notekis va bo‘shashgan struktura hamda ayrim mikrobo‘shliqlar hosil bo‘ladi. 3–4-tasvirlarda CHAC-20 namunada sirt morfologiyasining sezilarli o‘zgarishi kuzatiladi. Kimyoviy faollashtirish jarayonida KOH ning uglerod matritsasi bilan reaksiyasi natijasida strukturaviy buzilishlar sodir bo‘lib, rivojlangan g‘ovakli tuzilma shakllanadi. Yuvish jarayonida kaliyli fazalar chiqib ketishi natijasida qo‘shimcha g‘ovaklar hosil bo‘ladi va materialning sirt rivojlanganligi ortadi.

4. Xulosa

Ushbu tadqiqotda kungaboqar qobig‘i asosida faollashtirilgan uglerod adsorbent tayyorlash va uning fizik-kimyoviy xossalari o‘rganildi. Xomashyoni 500 °C da inert muhitda karbonizatsiya qilish hamda 20 % KOH yordamida kimyoviy faollashtirish natijasida g‘ovakli tuzilishga ega uglerodli material hosil qilindi.

XRD tahlil natijalari olingan namunalarda amorf uglerod tuzilmasining ustunligini ko‘rsatdi hamda uglerod qatlamlarining qisqa masofali

tartiblanganligini tasdiqladi. SEM tasvirlari esa karbonizatsiya va kimyoviy faollashtirish jarayonlari natijasida material yuzasida sezilarli morfologik o‘zgarishlar sodir bo‘lganligini va rivojlangan g‘ovakli struktura shakllanganligini ko‘rsatdi.

Olingan natijalar kungaboqar qobig‘i kabi qishloq xo‘jaligi biomassa chiqindilaridan samarali uglerodli adsorbent materiallar tayyorlash mumkinligini ko‘rsatadi.

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XROM VA MARGANESNI ATROF MUHIT HAMDA TIRIK ORGANIZMLARGA TA'SIRI VA FIZIK-KIMYOVIY USULLAR YORDAMIDA ANIQLASH

Nasrullayeva M. K.

Turambetova A.K

Mirzo Ulug'bek nomidagi O'zbekiston Milliy Universiteti

nasrullayevamarjona089@gmail.com

Annotatsiya: *Mazkur maqolada xrom va marganesni atrof muhit hamda tirik organizmlarga ta'siri va fizik-kimyoviy usullar yordamida aniqlash haqida qisqacha yoritilgan.*

Kalit so'zlar: *spektroskopiya, Rentgen fluressent, difenilkarbazid, adenosin trifosfat, nitrozo-R, voltammetriya.*

Abstract: *This article briefly discusses the effects of chromium and manganese on the environment and living organisms and their determination using physicochemical methods.*

Keywords: *spectroscopy, X-ray fluorescence, diphenylcarbazide, adenosine triphosphate, nitroso-R, voltammetry.*

Аннотация: *В данной статье кратко освещены влияние хрома и марганца на окружающую среду и живые организмы, а также их определение с помощью физико-химических методов.*

Ключевые слова: *спектроскопия, рентгенофлуоресцентный анализ, дифенилкарбазид, аденозинтрифосфат, нитрозо-R, вольтамперометрия.*

Xrom va marganesni atrof muhit va tirik organizimlarga ta'siri: Xrom va marganes ionlari odamlar va hayvonlarning ozuqasining muhim tarkibiy qismi

bo‘lib, xrom ionlarining yetishmasligi glyukoza hamda lipid almashinuvining buzilishiga olib keladi. Xrom (III) ionidan farqli ravishda, olti valentli xrom juda zaharli kanserogen bo‘lib, katta miqdorlarda iste’mol qilinganda hayvonlar va odamlarning o‘limiga olib kelishi mumkin. So‘nggi paytlarda turli sanoat va qishloq xo‘jaligi faoliyati tufayli xrom (VI) ioni ko‘p miqdorda to‘planishi tufayli atrof-muhitni ifloslantiruvchi sifatida tashvishlantirilmoqda[1]. Xrom zaharli og‘ir metall bo‘lib, xromning tuproqdagi harakati, uning tuproq-o‘simlik ko‘chishi va o‘simlikning turli qismlarida to‘planishi uning kimyoviy shakli, o‘simlik turi, tuproq fizik-kimyoviy xossalari bilan farq qiladi[2]. Xrom metall qoplamalarida, sovutish minoralarida, pigment sifatida, charm terisida, to‘qimachilikda va yog‘ochni saqlashda ifloslanishga qarshi vosita sifatida ishlatiladi[3]. Mikroorganizmlarning keng doirasi, shu jumladan bakteriyalar va suv o‘tlari, Cr (VI) ionini Cr (III) ioniga anaerob yoki aerob yo‘l bilan o‘tkazish qobiliyatiga ega [4]. So‘nggi yillarda suvning ifloslanishi dunyo oldida turgan eng xavfli muammolardan biriga aylandi. Xrom asosan kislotali jinslarda (granitlar) taxminan 25 mg/kg, cho‘kindi jinslarda (gil, slanetslar) 160 mg/kg gacha bo‘ladi [5].

Marganes (Mn) tabiatdagi ikkinchi eng ko‘p uchraydigan metall bo‘lib, inson tizimi uchun, o‘simliklar uchun mikroelement sifatida va fermentlarni faollashtirish uchun zarurdir. Marganes o‘z ichiga olgan mahsulotlardan haddan tashqari foydalanish atrof-muhitning ifloslanishiga olib keladi. U hayvonlar va o‘simliklarning o‘sishi uchun muhim mikroelement hisoblanadi[6]. Bundan tashqari, Mn suyak mineralizatsiyasi, metabolizmni tartibga solish va hujayralarni erkin radikal turlaridan himoya qilishda muhim rol o'ynaydi , metalloenzimlarning tarkibiy qismi va ferment faollashtiruvchisi . Shunday qilib, u muhim oziq moddasi bo'lib, arginaza , glutamin sintetaza , piruvat karboksilaza va marganets-superoksid dismutaza kabi turli fermentlar uchun kofaktor sifatida ishlaydi [7,8].Marganes adenosin trifosfat, ATP yoki oqsil kabi substratlar bilan bog‘lanish orqali konformatsion o‘zgarishga olib keladi[9].

Xrom va marganes ionini fizik-kimyoviy usullar yordamida aniqlash: Sanoat chiqindi suvlar tarkibidagi xrom (III) ionini sorbsion spektroskopik aniqlash

usuli ishlab chiqildi. Immobillash metodikasi keltirildi. Immobillash uchun tashuvchi tanlandi. Xrom (III) ionini aniqlash uchun organik reagent bilan hosil qilgan kompleksni hosil bo‘lishini pH muhitiga bog‘liqligi o‘rganildi. Immobillangan nitrozo-R-tuzi reagent bilan hosil qilgan kompleksning tuzilishini va reagentni tolaga immobillanish mexanizmi Rentgen fluressent orqali isbotlandi[10].

Marganes ionlarini aniqlashning tolali tashuvchida immobilizatsiya qilingan kupferon kationiga asoslangan organik reagent yordamida aniq va sezgir usulini ishlab chiqishdan iborat. Marganes komplekslanishning immobilizatsiyalangan reagent bilan reaktsiyasi uchun maqbul shart-sharoitlar tanlandi, marganesni spektrofotometrik aniqlash imkoniyati ko‘rsatildi, olingan ma’lumotlar turli omillarga (reagent konsentratsiyasi, immobilizatsiya vaqti, pH va h.k.) bog‘liqligi aniqlandi. Marganesni PPF tolasiga immobillangan nitrozo-R tuzi reagent bilan hosil qilgan kompleksi Raman spektroskopiya usuli bilan o‘rganildi. Tajribalar shuni ko‘rsatadiki, reagentning tabiati va konsentratsiyasi aniqlanishi kerak bo‘lgan metall ionlarining metrologik va analitik xususiyatlariga ta’sir qiladi. Analitik signalga asosan reagent, vaqt, muhitning tabiati ta’sir ko‘rsatadi va ularning razryadlanishi natijasida sorbsiya-spektroskopik usulning sezuvchanligi va selektiv ta’sirini oshirishadi. Immobillangan reagentlarning tarkibi va tuzilishini kvant-kimyoviy hisoblash orqali kompleksni taxminiy tuzilishi IQ spektroskopik usullari yordamida isbotlandi[11].

Mn(II) ni miqdoriy aniqlash uchun kvadrat to'lqin voltampermetriyasi qo'llanildi. MWCNTs/FTCF elektrodi mos ravishda 1,0 nM dan 0,1 mkM gacha va 1,0 mkM dan 0,1 mM gacha chiziqli aniqlash diapazonini ko'rsatdi, korrelyatsiya koeffitsientlari (R^2)mos ravishda 0,9865 va 0,9762 va aniqlash chegarasi 0,275 nM ni tashkil etdi. Mn(II) ning 10 barobar konsentratsiyasida har biri 11 ta raqobatdosh ionga nisbatan interferensiya tadqiqoti 15% dan past interferensiya darajasini ko'rsatdi[12].

Nitrozo-R-tuzni polietilen poliamin bilan modifikatsiyalangan poliakrilonitril (PPF) tolali sorbentga immobilizatsiya qildik va Mn(II) ni aniqlash uchun yuqori samarali matritsa yaratdik. Usul 5–50 mg L^{-1} chiziqli aniqlash diapazonini, 0,003

mg L^{-1} aniqlash chegarasini va 96–97% adsorbsiya samaradorligini namoyish etdi. Optimal sharoitlar pH 3–4 va maksimal yutilish to'lqin uzunligi 500 nm ni o'z ichiga oldi. Kvant kimyoviy hisob-kitoblar nitrozo-R-tuz/PPF kompleksining barqarorligini va uning Mn(II) bilan o'zaro ta'sirini tasdiqladi. Usul sanoat zonalaridan olingan tuproq namunalari yordamida tasdiqlandi va ICP-MS natijalari bilan kuchli moslikni ko'rsatdi (R^2 = 0,9979)[13].

Simonkolleit nano-trombotsitlari nam-kimyoviy usul yordamida sintez qilindi. Teri hujayralarining javobi inson fibroblastlarida kuchli sitotoksiklikni ko'rsatadi. Sichqoncha melanoma hujayralariga Mn mavjudligi ta'sir qilmaydi. Kuzatilgan toksiklik farqi hujayra turiga bog'liq javobni ko'rsatishi mumkin.Mn^{2+} /Mn^{3+} nisbati ZHC namunalarining toksikligini boshqaruvchi asosiy omil hisoblanadi[14].

1-JADVAL

M etall	Reagent	Usuli	Chegaraviy aniqlash (sezuvchanlik), µg/ml	Eritma muhiti	Ada biyot
Cr(VI)	difenilkarbazid	UB	0,04	pH = 5	15
Cr(VI)	Tiazol 2H-xromen-2-on	spektrofotometrik	0,0007	pH = 7	16
Mn(II)	tiofenil-2-karboksilik kislota	voltammetriya	0.09	pH =4.6	17
Mn(II)	1-(2-piridilaza)-2-naftol	spektrofotometrik	0.14	pH =9	18

1-jadvaldagi ma’lumotlarda metallarning ba’zi bir reagentlar bilan sharoitlari (usuli, sezuvchanligi, muhiti) keltirib o‘tilgan.

Xulosa: Yuqoridagi adabiyotlarning tahlili shuni ko‘rsatdiki, so‘ngi yillarda analitik kimyoda xrom (III) va marganes (II) ionlarini aniqlashning sezgirligini oshirish uchun turli xil usullar, jumladan organik reagentlardan foydalangan holda qattiq fazada aniqlash ishlari keng tarqalgan. Asosiy metrologik va analitik tavsiflari bo‘lgan oddiyligi, tejamkorligi, ekspressligi, ishonchliligi, arzonligi, ekspluatatsion xarajatlari bo‘lishi kerak bo‘lgan tegishli analitik usullarga talab hozirgi kunda yuqoriligi ko‘rsatildi zamon talablariga javob beradigan usullarni ishlab chiqish muhim ahamiyatga ega.

Yangi usullarni texnik va boshqa parametrlar bo‘yicha eng sodda, organik reagentlardan foydalanishga asoslangan bu test usullari deb hisoblanishi mumkin. Organik reagentlarni qo‘llash analitik kimyoning keng rivojlanayotgan yo‘nalishlaridan biri hisoblanadi. Usulning o‘ziga xosligi organik reagent yuzasida ajratish, konsentrlash va aniqlashning amalga oshirilishi hisoblanadi.

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CALCULATION OF THE HEAT OF FORMATION OF PHENYL-2-CHLOROPROPIONATE BY USING HYPERCHEM SOFTWARE

Ochilov Mansur
Almalyk State Technical Institute Republic of Uzbekistan
mansurochilov2003@gmail.com
Abdushukurov Anvar Kabirovich
National University of Uzbekistan named after M. Ulugbek
abdushukurov-ximik@mail.ru
Mamatkulov Nematillo Narzullaevich
National University of Uzbekistan named after M. Ulugbek, Tashkent
nematillomamatqulov767@gmail.com
Umirzakova Mahliya Abdimuminovna
National University of Uzbekistan named after M. Ulugbek
umirzakovamaxliyo@gmail.com

Abstract. *In this study, some quantum-chemical and physicochemical properties of the phenyl-2-chloropropionate molecule were investigated using the HyperChem software. During the research process, the heats of formation of the molecule were determined and analyzed using the INDO, MNDO, AM1, RM1, and PM3 methods.*

Keywords: *phenyl-2-chloropropionate, HyperChem, heat of formation, synthesis, structure, charge, molecule, reaction, energy.*

Introduction. Modern computational chemistry provides an opportunity to thoroughly investigate the structure, physicochemical properties, and reactivity of organic compounds [1]. Phenyl-2-chloropropionate is an organic compound containing an aromatic ring and a chlorine atom, and the study of its

molecular structure and electronic properties is of scientific and practical importance. Such compounds play an important role in various organic synthesis processes and in the formation of biologically active substances [2,3].

By analyzing the quantum-chemical parameters of the phenyl-2-chloropropionate molecule, it is possible to obtain important information about its molecular structure, energetic characteristics, and reactive centers. Therefore, studying the electronic structure of this molecule using computational methods is considered one of the relevant scientific tasks.

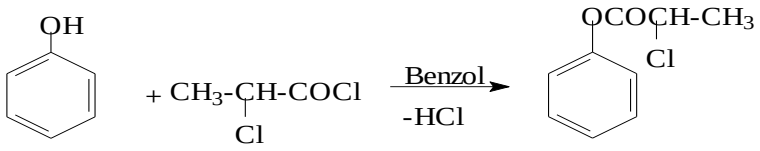
In this study, the quantum-chemical parameters of the phenyl-2-chloropropionate molecule were analyzed using computational methods. The calculations were carried out in the HyperChem software using semi-empirical methods such as INDO, MNDO, AM1, RM1, and PM3. During the research, the heat of formation of the phenyl-2-chloropropionate molecule was investigated.

The obtained results help to better understand the molecular properties of the phenyl-2-chloropropionate molecule, analyze its electronic structure, and preliminarily evaluate its chemical activity. The results of this research serve as an important theoretical basis for modeling the physicochemical properties of this type of organic compounds and for further scientific studies. Therefore, the investigation of the phenyl-2-chloropropionate molecule using quantum-chemical methods is of great importance for determining its electronic structure, evaluating reactive centers, and explaining its spectroscopic properties.

Quantum-chemical modeling methods make it possible to determine the electronic structure of molecules, predict reactive centers, and theoretically explain their spectroscopic properties. Semi-empirical quantum-chemical methods such as AM1, PM3, and MNDO are widely used to calculate molecular structures, total energy, and heats of formation of organic compounds.

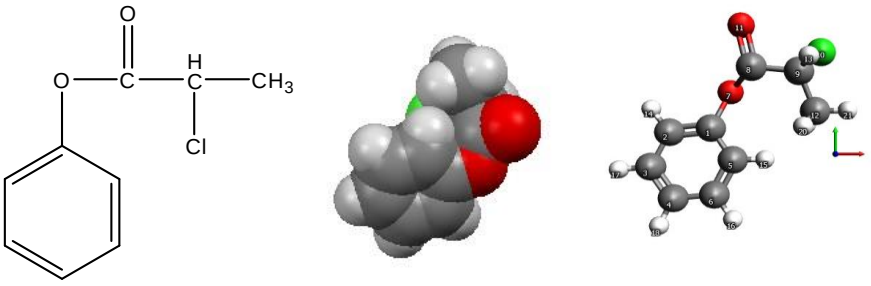
Main Part. According to literature data, the chloropropionylation reaction of phenol with 2-chloropropionyl chloride has not been studied. In order to obtain the O-chloropropionyl product, reactions of phenol with 2-chloropropionyl chloride were carried out in benzene and dioxane solutions. The

reaction proceeded according to the following scheme:



Phenol was acetylated with 2-chloropropionyl chloride, and thin-layer chromatography (TLC) was used to determine the composition of the reaction product. In the composition of the product, a single spot was observed in the hexane–ethyl acetate system at a volume ratio of 6:2 on Silufol UV-254 plates with an **Rf value of 0.42.** Based on physicochemical analyses of the reaction product, including **IR spectroscopy, ^{1}H NMR, ^{13}C NMR, and gas chromatography–mass spectrometry (GC-MS),** it was determined that **phenyl-2-chloropropionate** was formed. Phenyl-2-chloropropionate is an organic ester compound with the molecular formula **$C_9H_9ClO_2$.**

The **3D structure of phenyl-2-chloropropionate** is presented below.



Results and Discussion. To experimentally investigate some geometric and energetic parameters of phenyl-2-chloropropionate, the Avogadro software was used. In addition to studying several physicochemical constants of phenyl-2-chloropropionate, various quantum-chemical calculations were carried out using the HyperChem software in order to analyze its molecular structure. When the formation energy of phenyl-2-chloropropionate was studied using HyperChem software, the obtained results were analyzed and are presented in the table below.

The table shows the heats of formation and energetic parameters of the phenyl-2-chloropropionate molecule calculated using different semi-empirical methods implemented in HyperChem, namely **INDO, MNDO, AM1, RM1, and**

PM3. The data presented in the table demonstrate different types of energy in the molecule and their contribution to the total molecular energy. Semi-empirical computational methods such as MNDO, AM1, and PM3 are widely used to estimate molecular electronic structures and thermodynamic parameters, including heats of formation.

Table

Heats of formation of phenyl-2-chloropropionate calculated using the HyperChem program (INDO, MNDO, AM1, RM1, PM3) (kcal/mol)

№	Types of Energy	INDO	MNDO	AM1	RM1	PM3
1.	Bond energy	−6320.435	−2223.711	−2216.558	−1853.096	−2215.820
2.	Atomic energy	−69354.638	−50284.948	−50602.890	−50602.890	−46412.706
3.	Electronic energy	−304311.805	−247013	−248735.791	−248249.616	−243298.979
4.	Core–core interaction energy	228636.731	194505.030	195916.342	195793.6292	194670.451
5.	Heat of formation of the molecule	−4165.399	−68.675	−61.522	301.939	−60.784
6.	Gradient	0.098	0.094	0.097	11.829	0.075

7.	Total energy (kcal/mol)	−75675.073	−52508	−52819	−52455.987	−48628
8.	Total energy (a.u.)	−120.595	−83.677	−84.173	−83.605	−77.494

First, the **bond energy** is considered. This energy represents the amount of energy released or absorbed during the formation of chemical bonds between atoms. According to the calculation results, the bond energy obtained by the INDO method is −6320.435 kcal/mol. In the MNDO, AM1, and PM3 methods the values are also negative and lie approximately in the range from −2223 to −2215 kcal/mol. In the RM1 method, however, this value is −1853.096 kcal/mol, which slightly differs from the other methods. These differences are associated with the parameterization of the computational methods.

The next parameter is **atomic energy,** which reflects the energetic contribution of the individual atoms forming the molecule. In the INDO method, the atomic energy is −69354.638 kcal/mol, whereas in the MNDO, AM1, and RM1 methods the values are calculated to be around −50,000 kcal/mol. In the PM3 method, a value of −46412.706 kcal/mol is observed. These results indicate that each computational method evaluates atomic energetics differently.

Electronic energy characterizes the total energy state of the electrons in the molecule. In the INDO method, the electronic energy is −304311.805 kcal/mol, which is significantly more negative than the values obtained by the other methods. In the MNDO, AM1, RM1, and PM3 methods this parameter lies approximately within the range of −247,000 to −243,000 kcal/mol.

The **core–core interaction energy** represents the electrostatic interactions between atomic nuclei within the molecule. In the INDO method, this value is 228636.731 kcal/mol, while in the other methods it ranges between 194,000 and

195,000 kcal/mol. This energy has a positive value and reflects the repulsive interactions between atomic nuclei.

The **heat of formation of the molecule** is one of the most important parameters presented in the table. This value indicates the amount of heat released or absorbed during the formation of a compound from its constituent atoms in their standard states. According to the calculations, the heat of formation values are −4165.399 kcal/mol in the INDO method, −68.675 kcal/mol in the MNDO method, −61.522 kcal/mol in the AM1 method, and −60.784 kcal/mol in the PM3 method. In contrast, the RM1 method yields a positive value of 301.939 kcal/mol.

The **gradient value** indicates how close the molecule is to an optimized geometrical structure. In the table, these values range from 0.075 to 0.098, showing that the molecular geometry has been sufficiently optimized during the calculation process.

In addition, the table presents the **total energy** in two units: kcal/mol and atomic units (a.u.). In the INDO method, the total energy is −75675.073 kcal/mol, whereas in the MNDO and AM1 methods the value is approximately −52,000 kcal/mol. In the PM3 method, a value of −48628 kcal/mol is obtained. In atomic units, the values are −120.595 a.u., −83.677 a.u., −84.173 a.u., −83.605 a.u., and −77.494 a.u., respectively.

Conclusion

In general, a method for synthesizing **phenyl-2-chloropropionate** was developed through the chloropropionylation reaction of phenol with 2-chloropropionyl chloride. The results presented in the table for the heats of formation of phenyl-2-chloropropionate calculated using the HyperChem program with the **INDO, MNDO, AM1, RM1, and PM3 methods** indicate that the energetic properties of the phenyl-2-chloropropionate molecule vary to some extent depending on the computational method used.

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“EKOLOGIK MAS’ULIYAT” TUSHUNCHASINING MAZMUN-MOHIYATI

Teshayeva Dilnoza Chori qizi

Buxoro davlat universiteti

Annotatsiya. *Mazkur tezisda oliy ta’lim muassasalari talabalarida ekologik mas’uliyatni shakllantirishning ahamiyati yoritiladi. Ekologik muammolarning globallashuvi sharoitida yosh avlodning tabiatga ongli munosabatini shakllantirish dolzarb masalalardan biri hisoblanadi. Talabalarda ekologik qadriyatlar tizimini*

rivojlantirish, tabiatni asrashga mas'uliyatli munosabatni qaror toptirish hamda ekologik madaniyatni oshirishni shakllantirish muhim vazifalardan biri bo'lib xizmat qiladi. Tezisda ekologik mas'uliyatni rivojlantirishning pedagogik mexanizmlari, usullari va samarali yo'llari tahlil qilinadi.

Kalit so'zla: *Aksiologiya, ekologik mas'uliyat, ekologik qadriyatlar, ekologik madaniyat, oliy ta'lim, tarbiya, pedagogik yondashuv, barqaror rivojlanish*

Abstract. *This thesis highlights the importance of forming ecological responsibility among students of higher educational institutions. In the context of globalization of environmental problems, the formation of a conscious attitude of the younger generation to nature is one of the urgent issues. One of the important tasks is to develop a system of ecological values in students, to instill a responsible attitude to nature conservation, and to increase ecological culture. The thesis analyzes pedagogical mechanisms, methods, and effective ways of developing ecological responsibility.*

Keywords: *Axiology, ecological responsibility, ecological values, ecological culture, higher education, upbringing, pedagogical approach, sustainable development*

Аннотация. *В данной диссертации подчеркивается важность формирования экологической ответственности среди студентов высших учебных заведений. В контексте глобализации экологических проблем формирование осознанного отношения молодого поколения к природе является одним из актуальных вопросов. Одной из важных задач является развитие у студентов системы экологических ценностей, привитие ответственного отношения к охране природы и повышение экологической культуры. В диссертации анализируются педагогические механизмы, методы и эффективные способы развития экологической ответственности.*

Ключевые слова:*Аксиология, экологическая ответственность, экологические ценности, экологическая культура, высшее образование, воспитание, педагогический подход, устойчивое развитие*

Kirish. Zamonaviy sivilizatsiya taraqqiyoti insoniyat oldiga ko'plab murakkab muammolarni qo'ymoqda. Ularning eng dolzarbi — tabiat va jamiyat o'rtasidagi munosabatlarning keskinlashuvi, ya'ni ekologik inqirozdir. Bu inqirozning oldini olish va uni bartaraf etishda "ekologik mas'uliyat" tushunchasi markaziy o'rin egallaydi. Mazkur maqolada ushbu tushunchaning mazmun-mohiyati, uning falsafiy, huquqiy va axloqiy jihatlari tahlil etiladi.

Asosiy qism. "Ekologik mas'uliyat" tushunchasi XX asrning ikkinchi yarmida — atrof-muhit muammolari global miqyos kasb eta boshlagan davrda ilmiy muomalaga kirdi. 1972-yilda Stokgolmda bo'lib o'tgan BMTning atrof-muhit bo'yicha birinchi konferentsiyasi, 1992-yilda Rio-de-Janeyrodagi "Yer sammiti" va 2015-yilda qabul qilingan "Paris kelishuvi" — bularning barchasi ekologik mas'uliyatni xalqaro hamjamiyatning ustuvor yo'nalishi sifatida mustahkamladi.

Tushunchaning ildizlari qadimgi falsafaga borib taqalsa-da, uning zamonaviy talqini ayniqsa nemis faylasufi **Hans Jonas**ning "Mas'uliyat prinsipi" (1979) asarida chuqur ifodalangan. Jonas insonning kelajak avlodlar va tabiat oldidagi mas'uliyatini etika doirasida birinchi marta tizimli asoslab berdi.

Ekologik mas'uliyat — bu insonning tabiatga nisbatan ongli, qasdli va axloqiy jihatdan asoslangan munosabati bo'lib, u quyidagi asosiy unsurlarni o'z ichiga oladi:

1. Axloqiy mas'uliyat

Bu insonning ichki qadriyatlaridan kelib chiqadigan mas'uliyat turi. U shaxsni nafaqat qonun talabi bo'lgani uchun, balki vijdon amri bilan tabiatni asrashga undaydi. Tabiatni o'z manfaati uchun emas, balki uning o'z qiymati borligini anglab muhofaza qilish — axloqiy ekologik mas'uliyatning mohiyatidir.

2. Huquqiy mas'uliyat

Davlat va jamiyat tomonidan belgilangan qonun-qoidalar doirasidagi majburiyatlar majmuini o'z ichiga oladi. Tabiatni ifloslantirish, resurslarni isrofgarchilik bilan ishlatish yoki qonuniy me'yorlarni buzish — huquqiy mas'uliyatni yuzaga keltiradi. Ko'plab

mamlakatlar, shu jumladan O'zbekiston ham, ekologik qonunchilikni yildan-yilga takomillashtirmoqda.

3. Ijtimoiy mas'uliyat

Korporatsiyalar, muassasalar va jamoalarning ekologik faoliyati ijtimoiy mas'uliyat doirasida baholanadi. Bugungi kunda "yashil iqtisodiyot", "barqaror rivojlanish" va "korporativ ekologik mas'uliyat" (CSR) tushunchalari ishlab chiqarish va boshqaruv amaliyotiga keng joriy etilmoqda.

4. Kelajak avlodlar oldidagi mas'uliyat

Bu ekologik mas'uliyatning eng muhim va chuqur qatlami hisoblanadi. Hozirgi avlod bugungi ehtiyojlarini qondirish bilan birga, kelajak avlodlarning tabiiy resurslardan bahramand bo'lish huquqini ham ta'minlashi shart. Bu tamoyil "barqaror rivojlanish" konsepsiyasining poydevori bo'lib xizmat qiladi.

Xulosa. "Ekologik mas'uliyat" — bu faqat ilmiy yoki huquqiy atama emas, balki bugungi kunning hayotiy zaruratidir. U shaxs vijdonida, jamiyat qadriyatlarida, davlat siyosatida va xalqaro munosabatlarda bir vaqtning o'zida gavdalanishi kerak bo'lgan universal tamoyildir. Tabiatni asrash — kelajakni asrashdir. Ekologik mas'uliyatni his etgan jamiyatgina chinakam barqaror taraqqiyot sari yurishi mumkin.Shu bois oliy ta’lim muassasalarida ekologik tarbiyani qadriyatlar asosida tashkil etish, interfaol metodlardan foydalanish va amaliy faoliyatni kuchaytirish zarur.

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Cu(II) IONINI ANIQLSH USLUBIDA ANIQLASH USULINING TO‘G‘RILIGI VA QAYTA TIKLANUVCHANLIGI

Turabov Nurmuxammat Turabovich

O‘zbekiston Milliy universiteti

Todjiyev Jamoliddin Nasriddinovich

O‘zbekiston Milliy universiteti

todjiyev88@mail.ru

Tuliyev Bexruz Alimqulovich

O‘zbekiston Milliy universiteti

*bexruztuliyev*todjiyev88@mail.ru

Alimboyev Donyor Abdugappor o‘g‘li

Guliston davlat universiteti

Annotatsiya. *Ushbu ishda Cu(II) ionini HR reagenti yordamida spektrofotometrik aniqlash usulining to‘g‘riligi va qayta takrorlanuvchanligi baholandi. Metrologik ko‘rsatkichlar — standart chetlanish (S), nisbiy standart chetlanish (Sr) va ishonchlilik intervali (ΔX) aniqlanib, usulning aniqligi tahlil qilindi. Tajribalar pH=2,34 va λ=600 nm sharoitda olib borildi. Natijalar kiritilgan va aniqlangan qiymatlarning mosligini ko‘rsatdi. Sr qiymati 0,012 dan oshmadi, bu*

usulning yuqori aniqlik va barqarorlikka ega ekanligini tasdiqlaydi. Taklif etilgan usul turli obyektlarda Cu(II) ionini aniqlash uchun qo‘llanilishi mumkin.

Kalit so‘zlar: *Cu(II), spektrofotometriya, metrologik tavsiflar, standart chetlanish, qayta takrorlanuvchanlik, ishonchlilik intervali, analitik usul*

Annotation. *This study evaluates the accuracy and reproducibility of a spectrophotometric method for the determination of Cu(II) ions using the HR reagent. Metrological parameters such as standard deviation (S), relative standard deviation (Sr), and confidence interval (ΔX) were calculated to assess the reliability of the method. Experiments were carried out under optimal conditions (pH=2.34, λ=600 nm). The obtained results showed good agreement between introduced and found values, while the Sr value did not exceed 0.012, indicating high precision and reproducibility. The proposed method can be effectively applied for the determination of Cu(II) ions in complex samples, including industrial and environmental objects.*

Keywords: *Cu(II), spectrophotometry, metrological characteristics, standard deviation, reproducibility, confidence interval, analytical method*

Kirish. Ushbu tadqiqotda mis(II) ionlarini aniqlashning zamonaviy analitik usullaridan biri bo‘lgan spektrofotometrik usulning samaradorligi o‘rganildi. Analitik usullarning aniqligi va ishonchliligi metrologik ko‘rsatkichlar orqali baholanadi. Shu sababli, Cu(II) ionini aniqlashda qo‘llanilgan usulning to‘g‘riligi va qayta takrorlanuvchanligini baholash muhim ahamiyatga ega.

Aniqlash usulining to‘g‘riligi va qayta tiklanuvchanligi tekshirishda metrologik tavfsiflar (S, Sr, ΔX) analiz natijalarining aniqligi, qayta takrorlanuvchanligi va ishonchlilik darajasini baholash uchun muhim ko‘rsatkichlardan hisoblanadi.

S – natijalarning takrorlanuvchanligini ko‘rsatadi. Sr – natijalarning nisbiy o‘zgaruvchanligini baholaydi. ΔX – natijalar qanchalik ishonchli ekanligini ifodalaydi. Ushbu ko‘rsatkichlar analitik usullarni solishtirish, takomillashtirish va aniqlikni oshirish uchun qo‘llaniladi. Standart chetlanish S – tahlil natijalarining o‘rtacha qiymatdan o‘zgaruvchanlik darajasi bo‘lib, u aniqlash natijalarining

barqarorligi va tarqalishini ifodalaydi. Agar S kichik bo‘lsa, o‘lchov natijalari bir-biriga yaqin bo‘ladi, ya'ni tahlil barqaror hisoblanadi. Nisbiy standart chetlanish (Sr) – qayta takrorlanuvchanlik darajasini ifodalaydi.

Sr – standart chetlanishning o‘rtacha qiymatga nisbatan foiz yoki ulush sifatida ifodalanishi bo‘lib, u natijalarni takrorlanuvchanlikning nisbiy darajasini ko‘rsatadi va o‘lchov natijalarining o‘zgaruvchanlik darajasini solishtirish imkonini beradi hamda turli analitik usullarning sezgirligini solishtirish uchun foydalaniladi. O‘lchovlarning qayta takrorlanishini aniqlashga yordam beradi.

Ishonchlilik intervallari (ΔX) – natijaning ishonchliligini tushuntiradi va olingan natijalarni aniqligini ifodalovchi kattalik bo‘lib o‘lchov natijasining qanchalik ishonchli ekanligini xulosa qiladigan statistik ko‘rsatkich hisoblanadi. Bu interval aniqlash natijasi atrofida haqiqiy qiymat joylashgan ehtimollik chegarasini beradi va tahlil natijasining haqiqiy qiymatga qancha yaqin ekanligi aniqlanadi hamda ishlab chiqilgan uslublarni ishonchliligi baholanadi va turli ishlab chiqilgan analitik usullar bilan solishtirish uchun ishlatiladi.

Ishlab chiqilgan uslublarda Cu(II) ionini (HR) reagenti bilan hosil qilgan komplekslarini optimal sharoitlarda aniqlashdagi darajalangan grafik tenglamasiga $Yi(Cu^{2+})=a+bXi(Cu^{2+})=0,0159+0,0452Xi)$ asoslanib optik zichlikning metall ionining miqdoriga bog‘liqligi “kiritildi-topildi” usuli yordamida ishlab chiqilgan aniqlash usulning to‘g‘riligi va qayta tiklanuvchanligi tekshirib ko‘rildi.

Aniqlash uslubi: 25,0 sm^3 o‘lchov kolbasiga 10,0 sm^3 pH=2,34 bo‘lgan unversal bufer eritma, Cu(II) ning 10,0 mkg/sm^3 li eritmasidan 1,0 mkg dan 10,0 mkg gacha va 1,20 sm^3 0,05% li (HR) eritmasidan qo‘shib, kolbalarning belgisigacha distillangan suv solib suyultirildi. Eritmalar yaxshilab aralashtirilib optik zichlik qiymatlari mis(II) ioni uchun qalinligi l=3,0 sm li kyuvetada, KFK-3 asbobida, λ_{max}=600 nmda solishtirma eritmalarga nisbatan o‘lchanib borildi. Olingan tajriba natijalari jadvalda keltirildi.

jadval

Cu(II) ionini (HR) reagenti bilan hosil qilingan kompleksida aniqlash usulining to‘g‘riligi va qayta tiklanuvchanligini tekshirish natijalari

(pH=2,34; λ_{max}=600 nm; ℓ=2,0; C_{HR} =0,05 %; n=3; V_{HR}=2,0 sm^3)

	Kiritildi, Cu^{2+}, mkg	$A_{1,2,3}$ (Yi)	Topildi, Cu^{2+}, mkg (Xi)	$\bar{X}\pm\Delta X$	Xi-$\bar{X}$	$(Xi-\bar{X})^2$	S_r	S_r
	2	0,107 0,108 0,106	2,02 2,04 1,99	2,02±0,06	0,00 0,02 –0,03	0,0000 0,0004 0,0009	0,025	0,012
	3	0,156 0,154 0,153	3,10 3,06 3,03	3,06±0,09	0,04 0,00 –0,03	0,0016 0,0000 0,0009	0,035	0,011
	4	0,198 0,199 0,197	4,03 4,05 4,01	4,03±0,05	0,00 0,02 –0,02	0,0000 0,0004 0,0004	0,02	0,005
	5	0,244 0,245	5,05 5,07 5,02	5,05±0,14	0,00 0,02	0,0000 0,0004	0,058	0,011

		0,243			–0,03	0,0064		
	6	0,286 0,285 0,283	5,98 5,95 5,91	5,95±0,09	0,03 0,00 –0,04	0,0009 0,0000 0,0016	0,035	0,006

Cu(II) ionini (HR) reagenti bilan bog‘lovchi optik zichlik (A) va metall ionlarining miqdorlari orasidagi darajalangan grafigini hisoblash natijalari tasodifiy xatoliklar ning ta’sirini kamaytirish hamda aniqlash natijalarining aniqligini baholash maqsadida matematik statistika usullari asosida amalga oshirildi. jadvaldagi olingan natijalar shuni ko‘rsatadiki, optimal sharoitlarda Cu(II) ionini (HR) reagenti bilan aniqlashning spektrofotometrik uslublarini to‘g‘ri ekanligi va qayta takrorlanishigini isbotladi.

Xulosa: Yuqorida olingan natijalarda Cu(II) ionini olingan miqdori bilan hisoblangan miqdorlari bir – biriga to‘g‘ri keldi, hamda metrologik tavsiflaridan nisbiy standart chetlanishning (Sr) qiymati Cu(II) ioni uchun S_r=0,012 dan oshmadi, shuningdek tarkibi binar va murakkab aralashmalar, suniy eritmalar, sanoat qotishmalari, ishlab chiqarish korxonalarining chiqindi va oqova hamda tabiiy suvlari tarkibidan optimal sharoitlarda aniqlash imkonini beradi

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Ахмедов Баходир Исмоилович
Қарши давлат университети
E-mail: bahodir7722@gmail.com

Аннотация. *Ушбу мақолада ИИВ Академиясида спорт фаолиятининг шаклланиши ва эришилган тарихий ютуқлар таҳлил қилинган. Ўрганишда спортнинг курсантларни жисмонан ва маънавий баркамол авлодни тарбиялашдаги роли, турли республика ва халқаро мусобақаларда қўлга киритилган ютуқлари алоҳида таъкидланган.*

Калит сўзлар: *жисмоний тарбия, спорт, ИИВ Академияси, курсант, таълим, жаҳон чемпиони, осиё чемпиони.*

Annotation. *This article analyzes the formation of sports activities and historical achievements at the Academy of the Ministry of Internal Affairs. The study emphasizes the role of sports in the upbringing of a physically and spiritually developed generation of cadets, their achievements in various republican and international competitions.*

Keywords: *physical education, sports, Academy of the Ministry of Internal Affairs, cadet, education, world champion, Asian champion.*

Кириш

“Ҳар бир ота-она, ҳар бир миллатнинг нияти – жисмоний ва маънавий баркамол авлодни тарбиялашдир. Бунга эса жисмоний тарбия ва спортсиз эришиб бўлмайди. Спорт соғлом халқ, соғлом авлоднинг таянч устунидир”

Шавкат Мирзиёев,
Ўзбекистон Республикаси Президенти

Ўзбекистон Республикасида жисмоний тарбия ва спорт соҳаси жамият тараққиётининг юқори бўғинларидан бири сифатида эътироф этиб келинмоқда. Айниқса, ҳуқуқни муҳофаза қилувчи органларида хизмат

қиладиган профессионал кадрларни тайёрлашда жисмоний тайёргарлик, кучли ирода ва чидамлилик каби ҳислатларни шакллантириб боришда спорт алоҳида аҳамият касб этади.

ИИВ Академияси тарихда ва ҳозирги кунда ҳам спорт фаолиятини ривожлантириш, курсант ва тингловчиларнинг жисмоний тайёргарлигини мустаҳкамлашга қаратилган ишлар изчиллик билан олиб борилган ва янада ушбу йўналишда кўплаб чора-тадбирлар белгилаб келинмоқда.

ИИВ Академиясида спорт йўналишида қўлга киритилган барча ютуқлар нафақат таълим даргоҳи нуфузини оширишга, балки мамлакатимизда спорт маданиятини ривожлантириб боришга ҳам хизмат қилмоқда.

Мавзунинг долзарблиги

Долзарблиги шундаки, жисмоний тарбия ва спорт ёшларни ҳар томонлама баркамол этиб тарбиялашда ҳамда ҳуқуқни муҳофаза қилувчи органлар учун малакали кадрлар тайёрлашда жисмоний тайёргарлик ва спорт соҳаси муҳим ўринга тутади.

ИИВ Академиясида курсантларнинг жисмоний тайёргарлигини ошириш, спортга бўлган қизиқишини кучайтириш ҳамда турли хил мусобақаларда юқори натижаларга эришишга алоҳида эътибор берилмоқда. Шу муносабат билан ИИВ Академиясида спорт фаолиятининг шаклланиш ва эришилган ютуқларни ўрганиш ва таҳлил қилиш лозим ҳисобланади.

Тадқиқотнинг мақсади ва вазифалари

Мазкур тадқиқотнинг асосий мақсади ИИВ Академиясида спорт фаолиятининг шаклланиши, унинг ривожланиш босқичлари ва тарихий ютуқларини илмий таҳлил қилиш ҳамда жисмоний тайёргарлик тизимининг курсантлар касбий тайёргарлигига таъсирини ўрганишдан иборат. Бу мақсадларга эришиш учун ушбу таълим масканида спорт фаолиятининг шаклланиш тарихи ва ривожланиш босқичларини таҳлил қилиш, жисмоний тайёргарлик ва спорт машғулотларининг ташкил этилишини ўрганиш вазифалари юклатилади.

Тарихдан бизга маълумки, 1994 йилда ИИВ Академияси ташкил этилган [1] ва ҳуқуқ-тартибот органлари учун малакали мутахассисларни тайёрлаш масканига айланган эди. Ушбу таълим масканининг фахрланадиган йўналишларидан бири спорт йўналишидир.

Мустақиллик йилларида ИИВ Академияси спортчилари турли мусобақаларда 700 дан ортиқ медални қўлга киритган бўлсалар, 2019 йилнинг ўзида таҳлилларга кўра, спортчиларимиз Жаҳон, Осиё ва республика миқёсидаги нуфузли мусобақаларда 54 та олтин, 33 та кумуш ва 29 та бронза медалларини қўлга киритган. Курсантлар орасидан эса 3 нафар Жаҳон чемпиони ва 2 нафар Осиё чемпиони етишиб чиққан [2].

Шунингдек, янги таҳрирдаги Ўзбекистон Республикаси Конституциясининг 48-моддасида 4-хат бошида *“Давлат жисмоний тарбия ва спортни ривожлантириш, аҳоли ўртасида соғлом турмуш тарзини шакллантириш учун шарт-шароитлар яратади”* [3] - деб кўрсатилгани бежиз эмас, албатта.

Шу ўринда, ушбу таълим маскани ташкил этилгандан буён профессор-ўқитувчилар, курсант ва тингловчиларининг спортда эришган ютуқларини бир бор эслаб ўтиш учун тарихга назар соламиз. Жумладан,

- **Пўлатов Фазлиддин** – профессор, осиё самбо федерацияси президенти, самбо бўйича спорт усталари ўртасида икки карра жаҳон чемпиони, халқаро тоифадаги спорт устаси;

- **Қурбонов Акобир** – жаҳон юлдузлари чемпионатининг жаҳон чемпиони, кураш бўйича 1-жаҳон чемпиони;

- **Худойқулов Олим** – дзюдо ва самбо бўйича халқаро турнирлар совриндори, халқаро тоифадаги спорт устаси;

- **Маткаримов Ғайратбек** – кўп карра Ўзбекистон чемпиони, халқаро тоифадаги ҳакам;

- **Рахманов Дмитрий** – енгил атлетика бўйича Ўзбекистон чемпиони;

- **Олимов Отабек** – самбо бўйича икки карра осиё чемпиони;

- **Салимов Шерзод** – кўп карра Ўзбекистон чемпиони, спорт устаси;

- **Жумаев Фаррух** – самбо бўйича уч карра осиё чемпиони, халқаро тоифадаги спорт устаси;

- **Давлетова Нилуфар** – жаҳон юлдузлари чемпионатининг жаҳон чемпиони, осиё ўйинлари кумуш медал соҳиби;

- **Қамбарова Дилоромхон** – самбо бўйича осиё чемпиони, жаҳон чемпионатининг кумуш медали совриндори, халқаро тоифадаги спорт устаси;

- **Кадырова Марина** – самбо бўйича жаҳон чемпиони, жаҳон юлдузлари чемпионатининг кумуш медали совриндори, осиё чемпиони, халқаро тоифадаги спорт устаси;

- **Касымова Улдана** – самбо бўйича бир неча бор Ўзбекистон чемпиони;

- **Янкина Юлия** – самбо бўйича кўп карра жаҳон, европа, осиё чемпиони, халқаро тоифадаги спорт устаси;

- **Ибодов Маис** – эркин кураш бўйича жаҳон чемпиони, халқаро тоифадаги спорт устаси;

- **Кутуев Ринат** – каратэ бўйича жаҳон ва Америка чемпиони, халқаро тоифадаги спорт устаси, Шимолий Богемия кубоги ғолиби;

- **Зайцева Екатерина** – самбо бўйича жаҳон, европа, осиё чемпиони, халқаро тоифадаги спорт устаси, самбо бўйича жаҳон кубоги ғолиби;

- **Тулупова Елена** – кўп карра жаҳон чемпиони, самбо бўйича осиё чемпиони, халқаро спорт устаси;

- **Бучинцев Игорь** – самбо бўйича талабалар ўртасидаги жаҳон чемпиони, Осиё кубоги ғолиби;

- **Хўжаев Ботир** – кўп карра жаҳон чемпиони, самбо бўйича осиё чемпиони, халқаро спорт устаси;

- **Дилшод Орипов** – юнон-рим кураш бўйича кўп карра жаҳон ва осиё чемпиони, олимпия ўқинлари иштирокчиси;

- **Ибрагимов Шерзод** – каратэ бўйича икки карра жаҳон чемпиони, халқаро тоифадаги спорт устаси;

- **Ли Леонид** – таэквондо бўйича жаҳон, европа ва осиё чемпиони, халқаро спорт устаси;

- **Ким Алевтина** – таэквондо бўйича жаҳон ва осиё чемпиони, халқаро тоифадаги спорт устаси;

- **Лазарева Инна** – самбо бўйича осиё чемпиони ва жаҳон чемпионати совриндори;

- **Тиллабоев Жамшид** – талабалар ўртасида самбо бўйича жаҳон чемпиони;

- **Одилов Ислом** – самбо бўйича осиё чемпиони, жаҳон чемпионати совриндори;

- **Пономарева Ирина** – самбо бўйича осиё чемпиони ва жаҳон чемпионати совриндори;

- **Малькова Марина** – самбо бўйича осиё чемпиони, осиё кубоги ғолиби, талабалар ўртасида самбо бўйича жаҳон кумуш медали соҳиби;

- **Жабборов Улуғбек** – самбо бўйича осиё чемпиони, осиё кубоги ғолиби, талабалар ўртасида самбо бўйича жаҳон бронза медали соҳиби;

- **Алимов Саидкарим** – самбо бўйича икки карра осиё чемпиони;

- **Иргашев Руслан** – дзюдо бўйича бутунжаҳон ёшлар ўйинларининг кумуш медали соҳиби;

- **Шоимов Боходир** – самбо бўйича икки карра осиё чемпиони;

- **Ходжаев Хайдар** – самбо бўйича талабалар ўртасида жаҳон бронза медали соҳиби;

- **Одилов Равшан** – самбо бўйича талабалар ўртасида жаҳон бронза медали соҳиби, осиё чемпионати совриндори;

- **Азизов Алишер** – самбо бўйича осиё кубоги ғолиби;

- **Абдурахмонова Дилшода** – осиё чемпионатининг бронза медали соҳиби;

- **Газизова Ильмира** – самбо бўйича икки карра осиё чемпиони;

- **Артюшкова Алёна** – осиё чемпионатининг бронза медали соҳиби;

- **Серебряков Алексей** – осиё чемпионатининг бронза медали соҳиби;

- **Малькова Ирина** – осиё кубоги ғолиби, осиё чемпионатининг бронза медали соҳиби;

- **Иргашев Сухроб** – осиё чемпионатининг бронза медали соҳиби;

- **Ибрагимов Ўктам** – осиё чемпионатининг бронза медали соҳиби;

- **Мухторов Хаким** – осиё чемпионатининг бронча медали соҳиби;

- **Очилов Муртозо** – осиё чемпионатининг бронза медали соҳиби;

- **Тўхтамишев Шухрат** – самбо бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Қосимбетов Бахтиёр** – эркин кураш бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Рысай Алексей** – дзюдо бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Зокирбеков Санжар** – қўл жанги бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Мирзаахмедов Сардор** – қўл жанги бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Шамаев Зураб** – дзюдо бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Бомуродов Анвар** – самбо ва дзюдо бўйича Ўзбекистон чемпиони;

- **Великанова Елена** – самбо бўйича Ўзбекистон чемпиони;

- **Мирзаев Боходир** – қўл жанги бўйича халқаро ва Ўзбекистон турнирлари ғолиби;

- **Ғаниев Сардор** – эркин кураш бўйича Ўзбекистон чемпиони ва самбо бўйича Ўзбекистон кубоги ғолиби, спорт устаси шулар жумласидандир [4].

Шу билан бирга, ИИВ Академиясида таълим сифати ва самарадорлигини ошириш, соҳа учун етук малакали профессионал кадрлар тайёрлашни замон талаблари даражасида йўлга қўйишда жанговар ва жисмоний тайёргарлик кафедрасини ўрни беқиёсдир. Ҳозирда ушбу кафедрада 1 нафар фан доктори, 8 нафар фан номзоди ва фалсафа доктори фаолият юритмоқда. Профессор-ўқитувчиларнинг 2 нафари профессор, 8 нафари доцент илмий унвонларга эга [5].

Хулоса

Хулоса қилиб айтганда, ИИВ Академиясида спорт фаолиятининг шаклланиши ва ривожланиши курсантларни ҳар томонлама етук, жисмонан тайёргарлиги юқори бўлган кадрлар бўлиб тайёрланишида муҳим аҳамият касб этади. Ҳозирги кунга қадар ИИВ Академиясида спортга қаратилаётган эътибор натижасида кўплаб курсантлар республика ва халқаро мусобақаларда муносиб иштирок этган ҳолда юқори натижаларга эришиб келмоқдалар.

ИИВ Академияси спорт соҳасида қўлга киритилган ютуқлар ушбу таълим масканининг нуфузини ошириб бориш билан бирга, республикамизда ҳам жисмоний тарбия ва спортни ривожлантиришга ҳисса қўшмоқда. Шунинг учун келгусида ҳам ИИВ Академиясида спорт фаолиятини янада ривожлантириш, унинг самарадорлигини ошириш ҳамда ёш спортчиларни қўллаб-қувватлаш катта аҳамиятга эга.

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5. Ўзбекистон Республикаси ИИВ Академияси илмий-тадқиқот фаолиятини ташкил этиш бўлимининг ҳисоботи.

ОЦЕНКА ВЛИЯНИЯ ГИДРОТЕХНИЧЕСКОГО СООРУЖЕНИЯ НА ОКРУЖАЮЩУЮ СРЕДУ И НА СОСТОЯНИЕ ПОДЗЕМНЫХ ВОД

Саидова Сайёра Анваровна

Государственное учреждение «Институт ГИДРОИНГЕО» Узбекистан

email: saidovasayyora1963@email.ru

Аннотация. *В статье рассмотрен вопрос влияние гидротехнического сооружения на окружаюўую среду и на состояние подземных вод. При создании гидротехнического сооружения обясняется изучить совместное влияние всех факторов с учётом перспектив строительства и принимать меры для поддержания качества (в том числе подземных) вод.*

Ключевые слова: *подземная вода, уровень, гидротехническое сооружения, водохранилище*

Annotation. *The article examines the issue of the influence of hydraulic structures on the environment and on the state of groundwater. When creating a hydraulic structure, it is explained to study the combined influence of all factors, taking into account the prospects for construction, and take measures to maintain the quality (including groundwater) of water.*

Key words: *underground water, level, hydraulic structures, reservoir*

Введение. В аридных районах земного шара, в частности в Средней Азии, жизнедеятельность населения и экономическое развитие, не мыслимо без использования гидротехнических сооружений, особенно водохранилищ, как основных регуляторов режима речного стока региона.

Влияние водохранилищ на природную среду, в частности на ландшафты огромное, т.к. гидротехногенные сооружения имеют различные формы, объёмы, площади, кроме этого, объединяют целый комплекс определенных

гидросооружений и их влияние на природную среду имеет различную направленность, в разное воздействие на природные объекты. Современные водохранилища — это сложные техногенные системы и имеют различные направления. В основном они строятся в речных долинах, где для этой цели возводятся плотины. Перед плотиной в естественных понижениях или в руслах рек появляется естественный водный объект, создается водохранилище. Оно имеет различную функциональную направленность, площадь затопления, форму, глубину, береговую линию, зону прямого и косвенного влияния. В связи с этим водохранилище и связанные с ним гидротехнические сооружения оказывают различное влияние на природную среду.

Узбекистан располагает большим количеством гидротехнических сооружений на слабых грунтах. (лесс, лессовидные породы, пески, плывуны и т. д.). Надежность таких сооружений недостаточная, так как при достижении критических скоростей фильтрации в основаниях, по бортам и другим элементам конструкций происходит вынос частиц грунтов или расслабление степени засоленности пород при смачивании, что приводит к их разрушению и ряду утечек из каналов и рек. Наносимые такими явлениями ущербы и потери очевидны, что неприемлемо и требует своего исследования.

Эти явления требуют к себе внимания и ныне стало актуальным, в первую очередь, обеспечение служб мониторинга подземных вод научно-методическими пособиями и рекомендациями. Это связано с тем, что в прошлом разработками такого рода занимались союзные институты, и к тому же без учета особенностей геологического строения Узбекистана.

В научном плане обобщение данных по Узбекистану позволит восполнить пробел в знаниях специфики конструкции ирригационных сооружений на засоленных, подтопленных и других слабых грунтов.

В практическом отношении служба мониторинга подземных вод имея наставления или рекомендации сможет прогнозировать становление такого рода специальных задач и проводить исследования.

Своевременное выявление и предупреждение таких явлений позволит предотвращать наносимый ими ущерб и потери.

Водохранилища являются мощным фактором преобразования окружающей среды, источником потенциальной опасности на территориях их размещения. Именно поэтому изучение всех возможных последствий создания и эксплуатации искусственных водоемов является важным аспектом проблемы по обеспечению безопасности населения и территорий. В условиях усиления антропогенной нагрузки и наметившихся изменений климата данные исследования приобретают особую актуальность.

При рассмотрении влияния гидротехнических объектов на окружающую среду необходимо различать период строительства и период их эксплуатации. Первый период сравнительно кратковременный – несколько лет. В это время в районе строительства нарушается естественный ландшафт. Подъём уровня воды в верхнем бьефе начинается обычно в период строительства. В результате произведенного при этом наполнении водохранилища изменяются расходы и уровни воды в нижнем бьефе.

При создании водохранилищ необходимо тщательно изучить совместное влияние всех факторов с учётом перспектив строительства и принимать меры для поддержания качества (в том числе подземных) вод. Качество воды – характеристика состава и свойств воды, определяющая её пригодность для конкретных видов водопользования.

Создание водохранилищ ведёт за собой затопление территории. В зону затопления могут попасть сельскохозяйственные угодья, месторождения полезных ископаемых, промышленные и гражданские сооружения, памятники старины, дороги, лесные массивы, места постоянного обитания животных и растений и т. д. Наиболее заселены и освоены прирусловые участки реки и районы в устьях притоков. На склонах гор мало сельскохозяйственных угодий, обычно там отсутствуют промышленные объекты. Поэтому создание водохранилищ в горных условиях приносит значительно меньший ущерб, чем на равнинах.

Вследствие подъёма и снижения уровня воды в водохранилище при регулировании стока и волновых явлений проходит переработка берегов водохранилища. Она заключается в размыве и обрушении крутых склонов, срезке мысов и кос. Размеры переработки берегов зависят от их геологического строения, режима уровней воды, глубины водохранилища, конфигурации берегов, ветров и т. п. Относительная стабилизация берегов происходит через 5-20 лет после наполнения водохранилища.

Подтопление прилежащих к водохранилищу земель происходит вследствие подъёма уровня грунтовых вод. В зоне избыточного увлажнения подтопление влечёт за собой негативны последствия – переувлажнение корней растений и их отмирание. С изменением водно-воздушного режима почв может произойти их заболачивание, что ухудшает качество почвы и снижает её продуктивность. В засушливых районах подтопление улучшает условия произрастания растений при соответствующих глубинах почвенных вод. В неблагоприятных условиях может происходить засоление почвы.

Методика исследований. Влияние гидротехнического сооружения на подземные воды нужно рассматривать, разделив на три группы.

1. Благоприятная. При таких обстоятельствах считается, что влияния водохранилища на подземные воды минимально. Но этот вариант не очень подходит применительно к данной территории. Так как по данной ниже водохранилища достаточно обводнена. В этом случае рекомендуется наблюдательные скважины заложит в том направлении, где высокий уровень подземных вод и наблюдается зоны подтопления. Точку наблюдение нужно установить в направлении озера Балыклы. Здесь протекают несколько каналов и имеются несколько прудов для разведения рыб и наблюдается тенденция повышения уровня подземных вод. Это территория используется в сельскохозяйственных целях и покрыта дренажной сетью.

2. Условно благоприятная. В настоящее время в качестве одного из проявлений глобальных изменений природной среды, отражающих характер протекания геодинамических процессов, рассматривается сейсмичность. При

этом существующая связь безопасности напорных гидротехнических сооружений с сейсмическим фактором делает актуальным изучение и прогноз любых возможных изменений. При этом неблагоприятным образом сказывается близость разломных нарушений любого порядка. Обобщение мирового опыта позволяет сделать вывод, что создание водохранилищ в сейсмоопасных районах способно увеличить частоту их появления. По мнению большинства исследователей, при концентрации больших объемов воды в речных долинах в земной коре происходит перераспределение напряжений, что и вызывает землетрясения. Это явление принято называть «наведенной» сейсмичностью.

В этом случае рекомендуется наблюдательные скважины заложит в том направлении, где проходит предполагаемые разломные нарушения. Для этого нужно произвести геофизические исследования для более точного определения места разломных нарушений, где проходит линия предполагаемой тектонической нарушенности и наиболее высокий уровень подземных вод.

3. Неблагоприятные. Создание водохранилищ неизбежно ведет к проявлениям «новых» экзогенных геологических процессов, таких как абразия береговых склонов и направленная деформации русел зарегулированных рек. Масштабы и степень абразии берегов в зоне нового уреза воды определяются различным сочетанием зональных и азональных факторов, при этом ведущую роль играют: интенсивность волнового воздействия, уровенный режим водохранилищ, морфология береговых склонов и свойства слагающих их пород. Наиболее интенсивная переработка наблюдается в начальный период эксплуатации гидроузла.

Заключение. В целях безопасности плотины наблюдательные скважины рекомендуется заложить в районе верхнего и нижнего бьефа водохранилища. Это даёт возможность следить за изменениями минерализации подземных вод и, следовательно, за изменениями количества солей в структуре грунтов.

Таким образом, влияние водохранилищ на состояние окружающей среды

на сегодняшний день требует пристального внимания и изучения. Своевременная оценка и прогноз возможных изменений может быть осуществлен только на основе глубокого изучения и анализа закономерностей формирования природных экосистем, а также влияния на них техногенных процессов.

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ПРОСТРАНСТВЕННО-ВРЕМЕННАЯ ИЗМЕНЧИВОСТЬ ПОПУЛЯЦИЙ МЕЛКИХ МЛЕКОПИТАЮЩИХ В ЭКОСИСТЕМАХ НИЗОВЬЯХ ДЕЛЬТЫ АМУДАРЬИ

Тлегенов Мархабай Толегенович

Каракалпакский институт сельского хозяйства и агротехнологий

tlegenovmarxabay@gmail.com

Аннотация. *В статье анализируются биотопическое распределение, а также некоторые популяционные и демографические параметры сообщества мышевидных грызунов при различных уровнях плотности популяций фоновых (доминантных) видов.*

Ключевые слова: *дельта Амударьи, мелкие млекопитающие, динамика численности, популяционная структура, сообщества грызунов.*

Abstract. *This paper analyzes the* ***biotopic distribution****, as well as certain* ***population*** *and* ***demographic parameters*** *of the community of* ***murid rodents*** *under different levels of population density of background (dominant) species.*

Keywords: *Amu Darya Delta, small mammals, population dynamics, population structure, rodent communities.*

Введение. В настоящее время изучение процессов, в основе которых лежат механизмы адаптивной регуляции в условиях резкого ухудшения состояния окружающей среды, по-прежнему привлекает внимание исследователей, оставаясь центральным вопросом современной популяционной экологии [1, 2, 3, 4, 5, 6, 7]. Мелкие млекопитающие, будучи важным компонентом природных экосистем, традиционно широко используются в качестве модельных организмов в зоологических и экологических исследованиях, в том числе посвященных проблемам антропогенной трансформации ландшафтов [1, 2, 3]. Это многочисленная группа животных, которая благодаря своему положению в трофических цепях экосистем непосредственно испытывает на себе давление различных неблагоприятных факторов среды на обширных территориях и потому может служить индикатором её преобразований. [2, 3, 5, 6, 7].

В современных условиях интенсивного антропогенного и техногенного воздействия на природные комплексы Южного Приаралья существование многих видов животных находится под угрозой исчезновения. Интенсивность факторов окружающей среды, наряду с другими показателями, оказывает существенное влияние на популяционную структуру и динамику численности фауны мелких млекопитающих, обитающих в низовьях дельты Амударьи.

Материалы и методы. Материалом для исследования послужили результаты полевых работ, проведённых в 2019-2024 гг. в естественных и антропогенных местообитаниях мелких млекопитающих в низовьях дельты Амударьи [7]. В качестве показателей биологического разнообразия сообществ использовали общепринятые индексы: индекс биотопической приуроченности, индекс разнообразия Шеннона (H), а также индексы

разнообразия (C) и доминирования (D) Симпсона [4,5,6,7] Выбор биотопов в группе естественных был связан с основными типами растительности зональных элементов ландшафта [4, 5, 6, 7].

Естественные места обитания включали тугайные леса и тростниковые заросли в низовьях дельты Амударьи. В антропогенной группе биотопов были обследованы залежи, лесополосы вдоль автомагистралей и сельскохозяйственные поля фермерских хозяйств Республики Каракалпакстан.

Обсуждение результатов. В последние годы в связи с неблагоприятными направленными изменениями климата и связанными с ними преобразованиями растительного покрова одной из наиболее актуальных задач стала оценка устойчивости популяций симпатрических видов животных, а также сохранение состава и структуры их сообществ [4,5,6,7]. Детальный анализ биотопической приуроченности популяций мелких млекопитающих в низовьях Амударьи позволяет оценить их устойчивость к антропогенной трансформации экосистем и в определенной степени спрогнозировать тенденции изменения их положения в сообществах при дальнейшем хозяйственном освоении и ирригации земель.

Как известно, любая система экологического контроля состоит из экологического мониторинга и анализа полученных данных, на основе которых принимаются решения о перспективах функционирования экосистемы и её практического использования [1, 2, 3, 4, 5, 6, 7]. В данном случае гумидные экосистемы Приаралья - тугайные биоценозы - под влиянием общего процесса трансформации ландшафта претерпели глубокие сукцессионные изменения.

Анализ полученных оценок пространственной структуры популяций мелких млекопитающих и их биотопической приуроченности в низовьях Амударьи показывает, что популяции грызунов на территориях с интенсивным антропогенным воздействием и на естественных (природных) территориях существенно различаются по всем показателям. По характеру

распределения местообитаний млекопитающих территория низовьев Амударьи делится на три биотопа: камышовые заросли и водоёмы, тугайные леса и сельскохозяйственные угодья.

В результате усиления процессов опустынивания, сокращения тугайной и тростниковой растительности, интенсификации землепользования и других негативных факторов резко сократились ареал распространения и численность мезофильных видов. Анализ показал, что в низовьях Амударьи обитает 13 видов, среди которых многочисленны домовая мышь (Mus musculus, 13,6%), индийская крыса (Nesokia indica, 23,2%), малый тушканчик (Allactaga elater, 14,5%) и гребенщиковая песчанка (Meriones tamariscinus, 15,3%), а в водоемах встречается ондатра (Ondatra zibethica).

Орошаемое земледелие относится к числу наиболее мощных преобразующих факторов. На сельскохозяйственных полях различных агропредприятий формируется особое сообщество грызунов, которое существенно отличается от коренных сообществ, существовавших до освоения земель [4, 5, 6,7]. Как отмечают специалисты, далеко не все животные способны приспособиться к жизни на сельскохозяйственных угодьях, однако существуют виды грызунов, для которых обитание на полях стало обычным явлением [4, 5, 6, 7].

Применяемые информационные индексы видового разнообразия [4,5,6,7] помогают выявить различия между местообитаниями различных сообществ и определить наиболее благоприятный биотоп для мышевидных грызунов [5, 6, 7]. Видовой состав мелких млекопитающих в исследованных растительных сообществах очень схож как в количественном, так и в качественном отношении, а различия проявляются в основном на уровне редких видов [4,5,6,7]. Вследствие этого индексы разнообразия сообществ мышевидных грызунов в разных местообитаниях различаются незначительно и в среднем демонстрируют относительно низкие значения (табл. 1). Наибольшее видовое разнообразие было зафиксировано в сельскохозяйственных биотопах, где индекс разнообразия (H) был выше, чем в других естественных биотопах. В

других естественных местообитаниях - тугайных лесах и тростниковых зарослях - эти показатели были несколько ниже.

1- Таблица

Показатели видового разнообразия мелких млекопитающих в различных биотопах низовьев Амударьи

Биотоп	Индекс видового богатства,	С, индекс видового разнообразия,	Н, индекс доминирования симпсона, D
Тростниковые заросли	1,24	1,26	0,36
Водоёмы, дренажная сеть	0,21	0,34	0,15
Тугайная растительность	0,75	1.12	0.21
Сельскохозяйственные угодья	1,18	1,56	0,23

Более низкие значения индексов, полученных для тростниковых зарослей и тугайных экосистем, вероятно, связаны с тем, что их величины могут значительно колебаться во время массовых вспышек численности одного-двух фоновых видов [4,5,6,7].

Проведенные исследования позволили установить, что более низкий уровень общей численности и нарушение пространственной структуры популяций мезофильных видов грызунов (Ondatra zibethica, Microtus ilaeus и др.) обусловлены сокращением доли микроместообитаний, пригодных для их существования. Следует отметить, что эти местообитания становятся изолированными, а доля зональной территории с благоприятными условиями обитания сокращается по сравнению с исходной природной зоной, что отражается на показателях заселенности данной территории популяциями. В то же время виды сохраняются на тех участках, где емкость

микроместообитаний позволяет поддерживать их нормальную жизнедеятельность [4,5,6,7]. Среди элементов антропогенных ландшафтов наибольшее экологическое значение для грызунов имеет открытая коллекторно-дренажная сеть. Эти сооружения служат основными местами обитания и рефугиумами для таких видов грызунов, как Mus musculus, Nesokia indica и Meriones tamariscinus. После освоения и орошения сельскохозяйственных земель в различных фермерских хозяйствах Каракалпакстана популяции Mus musculus и Nesokia indica находят благоприятные кормовые и защитные условия на откосах открытой коллекторно-дренажной сети. Различные насыпи и построенные коллекторные дамбы с рыхлой почвой являются предпочтительными местами для рытья нор для Nesokia indica. В населенных пунктах и фермерских хозяйствах доминирующими видами грызунов становятся Mus musculus и Nesokia indica.

Таким образом, в антропогенных ландшафтах формируются совершенно новые экологические условия, к которым способны адаптироваться экологически пластичные виды. Трансформация ландшафта оказывает как прямое, так и косвенное воздействие на фауну и популяции грызунов, создавая оптимальные условия для существования одних видов и, наоборот, неблагоприятные - для других. Для подавляющего большинства видов грызунов кормовые условия в антропогенных ландшафтах ограничены [4, 5, 6, 7].

В результате антропогенной трансформации ландшафта, благодаря сохранению мозаичности биотопов, численность некоторых видов грызунов (Ondatra zibethica, Microtus ilaeus, Allactaga elater) возрастает. В то же время в антропогенных ландшафтах обедняется видовое разнообразие кормовых растений грызунов, нарушаются трофические связи и снижается плотность их популяций. Как следствие, разные виды грызунов демонстрируют неодинаковую степень приуроченности к антропогенным комплексам. Так, Mus musculus хуже других видов приспособлен к обитанию в естественных

биотопах и достигает высокой численности в антропогенных. В естественных биотопах этот вид появляется только в годы высокой плотности популяции. Meriones tamariscinus обитает в естественных биотопах, преимущественно в тугайных пойменных лесах и тростниковых зарослях, где может занимать доминирующее положение; из антропогенных биотопов для постоянного обитания он использует интразональные полосы. [4,5,6,7].

Таким образом, стабильность популяций мелких млекопитающих в районах с высоким антропогенным прессом, по-видимому, определяется индивидуальными адаптивными реакциями, приводящими к интенсификации физиологических процессов в организме. С точки зрения эволюционно-экологического подхода, этот механизм представляет собой первый, наиболее примитивный и энергозатратный, этап адаптивных изменений, однако именно он обеспечивает существование и целостность популяционных систем мелких млекопитающих в условиях интенсивного антропогенного воздействия.

На трансформированных территориях амплитуда динамики численности популяций по сравнению с природными территориями возрастает (за исключением Microtus ilaeus), что подчёркивает несбалансированность условий обитания для большинства мезофильных видов. Этот эффект особенно заметен в периоды депрессий численности и ведёт к увеличению амплитуды её колебаний. Для структуры популяций характерен значительный вклад синантропных видов (Mus musculus, Nesokia indica). Численность животных в районах антропогенных сукцессий в низовьях Амударьи сопоставима с показателями в ненарушенных природных ландшафтах, а в некоторых местообитаниях и значительно превышает их.

Наши данные подтверждают хорошо известную концепцию, согласно которой в экологическом оптимуме ареала вида плотность популяции не только выше, но и более стабильна, тогда как на периферии она колеблется в более широком диапазоне [4,5,6,7]. В пессимальных условиях популяции сильно разрежены, у них отсутствуют эффективные механизмы регуляции численности, а их обилие в основном ограничивается внешними факторами.

Анализ демографической, половой и возрастной структуры популяций фоновых видов показывает, что основные параметры популяций стабильны и соответствуют видовым нормам. Сходство в репродуктивных процессах отмечается у домовой мыши (Mus musculus). Высокий репродуктивный потенциал позволяет популяциям увеличивать свою плотность в течение одного-двух сезонов размножения, а высокая ёмкость среды обитания способствует поддержанию её на высоком уровне. [4,5,6,7].

Демографическая структура слабо зависит от уровня численности популяции, антропогенного воздействия, биотопической приуроченности или внешних факторов среды. Соотношение самцов и самок во всех возрастных группах практически равное, что также свидетельствует о стабильности популяции. У рыжей полёвки наблюдается высокая интенсивность размножения, а изменчивость размера выводка по годам и сезонам не является фактором, регулирующим численность популяции. Для тамарисковой песчанки (Meriones tamariscinus) характерно наличие внутрипопуляционных механизмов регуляции численности; в годы высокой плотности в популяции преобладают самцы разных возрастных групп. Домовая мышь (Mus musculus) способна к интенсивному размножению и быстрому росту численности, отличается большим размером выводка и демонстрирует примерно равное соотношение полов. [4,5,6,7].

Вывод. В настоящее время на данной территории достигнут баланс между природными ресурсами и плотностью населяющих её популяций. Сосуществование видов, по-видимому, определяется не конкурентными взаимодействиями, а разделением жизненного пространства в соответствии с биологическими особенностями каждого вида.

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SOCIAL SCIENCES, HUMANITIES, AND SOCIETAL DEVELOPMENT

TIL VA TAFAKKUR: DUNYONI INTEGRATSIYA QILISHDA TILNING ROLI

Abdullayeva Gulnora Erimmatovna

Xodjayeva Gulyor Bahramovna

Abu Rayhon Beruniy nomidagi Urganch davlat universiteti

Annotatsiya. *Mazkur maqolada til va tafakkur o‘rtasidagi uzviy munosabat, tilning inson tafakkurini shakllantirishdagi o‘rni hamda globallashuv sharoitida dunyo xalqlari o‘rtasidagi integratsiyani ta’minlashdagi ahamiyati tahlil qilinadi. Til kommunikativ, kognitiv va madaniy fenomen sifatida jamiyatning ijtimoiy tajribasini saqlash, uzatish va yangilashda markaziy vosita bo‘lib xizmat qiladi. Maqolada nazariy yondashuvlar, tilning ijtimoiy funksiyalari va ko‘p tillilikning zamonaviy taraqqiyotdagi o‘rni akademik uslubda yoritiladi.*

Kalit so‘zlar: *til, tafakkur, kommunikatsiya, integratsiya, globallashuv, kognitiv jarayon, madaniyatlararo muloqot, ko‘p tillilik.*

Abstract. *This article analyzes the inextricable relationship between language and thought, the role of language in the formation of human thought, and its importance in ensuring integration between the peoples of the world in the context of globalization. Language, as a communicative, cognitive, and cultural phenomenon, serves as a central tool for preserving, transmitting, and updating the social experience of society. The article discusses theoretical approaches, the social functions of language, and the role of multilingualism in modern development in an academic manner.*

Keywords: *language, thought, communication, integration, globalization, cognitive process, intercultural dialogue, multilingualism.*

Аннотация. *В данной статье анализируется неразрывная связь между языком и мышлением, роль языка в формировании человеческого мышления и его важность для обеспечения интеграции народов мира в контексте глобализации. Язык, как коммуникативный, познавательный и культурный феномен, служит центральным инструментом сохранения, передачи и обновления социального опыта общества. В статье в академическом ключе рассматриваются теоретические подходы, социальные функции языка и роль многоязычия в современном развитии.*

Ключевые слова: *язык, мышление, коммуникация, интеграция, глобализация, познавательный процесс, межкультурный диалог, многоязычие.*

Kirish

Til insoniyat jamiyatining eng muhim ijtimoiy hodisalaridan biri bo‘lib, u nafaqat aloqa vositasi, balki bilimni tartibga solish, saqlash va uzatish mexanizmi sifatida ham amal qiladi. Inson o‘z fikrini til orqali shakllantiradi, umumlashtiradi va boshqalar bilan almashadi. Shu jihatdan til faqat kommunikativ vosita emas, balki tafakkurning tashqi ko‘rinishi va ijtimoiy mavjudlik shaklidir.Til va tafakkur munosabati tilshunoslik, falsafa, psixologiya va kognitiv fanlar doirasida uzoq yillardan beri muhim nazariy muammo sifatida tadqiq etib kelinadi. Tilning ijtimoiy tabiati, uning belgilar tizimi sifatidagi mohiyati hamda ma’no yaratishdagi funksiyasi klassik tilshunoslikda alohida o‘rin tutadi (Saussure, 1916). Zamonaviy ilmiy qarashlarda esa til tafakkur jarayonini strukturallashtiruvchi, konseptual tasniflarni mustahkamlovchi va dunyo haqidagi tasavvurlarni me’yorlashtiruvchi mexanizm sifatida talqin qilinadi (Sapir, 1921). Bugungi globallashuv sharoitida tilning roli yanada kengaydi. Endilikda til nafaqat milliy birlikni saqlash vositasi, balki transmilliy iqtisodiy, ilmiy va madaniy aloqalarni ta’minlovchi strategik resurs sifatida ham baholanadi. Shu sababli til va tafakkur masalasini dunyo integratsiyasi kontekstida o‘rganish nazariy hamda amaliy jihatdan dolzarbdir.Til - jamiyat tomonidan yaratiladigan va jamiyatda amal qiladigan murakkab semiotik tizimdir. U fonetik, leksik, grammatik va uslubiy qatlamlar orqali fikrning tashqi ifodasini

ta’minlaydi. Tilning asosiy xususiyatlaridan biri shundaki, u individual ong mahsuli bo‘lishi bilan birga kollektiv tajriba mahsuli hamdir. Demak, til shaxsiy nutqda voqelanadi, ammo ijtimoiy ongda me’yorlashadi. Tafakkur esa borliqni ongda aks ettirish, tushuncha hosil qilish, qiyoslash, tahlil va umumlashtirish kabi aqliy operatsiyalar majmuidir. Tafakkur yordamida inson voqelikni bevosita sezish chegarasidan tashqariga olib chiqadi, sabab-oqibat aloqalarini belgilaydi va konseptual bilimni yaratadi. Til shu konseptual bilimning moddiylashgan shakliga aylanadi.Shu nuqtai nazardan, til va tafakkur o‘rtasidagi munosabatni bir tomonlama emas, balki o‘zaro ta’sirga asoslangan tizim sifatida tushunish maqsadga muvofiq. Til fikrni ifodalaydi, lekin ayni paytda fikrning shakllanish trayektoriyasiga ham ta’sir etadi. Ayniqsa, kategoriyalash, baholash va nomlash jarayonlarida tilning strukturaviy imkoniyatlari tafakkurning yo‘nalishini belgilab beradi.Til va tafakkur o‘rtasidagi munosabat dialektik xarakterga ega: bir tomondan, tafakkur tilsiz to‘liq ijtimoiylashmaydi; ikkinchi tomondan, til tafakkursiz bo‘sh shaklga aylanadi. Insonning ichki nutqi, mantiqiy xulosalari va abstrakt tasniflari til orqali tizimlashadi. Demak, til fikrni shunchaki tashqi shaklda ifodalab qo‘ymaydi, balki uni aniq mantiqiy tuzilishga keltiradi.Lingvistik nisbiylikka oid qarashlar inson dunyoqarashi uning tilidagi semantik va grammatik kategoriyalar bilan bog‘liqligini ko‘rsatadi (Sapir, 1921). Bu yondashuvni mutlaqlashtirmasdan turib ham e’tirof etish mumkinki, tilda mavjud tasniflar, atamalar va metaforik modellar tafakkur jarayonida faol ishtirok etadi. Shuning uchun turli tillarni bilish insonning konseptual ufqini kengaytiradi.Tafakkurning mahsuldorligi ham ko‘p jihatdan tilning boyligiga, aniqligiga va semantik nozikliklariga bog‘liq. Leksik zahirasi keng, tushunchaviy apparati rivojlangan tilda murakkab ilmiy g‘oyalarni ifodalash va muhokama qilish osonlashadi. Natijada til tafakkurning kengayishiga xizmat qiluvchi epistemik vositaga aylanadi.Til jamiyat hayotida bir vaqtning o‘zida kommunikativ, kognitiv, kumulyativ va identifikatsion funksiyalarni bajaradi. Kommunikativ funksiya insonlar o‘rtasidagi aloqa va axborot almashinuvini ta’minlasa, kumulyativ funksiya tarixiy xotira, madaniy tajriba va qadriyatlarni avloddan avlodga yetkazadi. Shu tariqa til madaniyatning tashuvchisi va reproduktiv

mexanizmi sifatida namoyon bo‘ladi.Har bir xalqning dunyoni ko‘rish usuli, ijtimoiy me’yorlari va estetik qarashlari til birliklarida muayyan darajada aks etadi. Milliy tilning rivoji faqat lingvistik hodisa emas, balki ma’naviy mustaqillik, tarixiy davomiylik va madaniy suverenitet masalasi hamdir. Tilning zaiflashuvi ko‘pincha madaniy kodlarning yemirilishiga olib keladi.Tilning milliy o‘zlikni mustahkamlovchi roli ko‘plab mutafakkirlar tomonidan ta’kidlangan. Xususan, o‘zbek ijtimoiy-falsafiy tafakkurida til ma’naviy merosni saqlash, milliy xotirani tiklash va jamiyatni birlashtirish vositasi sifatida baholangan (Karimov, 2008). Shu sababli til siyosati, terminologiya siyosati va ta’lim tili masalalari bevosita jamiyat taraqqiyoti bilan bog‘liqdir. Globallashuv davrida tilning funksional maydoni milliy chegaralar bilan cheklanmay qoldi. Xalqaro savdo, ilmiy hamkorlik, raqamli kommunikatsiya va akademik mobillik umumiy yoki o‘zaro tarjima qilinadigan til vositalarini talab etmoqda. Shu ma’noda til global integratsiyaning infratuzilmaviy elementi sifatida ishlaydi.Bugungi kunda ingliz tili xalqaro ilm-fan va texnologiya sohasida yetakchi kommunikativ maydonni egallagan bo‘lsa-da, bu holat boshqa tillarning ahamiyatini kamaytirmaydi. Aksincha, ko‘p tillilik global dunyoda raqobatbardoshlikni oshiradi, madaniyatlararo vositachilikni kuchaytiradi va mahalliy bilimlarning xalqaro maydonga chiqishiga yordam beradi. Demak, integratsiya bir tilni mutlaqlashtirish emas, balki ko‘p tilli muvozanatni yaratish orqali samarali bo‘ladi. Raqamli platformalar va internetning jadal rivoji tilning integratsion salohiyatini keskin oshirdi. Masofaviy ta’lim, onlayn konferensiyalar, elektron kutubxonalar va avtomatik tarjima texnologiyalari bilim almashinuvini demokratlashtirdi. Biroq bu jarayon til tengsizligi, kichik tillarning siqilishi va terminologik asimmetriya kabi muammolarni ham yuzaga chiqarmoqda. Shuning uchun global integratsiya til siyosati bilan uyg‘un holda olib borilishi zarur.Til ta’lim tizimining asosiy tashuvchisi bo‘lib, bilimning shakllanishi, tushuntirilishi va ichkilashtirilishida hal qiluvchi rol o‘ynaydi. O‘quv jarayonida tushunchalarning aniqligi, ta’riflarning mantiqiyligi va matnning uslubiy ravonligi bevosita til sifatiga bog‘liq. Shu sababli ilmiy tilning rivoji, akademik yozuv madaniyati va terminologik izchillik ta’lim samaradorligining muhim shartlaridan

hisoblanadi.Ko‘p tillilik insonning kognitiv moslashuvchanligini kuchaytiradi, turli konseptual modellarni qiyoslash imkonini beradi va murakkab fikriy operatsiyalarni faollashtiradi. Bir nechta tilda mutolaa qiladigan shaxs turli ilmiy maktablar va metodologiyalar bilan bevosita tanishadi, bu esa tafakkur ufqini kengaytiradi. Natijada til nafaqat bilimni uzatish, balki bilimni yangidan ishlab chiqish vositasiga ham aylanadi.

Bugungi sharoitda yuqori malakali mutaxassis tayyorlash til kompetensiyasini rivojlantirishsiz tasavvur etib bo‘lmaydi. Fanlararo muloqot, ilmiy maqola yozish, konferensiyalarda qatnashish va xalqaro ma’lumotlar bazalaridan foydalanish til bilan chambarchas bog‘liqdir. Demak, tilning rivoji - bu bir vaqtning o‘zida tafakkurning, ilmning va jamiyatning rivojidir.

Xulosa

Til va tafakkur o‘rtasidagi munosabat insonning bilish faoliyatini tushunishda markaziy nazariy masalalardan biridir. Til fikrning tashqi ifodasi bo‘lish bilan kifoyalanmay, uning shakllanishi, tartibga solinishi va ijtimoiylashuvida ham faol ishtirok etadi. Shu sababli tilni tafakkurdan ajratib o‘rganish yetarli natija bermaydi.Zamonaviy globallashuv sharoitida tilning vazifalari yanada kengaydi: u milliy o‘zlikni saqlash, bilimlarni uzatish, madaniyatlararo muloqotni yo‘lga qo‘yish va dunyo miqyosida integratsiyani ta’minlash vositasiga aylandi. Ayniqsa, ko‘p tillilik, akademik til madaniyati va ilmiy kommunikatsiya bugungi taraqqiyotning zarur shartlaridan biri sifatida namoyon bo‘lmoqda.Shunday ekan, tilni rivojlantirish masalasi faqat filologik muammo emas, balki strategik ijtimoiy vazifadir. Tilga bo‘lgan e’tibor - tafakkurga, ilm-fanga va jamiyatning kelajak salohiyatiga bo‘lgan e’tibordir.

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FRAZEOLOGIK BIRLIKLARDA MILLIY-MADANIY SEMANTIKANING IN’IKOSI

S.U.Abduxalimova

Qo‘qon davlat universiteti

3-kurs tayanch doktoranti

xaydaraliyeva95@mail.ru

Annotatsiya

Ushbu maqolada frazeologik birliklarning milliy-madaniy semantikasi madaniyatlararo muloqot prizmasida tadqiq etiladi. Iboralar shunchaki til birligi emas, balki xalqning dunyoqarashini aks ettiruvchi «madaniy kod» sifatida tahlil qilingan. Tadqiqot davomida o‘zbek va ingliz tillaridagi realiyalar, somatik va animalistik obrazlar qiyoslanib, ularning muloqotdagi pragmatik xususiyatlari ochib berilgan. Natijalar shuni ko‘rsatadiki, frazeologizmlarni to‘g‘ri anglash madaniyatlararo tushunmovchiliklarning oldini oladi va tarjima mahoratini oshiradi. Maqola lingvokulturologiya va tarjimashunoslik yo‘nalishidagi mutaxassislar uchun mo‘ljallangan.

Kalit so‘zlar: frazeologiya, madaniyatlararo muloqot, milliy-madaniy semantika, lingvokulturologiya, pragmatik xato, madaniy kod, ekvivalentlik

Annotation:

This article explores the national-cultural semantics of phraseological units through the lens of intercultural communication. Idioms are analyzed not merely as linguistic units but as «cultural codes» reflecting a nation's worldview. The research compares realia, somatic, and animalistic imagery in Uzbek and English, highlighting their pragmatic roles in discourse. Findings suggest that a deep understanding of phraseology prevents intercultural miscommunication and enhances translation proficiency. This study provides valuable insights for specialists in ethnolinguistics and translation studies, offering a systematic approach to cultural adaptation in language.

Keywords: phraseology, intercultural communication, national-cultural semantics, ethnolinguistics, pragmatic failure, cultural code, equivalence.

Kirish

Til shunchaki axborot almashish quroli emas, balki millatning asrlar davomida to‘plagan tajribasi, qadriyatlari va hissiyotlarini o‘zida saqlaydigan tirik xazinadir. Ushbu ulkan xazinaning eng jozibador va mazmunan zichlashgan qismi, shubhasiz, frazeologizmlardir. Ular xalqning dunyoqarashini obrazli shaklda ifodalovchi «madaniy genom» vazifasini o‘taydi.

Bugungi globallashuv sharoitida, turli madaniyat vakillari o‘zaro muloqotga kirishar ekan, til to‘siqlari faqatgina lug‘at boyligi bilan hal bo‘lmayotganiga guvoh bo‘lmoqdamiz. Madaniyatlararo muloqot diskursida frazeologik birliklar ko‘pincha kutilmagan «tushunmovchilik nuqtalari»ga aylanadi. Buning sababi shundaki, iboralarning tub ma’nosi ularni tashkil etgan so‘zlarning mexanik yig‘indisidan emas, balki o‘sha xalqqa xos bo‘lgan chuqur milliy assotsiatsiyalar va tarixiy xotiradan suv ichadi.

Tadqiqotning dolzarbligi: Hozirgi kunda chet tilini o‘rganish va o‘rgatishda shunchaki grammatik qoidalar yoki leksik birliklarni yodlash yetarli emas. Muloqotning muvaffaqiyati bevosita «madaniy konnotatsiya»ni — so‘z ortidagi yashirin ma’no va emotsional bo‘yoqni to‘g‘ri anglashga bog‘liq bo‘lib qolmoqda.

Frazeologizmlarni tushunmaslik nafaqat so‘z o‘yinini boy berishga, balki muloqotdagi pragmatik xatolarga, hatto madaniy ziddiyatlarga olib kelishi mumkin.

Tadqiqotning maqsadi: Ushbu ishda frazeologik birliklar tarkibidagi milliy-madaniy komponentlarning shakllanish mexanizmlarini tahlil qilish hamda ularning jonli muloqot jarayonidagi (diskursiv) o‘ziga xosliklarini ochib berish ko‘zda tutilgan. Bizning vazifamiz — til birliklari ortida yashiringan madaniy kodlarni «o‘qish» orqali samarali madaniyatlararo muloqot modelini yaratishga hissa qo‘shishdir.

Asosiy qism

Ushbu tadqiqot doirasida frazeologik birliklarning murakkab va ko‘p qirrali tabiatini ochib berish maqsadida o‘zaro bir-birini to‘ldiruvchi quyidagi zamonaviy lingvistik metodlar majmuasidan foydalanildi:

2.1. Lingvokulturologik tahlil: Til va madaniyat sintezi

Ushbu metod yordamida frazeologizmlar shunchaki leksik birlik emas, balki milliy mentalitetning «arxivlangan» ko‘rinishi sifatida tadqiq etildi. Tahlil jarayonida iboralarning etimologiyasi, ularning xalq og‘zaki ijodi, urf-odat va an’analar bilan bog‘liqligi o‘rganildi. Bu bizga til birligi qatiga yashiringan «milliy ruh»ni va uning muloqotdagi ramziy ma’nolarini aniqlash imkonini berdi.

2.2. Qiyosiy-tipologik metod: Madaniyatlararo ko‘prik

Turli tizimli tillarni (o‘zbek va ingliz) solishtirish orqali frazeologik tizimlarning o‘xshash (universal) va farqli (milliy-spesifik) jihatlari klassifikatsiya qilindi. Bunda asosiy e’tibor quyidagilarga qaratildi:

Frazeologik ekvivalentlik: Bir tildagi obrazning ikkinchi tilda aynan saqlanishi.

Lakunalar (bo‘shliqlar): Muayyan madaniyatga xos bo‘lib, ikkinchi tilda muqobili bo‘lmagan birliklarni aniqlash va ularning madaniyatlararo muloqotdagi «to‘siq» darajasini baholash.

2.3. Kontekstual va diskursiv tahlil: Jonli muloqot dinamikasi

Frazeologizm lug‘atda o‘lik birlik bo‘lsa, nutqda u tiriladi. Ushbu metod orqali frazeologik birliklarning konkret nutqiy vaziyat (diskurs) ichidagi xatti-harakati tahlil qilindi. Tadqiqotda iboralarning matn ichida o‘zgarishi (transformatsiyasi), yangi ma’no qirralari kasb etishi hamda muloqot ishtirokchilarining emotsional holatiga ta’sir ko‘rsatish xususiyatlari kuzatildi.

2.4. Semantik komponentlar tahlili

Iboralar tarkibidagi ayrim so‘zlarning (masalan, rang, raqam yoki tana a'zolari) simvolik yukini aniqlash uchun qo‘llanildi. Bu metod har bir so‘zning frazeologizm tarkibiga kirishda qanday madaniy «filtr»dan o‘tganini ko‘rsatib beradi.

O‘tkazilgan qiyosiy-tipologik tahlillar shuni ko‘rsatdiki, frazeologik birliklarning milliy-madaniy semantikasi shunchaki tasodifiy obrazlar emas, balki xalqning hayot tarzi bilan bog‘liq uchta asosiy ustun (kod) asosida shakllanadi:

3.1. Etnomadaniy realiyalar (Ob’yektlar kodi)

Iboralar tarkibidagi moddiy madaniyat unsurlari — taomlar, kiyim-kechaklar va joy nomlari o‘sha xalqning dunyoqarashini o‘zida muhrlaydi.

Tahlil: O‘zbek tilidagi «oshga pashsha tushmoq» iborasini olaylik. Bu yerda «osh» shunchaki ozuqa emas, balki jamoaviylik, bayram va muqaddaslik ramzidir. Unga pashshaning tushishi — katta va xayrli ishning arzimagan illat tufayli buzilishini anglatadi.

Qiyos: Ingliz madaniyatida bu holat «a fly in the ointment» (malham ichidagi pashsha) orqali ifodalanadi. Bu yerda «malham» (ointment) qadimgi tibbiyot va diniy marosimlarda qadrli sanalgan, shuning uchun uning pashsha bilan ifloslanishi salbiy assotsiatsiyani keltirib chiqargan.

3.2. Somatik metaforalar (Tana a’zolari kodi)

Inson tana a’zolari universal bo‘lsa-da, ularga yuklangan ramziy ma’no madaniyatlar kesimida tubdan farq qilishi mumkin.

Tahlil: O‘zbek mentalitetida «jigar» (liver) yaqinlik, qondoshlik va sadoqatning eng yuqori nuqtasi hisoblanadi («jigarim», «jigargo‘sham»).

Qiyos: G‘arb madaniyatida (masalan, ingliz tilida) bu emotsional yuk ko‘pincha «heart» (yurak) komponentiga tushadi. Agar o‘zbek kishisi jigari haqida gapirganda «mehribonlik»ni nazarda tutsa, ingliz muloqotida bu holat ko‘proq «dear heart» yoki «kind-hearted» kabi birliklar bilan qoplanadi.

3.3. Animalistik obrazlar (Hayvonot olami kodi)

Hayvonlarga xos xususiyatlarning ko‘chma ma’no hosil qilishi madaniyatlararo muloqotda eng ko‘p «tuzoq» (miscommunication) yaratadigan sohadir.

Tahlil: «It» (dog) obrazi sharq va g‘arb diskursida qarama-qarshi qutblarda turadi. O‘zbek frazeologiyasida u ko‘pincha pastlik, sadoqatning salbiy bo‘yog‘i yoki qadrsizlik bilan assotsiatsiya qilinsa («itning keyingi oyog‘i», «iti maza qilmoq»), ingliz madaniyatida it — oila a’zosi va haqiqiy do‘st timsolidir («a man’s best friend», «top dog»).

Natija: Muloqot ishtirokchisi bu nozik farqlarni bilmasligi suhbatdoshining shaxsiyatiga tegadigan pragmatik xatoga sabab bo‘lishi mumkin.

Tahliliy xulosalar jadvali

№	Frazeologik Birlik (Manba til)	Madaniy komponent	Simvolik ma’nosi	Funksional muqobili (Nishon til)
1.	«Oshga pashsha tushmoq»	Osh (Realiya)	Ezgu ishning buzilishi	«A fly in the ointment»
2.	«To carry coals to Newcastle»	Newcastle (Lokatsiya)	Befoyda harakat	«Daryoga suv quymoq»

3.	«Eshak polvon, ot polvon»	Polvon (Maqom)	Istehzo/Kuch-quvvat	«As strong as an ox»
4.	«To spill the beans»	Beans (O‘simlik)	Yashirin sirni ochish	«Sirni boy bermoq»

Tadqiqotimiz natijalari shuni tasdiqlaydiki, frazeologik birliklarni tarjima qilish yoki muloqotda qo‘llash — bu shunchaki so‘zlarni bir tildan ikkinchisiga mexanik ko‘chirish emas, balki bir milliy dunyoqarashdan ikkinchisiga ma’naviy ko‘prik qurish jarayonidir. Ushbu jarayonda tilshunos yoki tarjimon zimmasiga nafaqat lug‘at bilan ishlash, balki o‘sha xalqning «yurak urishi» va tarixiy xotirasini his qilishdek murakkab vazifa yuklanadi.

4.1. «Kalka» tarjimasi va pragmatik muvaffaqiyatsizlik

Madaniyatlararo diskursda frazeologik birliklarni so‘zma-so‘z (kalka) o‘girish ko‘p hollarda pragmatik muvaffaqiyatsizlikka (pragmatic failure) olib keladi. Buning sababi, iboralarning semantik o‘zagi ko‘pincha o‘sha xalqning diniy e’tiqodlari, qadimiy mifologiyasi va turmush tarzi bilan chambarchas bog‘liqligidir.

Misol tahlili: Ingliz tilidagi «to carry coals to Newcastle» (Nyu-Kaslga ko‘mir tashimoq) iborasini ko‘rib chiqaylik. Nyu-Kasl — tarixan ko‘mir sanoati markazi. Uni o‘zbek tilidagi «Xo‘jaga ziyorat o‘rgatmoq» yoki «Daryoga suv quymoq» kabi variantlar bilan almashtirish mantiqan to‘g‘ri bo‘lsa-da, ularning har biri o‘ziga xos lokal «shira»ga ega. «Xo‘ja» obrazi orqali o‘zbek kishisining diniy-ijtimoiy tabaqalanishga oid tasavvurlari namoyon bo‘lsa, Nyu-Kasl misolida ingliz iqtisodiy tarixi aks etadi. Bu kabi «lokal bo‘yoqlar» muloqotda milliy o‘ziga xoslikni ta’minlaydi.

4.2. «Loviya» va yashirin mantiqiy zanjir

G‘arb madaniyatiga xos bo‘lgan «to spill the beans» (loviyani to‘kib yuborish) iborasi ingliz suhbatdoshi uchun oddiy va tabiiy tuyulsa, o‘zbek kitobxoni yoki tinglovchisi uchun bu tasvir ortidagi yashirin mantiqiy zanjirni (masalan, qadimgi Gretsiyadagi ovoz berish an’analarini) tushuntirish talab etiladi. Bu esa muloqot ishtirokchisidan shunchaki lingvistik bilimni emas, balki chuqur entsiklopedik tayyorgarlikni ham talab qiladi.

4.3. Internatsionalizatsiya va milliy o‘zak ziddiyati

Zamonaviy diskursning o‘ziga xos jihati shundaki, bugungi kunda frazeologizmlarning «internatsionallashuvi» — ya’ni bir tildagi iboralarning boshqa tillarga ommaviy kirib borishi kuzatilmoqda. Biroq, bu jarayonda ham milliy o‘zak (national core) o‘z kuchini saqlab qoladi. Masalan, «Vaqt — oqar daryo» yoki «Vaqt — bu pul» kabi tushunchalar umuminsoniy bo‘lsa-da, ularning har bir madaniyatdagi qabul qilinish darajasi va hissiy yuklamasi turlichadir.

4.4. Madaniy sezgirlikning ahamiyati

Munozarali jihati shundaki, zamonaviy muloqotda frazeologizmlarni noto‘g‘ri qo‘llash shunchaki «til bilmaslik» emas, balki suhbatdoshning madaniyatiga nisbatan hurmatsizlik sifatida talqin qilinishi mumkin. Shuning uchun, frazeologik birliklar tahlili muloqotda «madaniy filtr» vazifasini o‘tashi kerak. Tarjimonning mahorati — bir xalqning qadriyatini ikkinchi xalqqa uning o‘z tushunchalari tilida, ammo asil ma’noni yo‘qotmagan holda yetkazib bera olishidadir.

Xulosa

O‘tkazilgan tadqiqot va qiyosiy tahlillar shuni ko‘rsatadiki, frazeologik birliklar tilning shunchaki estetik bezagi yoki nutqning «shirasi» emas. Ular har bir millatning asrlar davomida shakllangan intellektual va emotsional tajribasini, qadriyatlar tizimini hamda dunyoqarashini o‘zida mujassam etgan kontseptual xarita vazifasini o‘taydi. Xulosa o‘rnida quyidagi muhim jihatlarni alohida ta’kidlash lozim:

Muloqot strategiyasi va xavfsizligi: Frazeologizmlarning milliy-madaniy semantikasini chuqur anglash madaniyatlararo muloqotda yuzaga kelishi mumkin bo‘lgan semantik «tuzoq»lar va anglashilmovchiliklarning oldini oladi. Bu esa muloqot ishtirokchilariga nafaqat axborot almashish, balki suhbatdoshining madaniy «shaxsiyati»ga hurmat bilan yondashish imkonini beradi.

Tarjima nazariyasining boyishi: Tadqiqot davomida aniqlangan qiyosiy misollar tarjima nazariyasini yangi amaliy tahlillar bilan boyitadi. Frazeologizmlarni tarjima qilishda «ekvivalentlik» tushunchasi shunchaki ma’no muvofiqligi emas, balki madaniy kontekstni moslashtirish (adaptatsiya) ekanligi isbotlandi.

Madaniy tolerantlik va sezgirlik: Til o‘rganuvchilar va tadqiqotchilarda frazeologik kompetensiyani shakllantirish ularda «madaniyatlararo tolerantlik» va sezgirlikni tarbiyalaydi. Bu esa globallashgan dunyoda turli dunyoqarash egalari o‘rtasida o‘zaro ishonch va tushunish ko‘priklarini mustahkamlashga xizmat qiladi.

Lingvistik prognoz: Kelgusida frazeologizmlarni o‘rganish nafaqat ularning lug‘aviy ma’nosini, balki ularning raqamli diskurs va sun’iy intellekt tarjimasidagi o‘rnini tadqiq etishni ham talab etadi.

Umuman olganda, frazeologiya — bu shunchaki tilshunoslikning bir bo‘limi emas, balki insoniyatning o‘zligini anglash yo‘lidagi muhim madaniy kalitidir.

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O‘ZBEK ROMANCHILIGIDA INSON TAQDIRI VA SHAXS MUNOSABATI

Diyorova Dilafruz

Shahrisabz davlat pedagogika instituti

Annotatsiya: *Mazkur maqolada o‘zbek romanchiligida inson taqdiri va shaxs munosabati masalasi badiiy talqin nuqtai nazaridan tahlil qilinadi. Tadqiqot obyekti sifatida Ikki eshik orasi va Oltin zanglamas romanlari tanlab olinib, ularda insonning tarixiy sharoit, ijtimoiy muhit, axloqiy qadriyatlar hamda shaxsiy e’tiqod bilan bog‘liq ichki kechinmalari yoritilishi o‘rganildi.*

Kalit so’zlar*: inson taqdiri, shaxs va jamiyat, o‘zbek romanchiligi, badiiy talqin, ruhiy kechinma.*

Аннотация: *В данной статье вопрос взаимоотношения человеческой судьбы и личности в узбекской романистике анализируется с точки зрения художественного осмысления. В качестве объекта исследования выбраны романы «Ikki eshik orasi» и «Oltin zanglamas», в которых изучается отражение внутренних переживаний человека, связанных с историческими условиями, социальной средой, нравственными ценностями и личными убеждениям.*

Ключевые слова: *судьба человека, личность и общество, узбекская романистика, художественная интерпретация, духовные переживания.*

Annotation: *This article analyzes the issue of the relationship between human destiny and personality in Uzbek novelism from the perspective of artistic interpretation. The novels "Ikki eshik orasi" and "Oltin zanglamas" were selected as the objects of the study, and the depiction of a person's inner experiences related to historical conditions, social environment, moral values, and personal beliefs is examined in these works.*

Keywords: human destiny, personality and society, Uzbek novelism, artistic interpretation, spiritual experiences.

O‘zbek romanchiligi XX asr davomida inson va jamiyat munosabatlarini chuqur badiiy tahlil qilish orqali yuksak taraqqiyot bosqichiga ko‘tarildi. Ayniqsa, inson taqdiri masalasi romanchilikning markaziy mavzularidan biri sifatida shakllandi. Taqdir tushunchasi adabiyotda nafaqat shaxsning hayot yo‘li, balki uning ichki olami, ruhiy iztiroblari, axloqiy tanlovlari va jamiyat bilan munosabatlari orqali ifodalanadi. O‘zbek adabiyotida insonning murakkab hayotiy sharoitlar ichida o‘zligini saqlab qolishi, e’tiqodi va vijdoniga sodiq qolishi muhim badiiy mezon sifatida qaraladi. O‘tkir Hoshimov va Shuhrat ijodida aynan inson taqdiri, uning ijtimoiy muhit bilan ziddiyatlari va ruhiy izlanishlari yuksak mahorat bilan tasvirlangan. “Ikki eshik orasi”[4] romanida urush va undan keyingi davr inson hayotini qanday sinovlarga duchor qilgani ochib berilsa, “Oltin zanglamas”[5] romanidainson sha’ni, halolligi va ma’naviy pokligi jamiyatdagi murakkab jarayonlar fonida tasvirlanadi. Mazkur maqolaning maqsadi ushbu ikki roman misolida o‘zbek romanchiligida inson taqdiri va shaxs munosabati masalasini tahlil qilishdan iborat.

Inson taqdiri badiiy adabiyotda ko‘pincha ijtimoiy-tarixiy jarayonlar bilan chambarchas bog‘liq holda yoritiladi. “Ikki eshik orasi” romanida inson hayoti ikki eshik – tug‘ilish va o‘lim oralig‘idagi murakkab sinovlar majmui sifatida talqin etiladi. Asarda urush yillari, qiyinchilik, ayriliq va iztirob inson ruhiyatiga chuqur

[4]“Ikki eshik orasi” roman “Nurli dunyo” nashriyot uyi Toshkent – 2024.
[5]“Olitin zanglamas” roman “Sharq” nashriyot-matbaa konserni bosh tahririyati Toshkent-1995

ta’sir ko‘rsatadi. Qahramonlarning hayoti orqali taqdirning shafqatsiz zarbalari, ammo shu bilan birga insoniy mehr va sabr-toqatning qudrati namoyon bo‘ladi. Roman qahramonlari taqdirga bo‘ysunuvchi emas, balki unga qarshi kurashuvchi, o‘z e’tiqodini saqlab qoluvchi shaxslar sifatida gavdalanadi. Bu jihat o‘zbek romanchiligida shaxsning faol pozitsiyasini ko‘rsatadi. Shaxs va jamiyat o‘rtasidagi ziddiyat ayniqsa urush davri tasvirlarida yaqqol seziladi. Urush insonlarni jismonan emas, ma’nan ham sinovdan o‘tkazadi. Qahramonlar ichki iztiroblar, ayriliq va yo‘qotishlar orqali yetiladi. Inson taqdiri bu yerda faqat tashqi voqealar ketma-ketligi emas, balki ruhiy kamolot jarayoni sifatida talqin qilinadi. “Oltin zanglamas” romanida esa shaxsning jamiyat bilan munosabati axloqiy mezonlar asosida ochiladi. Asarda “oltin” ramzi inson qalbining pokligi, halolligi va vijdoni timsoli sifatida qo‘llanadi. “Zanglamas” sifati esa bu poklikning har qanday ijtimoiy bosim, adolatsizlik va ma’naviy inqirozga qaramay saqlanib qolishini anglatadi. Roman qahramonlari murakkab ijtimoiy sharoitda yashar ekan, ular tanlov oldida qoladi: manfaat yo‘lini tanlashmi yoki vijdonga sodiq qolishmi. Muallif aynan shu tanlov orqali shaxsning ichki erkinligini ko‘rsatadi.

O‘zbek romanchiligida inson taqdiri ko‘pincha jamiyatdagi adolatsizliklar bilan to‘qnash keladi. Har ikki romanda ham shaxsning ma’naviy qiyofasi markazga chiqariladi. Insonning chinakam qadr-qimmati uning boyligida yoki mavqeida emas, balki axloqiy pokligida ekanligi g‘oyasi ilgari suriladi. “Ikki eshik orasi”da mehr-oqibat vainsoniylik, “Oltin zanglamas”da esa halollik va vijdon asosiy badiiy mezon sifatida namoyon bo’ladi. Bu asarlar o‘zbek romanchiligida inson taqdiri masalasini milliy mentalitet va ma’naviy qadriyatlar bilan uyg‘un holda yoritganligi bilan ahamiyatlidir. Shaxsning ichki monologlari, ruhiy kechinmalari, o‘z-o‘zi bilan kurashi tasviri romanchilikning psixologik qatlamini boyitadi. Inson taqdiri shu tariqa nafaqat tashqi voqealar oqimi, balki ichki ruhiy jarayon sifatida namoyon bo‘ladi. Har ikki muallif insonning kuchi uning sabrida, sadoqatida va vijdonida ekanini ko‘rsatadi. Bu esa o‘zbek romanchiligida insonparvarlik g‘oyasining ustuvorligini tasdiqlaydi.

Tahlil qilingan romanlar shuni ko‘rsatadiki, o‘zbek romanchiligida inson taqdiri va shaxs munosabati masalasi chuqur falsafiy va badiiy asosda yoritilgan. “Ikki eshik orasi” inson hayotini tarixiy sinovlar fonida ko‘rsatib, shaxsning ruhiy kamolotini ochib beradi. “Oltin zanglamas” esa axloqiy tanlov va vijdon masalasini markazga olib chiqadi. Har ikki asarda inson taqdiri jamiyat bilan uzviy bog‘liq holda talqin qilinadi, ammo shaxsning ichki erkinligi va ma’naviy mustaqilligi ustuvor qadriyat sifatida tasdiqlanadi. Shuningdek,Islom Karimov ham o’zining “Yuksak ma’naviyat – yengilmas kuch” [6]asarida adabiyotning tarbiyaviy ahamiyati haqida shunday yozgan: “Adabiyot – inson qalbini poklaydigan, uni ezgulikka yetaklaydigan buyuk kuchdir.” Shu o’rinda hozirgi Prezidentimiz o’z kitoblarida “Adabiyot va san’at – xalqning qalbi va tafakkurni yuksaltiradigan beqiyos kuchdir”. [7]Bu fikr to’g’ridan-to’g’ri “Oltin zanglamas” asari haqida emas, lekin Shuhrat kabi adiblar ijodi aynan shu ma’naviy kuchni shakllantirganini nazarda tutish mumkin. Demak, o‘zbek romanchiligida inson taqdiri tasviri orqali milliy xarakter, ma’naviyat va insonparvarlik g‘oyalari yuksak badiiy darajada ifodalangan.

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LOWER JURASSIC DEPOSITS OF THE SUDOCHIY DEPRESSION: PALYANOSTRATIGRAPHIC CHARACTERISTICS

Djalilov Gafur Ganiyevich

Head of Laboratory, State Institution "Institute of Geology and Exploration of Oil and Gas Fields"

Ilhomova Shahnoza Iqboljon qizi

National University of Uzbekistan named after Mirzo Ulugbek

E-mail: gafur@mail.ru; shahnoza7595@gmail.com

Abstract. *The Lower Jurassic deposits of the Sudochiy Depression, located within the Ustyurt Plateau, represent a key stratigraphic interval for understanding the geological evolution of the Aral Sea Basin. These deposits are characterized by considerable thickness, variable lithology, and diverse palynomorph assemblages. This study presents a detailed palynological analysis and establishes a refined palynostratigraphic framework based on the vertical distribution of spores and pollen. Several palynostratigraphic intervals are distinguished using first and last appearance data (FAD/LAD) of key taxa. The results improve stratigraphic subdivision and allow correlation with Lower Jurassic sequences of Central Asia.*

Keywords: *Lower Jurassic, palynology, palynostratigraphy, spores, pollen, biostratigraphy, Central Asia, Pliensbachian, Toarcian*

Introduction. The Lower Jurassic represents an important stage in the evolution of sedimentary basins, particularly in regions where macrofossils are scarce. In such cases, palynological data provide one of the most reliable tools for stratigraphic subdivision and correlation.

Palynomorphs are characterized by high preservation potential due to their resistant exine structure and wide geographic distribution. Their relatively rapid evolutionary changes allow the recognition of biostratigraphic intervals and facilitate regional and interregional correlations.

The Sudochiy Depression is a major structural element of the Aral Sea Basin within the Ustyurt Plateau. Although Lower Jurassic deposits are widely developed in this area, their detailed palynostratigraphic characteristics remain insufficiently constrained. The aim of this study is to analyze palynomorph assemblages and establish a refined palynostratigraphic framework.

Geological Setting. The Sudochiy Depression is a large tectonic structure formed on a Paleozoic basement. The Lower Jurassic deposits unconformably overlie eroded basement rocks and form a thick sedimentary succession.

Lithologically, the sequence consists of sandstones, siltstones, and claystones, reflecting a range of depositional environments from continental (fluvial–deltaic) to marginal-marine settings. The thickness of the deposits increases toward the central part of the basin due to subsidence.

Periodic marine incursions influenced sedimentation and are reflected in both lithology and palynomorph assemblages.

Materials and Methods

Palynological samples were obtained from subsurface sections corresponding to the Lower Jurassic interval. Standard laboratory preparation included treatment with HCl and HF acids to remove carbonate and silicate components.

Organic residues were concentrated and mounted on slides for microscopic analysis. Identification of palynomorphs was based on morphological criteria, including exine structure, ornamentation, and aperture characteristics.

Semi-quantitative analysis of palynomorph abundance was used to establish stratigraphic trends and paleoenvironmental interpretations.

Palynological Composition

The palynomorph assemblages are diverse and dominated by spores and gymnosperm pollen.

Spores include **Deltoidospora, Leiotriletes, Osmundacidites, Dictyophyllidites, Gleicheniidites, and Cyathidites**, indicating the widespread development of fern-dominated vegetation under humid conditions.

Pollen assemblages are represented by **Classopollis, Callialasporites, Cycadopites, Araucariacites, Alisporites, and Pinuspollenites.** The dominance of *Classopollis* is particularly significant, as it is associated with cheirolepidiaceous conifers adapted to warm and semi-arid climates.

The presence of *Callialasporites* reflects coniferous vegetation, whereas *Cycadopites* indicates cycadophytes typical of warm climates. The occurrence of *Araucariacites* suggests the presence of araucarian forests.

Vertical variations in the ratio of spores to pollen reflect climatic fluctuations between humid and semi-arid conditions.

Palynostratigraphic Framework

Based on the vertical distribution of palynomorphs, three main palynostratigraphic intervals are distinguished:

Interval I – Spore-dominated Interval (Early Pliensbachian?)

This interval is characterized by the dominance of fern spores (*Deltoidospora*, *Leiotriletes*). It reflects humid environmental conditions and represents the lower part of the succession. The base is defined by the FAD of key spore taxa.

Interval II – Callialasporites Interval Zone (Pliensbachian)

This interval is marked by the FAD and increasing abundance of *Callialasporites*. It represents a transitional phase with mixed vegetation and changing climatic conditions.

Interval III – Classopollis Abundance Zone (Late Pliensbachian–Toarcian)

This interval is characterized by the acme of *Classopollis* and a relative decline of spore taxa (LAD of some fern spores). It reflects a shift toward more arid climatic conditions and increased dominance of coniferous vegetation.

These intervals can be correlated with established Lower Jurassic palynostratigraphic schemes of Central Asia and adjacent regions.

Paleoenvironmental and Paleoclimatic Interpretation

Palynological data indicate significant environmental variability during the Early Jurassic.

The lower interval reflects humid conditions with extensive fern vegetation. The middle interval indicates transitional conditions, while the upper interval reflects increasing aridity and expansion of xerophytic conifers.

The presence of mixed assemblages suggests fluctuating depositional environments, including continental and marginal-marine settings.

Stratigraphic Significance

The identified palynostratigraphic intervals provide a reliable framework for stratigraphic subdivision of the Lower Jurassic deposits.

These results enable correlation with other sections of the Ustyurt Plateau and broader Central Asian region, contributing to improved regional stratigraphy.

ConclusionThe Lower Jurassic deposits of the Sudochiy Depression are characterized by diverse palynomorph assemblages that allow detailed palynostratigraphic subdivision.

The recognition of interval zones based on FAD and LAD of key taxa refines stratigraphic resolution and improves regional correlations. The palynological data also provide valuable insights into paleoenvironmental and paleoclimatic evolution during the Early Jurassic.

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POVERTY IN UZBEKISTAN: CONCEPTUAL UNDERSTANDING AND POLICY MEASURES

Dosnazarova Aysuliw Jandullaevna

Tashkent State University of Economics

dosnazarova4@gmail.com

Annotation*: Poverty is a multidimensional socio-economic issue that includes income deprivation and limited access to essential services. In Uzbekistan, poverty reduction has become a key policy priority, supported by economic reforms and expanded social protection programs. This paper examines theoretical approaches to poverty and analyzes national strategies such as employment generation, targeted welfare, and regional development initiatives. The findings suggest that Uzbekistan is transitioning toward inclusive growth policies, although structural challenges remain. Continued institutional reforms and investment in human capital are essential for sustainable poverty reduction.*

Keywords: *population welfare, socio-economic development, poverty reduction, human capital, sustainable growth.*

Poverty is widely recognized as a condition in which individuals or households lack sufficient resources to maintain a minimum standard of living. Modern approaches emphasize that poverty is not only economic but also social and human in nature. It includes deprivation in education, healthcare, housing, and access to opportunities. In Uzbekistan, poverty has become an important topic of public policy, especially in the context of economic reforms and transition processes. The government has adopted new methodologies to measure poverty more accurately, taking into account household income, consumption, and living conditions. These improvements help to identify vulnerable groups and design effective policy responses. One of the main directions of poverty reduction in Uzbekistan is strengthening the social protection system. The state provides targeted financial assistance to low-income families, including child benefits and subsidies for essential services. Such measures aim to reduce inequality and ensure a basic standard of living for all citizens.

Another important strategy is employment generation. The government actively promotes entrepreneurship, vocational training, and small business development. Preferential loans and financial support programs encourage self-employment, particularly in rural areas where poverty rates are higher. Job creation is considered a key factor in achieving long-term poverty reduction. Regional development also plays a significant role in addressing poverty. Infrastructure projects, housing programs, and investment initiatives are implemented to reduce disparities between regions. These efforts contribute to improving living conditions and creating new economic opportunities. Education and human capital development are essential components of sustainable poverty reduction. By investing in education and skills training, Uzbekistan aims to increase productivity and improve employment prospects. This approach aligns with international best practices and supports inclusive economic growth.

Poverty in Uzbekistan remains a multifaceted challenge that requires comprehensive and coordinated policy measures. The country has made significant progress by implementing social protection programs, promoting employment, and investing in regional development. However, further efforts are needed to ensure sustainable and inclusive growth. Strengthening institutions, improving education, and expanding economic opportunities will be crucial for reducing poverty in the long term.

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GLOBALLASHUV JARAYONIDA YOSHLAR MA'NAVIYATI VA SIYOSIY QARASHLARINING O'ZGARISHI

Ergashov Zuhriddinjon Zavqiddinjonovich
O'zbekiston xalqaro islom akademiyasi
e-mail: ergashovzuxriddin078@gmail.com

Annotatsiya: *Ushbu maqolada globallashuv jarayonining yoshlar ma'naviyati va siyosiy qarashlariga ko'rsatgan ta'siri tahlil qilinadi. Raqamli texnologiyalar, global axborot oqimlari, ijtimoiy tarmoqlar va media makonning kengayishi natijasida yoshlar ongida yuz berayotgan ma'naviy transformatsiya va siyosiy ijtimoiylashuv jarayonlari o'rganiladi. Tadqiqotda globallashuv sharoitida yoshlar orasida ma'naviy barqarorlikni ta'minlash, siyosiy ongni sog'lom shakllantirish va media savodxonlikni kuchaytirish bo'yicha taklif va tavsiyalar ishlab chiqiladi.*

Kalit so'zlar: *Globallashuv, yoshlar ma'naviyati, siyosiy qarashlar, raqamli madaniyat, media makon, siyosiy ijtimoiylashuv, ma'naviy xavfsizlik, ijtimoiy tarmoqlar, siyosiy faollik, media savodxonlik.*

Annotation: *This article analyzes the impact of globalization on the spiritual values and political views of youth. It examines the processes of spiritual transformation and political socialization occurring in the consciousness of young people as a result of the expansion of digital technologies, global information flows,*

social networks, and the media space. The study develops proposals and recommendations for ensuring spiritual stability among youth, fostering a healthy political mindset, and strengthening media literacy in the context of globalization.

Keywords: *Globalization, youth spirituality, political views, digital culture, media space, political socialization, spiritual security, social networks, political activity, media literacy.*

Kirish: Bugungi kunda globallashuv jarayoni o‘zining yuqori sur’atlari bilan rivojlanmoqda va bu jarayon turli sohalarda sezilmoqda. Shu sharoitda yoshlar ma’naviyati ham o‘zgarishlarga duch kelmoqda, chunki sun’iy intellekt, axborot-kommunikatsiya texnologiyalari va ijtimoiy tarmoqlarning kengayishi ularning dunyoqarashiga bevosita ta’sir ko‘rsatmoqda. Ushbu vositalar globallashuv jarayonini rivojlantirishga yordam berishi mumkin bo‘lsada, ular bilan birga yoshlar ma’naviyati va siyosiy qarashlariga salbiy ta’sir qilishi mumkin bo‘lgan xavf-xatarlar ham mavjud.

Shuningdek, globallashuv jarayoni yoshlarning milliy identiteti va madaniy qadriyatlariga ham ta’sir qilmoqda. Yoshlar orasida global madaniyat va mahalliy qadriyatlar o‘rtasida muvozanatni saqlash, axborot va media savodxonligini oshirish, hamda siyosiy qarashlarni sog‘lom shakllantirish dolzarb vazifalardan biridir.

Asosiy qism: O‘zbekiston globallashuv jarayonida faol davlatlardan biri sifatida ajralib turadi va axborot almashuvi sohasida tezkor o‘sish kuzatilmoqda. Ma’lumotlarga ko‘ra, 2016 yilda internetdan muntazam foydalanadigan aholi soni taxminan 12,1 million kishini tashkil etgan bo‘lsa, 2019 yilda bu raqam 22,5 milliondan oshgan. Shuningdek, mobil aloqa abonentlarining umumiy soni 22,8 millionga yetib, ularning 16 milliondan ortig‘i uchinchi va to‘rtinchi avlod mobil aloqasidan foydalanmoqda.

O‘zbekistonda internetdan foydalanuvchilarning taxminan **60 foizi 25 yoshgacha bo‘lgan yoshlar** bo‘lib, bu nafaqat eng faol raqamli foydalanuvchi qatlamini, balki kelajakdagi yetakchilarni ham tashkil etadi. Shu bilan birga, 2025-yil ma’lumotlariga ko‘ra, O‘zbekistonda internet foydalanuvchilari soni 32,7

millionni tashkil etib, bu aholining 89 % ga teng [1]. Ushbu statistika yoshlar orasidagi raqamli madaniyat va global axborot oqimlarining tezkor kengayishini, shuningdek, ularning ma’naviyati va siyosiy qarashlariga globallashuv jarayonida ta’sir ko‘rsatish imkoniyatini aniq ko‘rsatadi. Zamon bilan hamnafas bo‘lish bugungi yoshlar uchun muhim omillardan biridir. Yoshlarimiz texnologiya, axborot resurslari va sun’iy intellektdan to‘g‘ri va samarali foydalanishga intilmoqda. Ularning aksariyati xalqaro universitetlarda sun’iy intellekt va axborot texnologiyalari yo‘nalishlarida tahsil olib, o‘z bilim va ko‘nikmalarini mustahkamlab bormoqda. Natijada ular mamlakatimiz taraqqiyotiga xizmat qiladigan innovatsion dasturiy mahsulotlar, platformalar va xizmatlarni yaratishga katta hissa qo‘shmoqda.

Mamlakatimiz ushbu sohalarni rivojlantirish uchun keng imkoniyatlar yaratilmoqda. Jumladan, Prezidentimiz Sh. Mirziyoyev tashabbusi bilan 2025-yil 28-noyabr kuni Toshkent shahrida “Besh million sun’iy intellekt yetakchilari” xalqaro forumi tashkil etildi. Ushbu forumda Birlashgan Arab Amirliklari hukumat ishlari bo‘yicha vaziri Muhammad bin Abdulloh Al-Gargaviy boshchiligidagi delegatsiya hamda bir qator davlatlar vakillari ishtirok etdi. Forumning o‘tkazilishi mamlakatimizda sun’iy intellekt sohasiga berilayotgan e’tibor, yoshlar uchun yaratilayotgan sharoitlar va global ilmiy hamkorlikning yangi bosqichga ko‘tarilayotganini ko‘rsatadi.

Prezidentimiz ta’kidlaganidek, Birinchi va Ikkinchi Renessans davrlarida yurtimizdan yetishib chiqqan buyuk allomalar Muhammad al-Xorazmiy, Abu Rayhon Beruniy, Mirzo Ulug‘beklarning algoritm, matematika va mantiq fanlariga qo‘shgan ulkan hissasi bugungi sun’iy intellekt rivojining ilmiy poydevorini shakllantirgan. Shuningdek, yuqorida keltirilgan fikrlar shuni ko‘rsatadiki, davlatimiz rahbari yoshlarning ushbu sohada erishayotgan yutuqlarini yuqori baholab: *“Biz ishonamiz: ular ertaga yurtimizga qaytib, sun’iy intellektning eng so‘nggi yutuqlarini ta’limga, iqtisodiyotga, davlat boshqaruviga joriy qilishda yetakchi kuchga aylanadi”*, deya ta’kidladi [2]. Bu fikrlar globallashuv jarayonida yoshlarning ma’naviy va intellektual rivoji, siyosiy qarashlarining shakllanishi va

raqamli texnologiyalar bilan uyg‘unlashuvi davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi.

Globallashuv jarayonining salbiy oqibatlari ham mavjud. Internet tarmoqlari va sun’iy intellektning keng tarqalishi yoshlarning ma’naviyati va siyosiy ongi pasayishiga sabab bo‘lishi mumkin. Yoshlar texnologiyaga haddan tashqari bog‘lanib, mustaqil fikrlash ko‘nikmalarini yo‘qotish xavfi bilan duch kelmoqda. Ijtimoiy tarmoqlardan foydalanish XXI asrda keng tarqala boshladi va ularda xabarlarni tezkor, sur’atlar bilan jonli tarzda tarqatish imkoniyati mavjudligi sababli tez ommalashdi. Bugungi kunda “Instagram”, “Facebook”, “Telegram” va “ChatGPT” kabi platformalar yoshlar orasida eng ko‘p ishlatiladigan ijtimoiy tarmoqlar sifatida sanaladi, ulardan eng ko‘p foydalanilgan “ChatGPT” platformasidir. Bu platformada xabarlarni tez topish, matnni istalgan tilda tarjima qilish va boshqa qulayliklar mavjud. Lekin, yoshlarning erkin fikrlashi,o‘ziga bo‘lgan ishonchini kamaytirmoqda, bu esa fojeadir.

Bozarboyeva M. “Globallashuv sharoitida ijtimoiy tarmoqlarning yoshlar ma’naviy-axloqiy madaniyatiga ta’siri” maqolasida ta’kidlaganidek, ijtimoiy tarmoqlar yoshlarning ma’naviy va axloqiy madaniyatiga sezilarli ta’sir ko‘rsatmoqda. Virtual suhbatlar jarayonida ko‘pincha ochiqlik chegarasi buzilib, salbiy muomala muhiti yuzaga keladi. Ba’zi shaxslar yovuz g‘oyalarni tarqatib, yoshlarni yo‘ldan adashtiradi. Bu holat jamiyatning tinchligi, ma’naviy barqarorligi va oilaviy qadriyatlarni xavf ostiga qo‘yadi [3].

Internet endi faqat axborot almashish vositasi emas, balki jamoatchilik fikrini boshqarish quroli sifatida ham ishlatilmoqda. Endi hech qanday katta kuch sarflamasdan, qarshiliklarga uchramasdan, odamlarning ongiga ta’sir qilish, ularning qarashlarini o‘z foydasiga yo‘naltirish mumkin. Shu bilan birga, globallashuv davrida ijtimoiy tarmoqlar yoshlar va jamiyatga ham ijobiy, ham salbiy ta’sir ko‘rsatadi. Axborot xurujlari, odatda, avvalo inson ongini va qalbini zabt etish orqali mafkuraviy ta’sir o‘tkazishga qaratilgan.

Bunday holatlar davlat barqarorligiga xavf solishi, millat tarixiy qadriyatlari va o‘ziga xosligini tahlikaga qo‘yishi mumkin. Shu bois, ijtimoiy tarmoqlarda

tarqatilayotgan zararli va buzg‘unchi g‘oyalarning ta’sirini anglash va ulardan doim ogoh bo‘lish bugungi kunning eng muhim vazifalaridan biridir, ayniqsa yoshlar bu masalani chuqur tushunishi kerak.

Davlatimiz rahbari Shavkat Mirziyoyev ta’kidlaganidek, “*biz farzandlarimizning ongi,dunyoqarashi asrlar davomida sinovdan o’tgan,yuksak ma’naviyat xazinasi bo’lgan jahon va milliy adaboyotimiz asosida emas,balki qandaydir shubhali, zararli axborotlar asosida shakllanishiga beparvo qarab turolmaymiz*” [4]. Bu fikrning asosiy mazmuni shundan iboratki, **bolalarimizning ongiga va dunyoqarashiga befarq bo‘lmasligimiz kerak**. Chunki farzandlar qanday ma’lumotga tayanib ulg‘ayishi – ularning kelajakda qanday inson bo‘lishini belgilaydi. Shuningdek, yoshlar ongini **asrlar davomida shakllangan, sinovdan o‘tgan milliy va jahon adabiyoti**, ya’ni ma’naviy boyliklar asosida tarbiyalash kerak. Chunki bu manbalar insonni to‘g‘ri yo‘lga boshlaydi, axloq va madaniyatni shakllantiradi. Aksincha, internetda tarqalayotgan **shubhali, zararli va ishonchsiz axborotlar** bolalarning tafakkurini buzishi, ularning dunyoqarashini noto‘g‘ri shakllantirishi mumkin. Shu sababli, bu jarayonga beparvo qarash – kelajak avlod taqdiriga befarq bo‘lish bilan barobar.

Davlatimiz yoshlar siyosatini rivojlantirish va ularning imkoniyatlarini kengaytirishga qaratilgan tizimli islohotlarni amalga oshirmoqda. Yoshlar masalalariga alohida e’tibor qaratish maqsadida **Yoshlar ittifoqi** va **Yoshlar ishlari agentligi** tashkil etildi. Ushbu tashkilotlar yoshlarning ijtimoiy, ma’naviy va intellektual faolligini oshirishga qaratilgan turli tadbirlar va loyihalarni amalga oshirmoqda.

Shu jumladan, yoshlar orasida **“Eng yaxshi ixtirochi”**, **“Men dasturchiman”, “Kitobxonlik”** va boshqa tanlovlar muntazam o‘tkaziladi. Tanlov g‘oliblari yaratgan loyihalari va ishlari amaliyotga tatbiq etilib, jamiyat rivojiga hissa qo‘shadi. Yoshlarning bo‘sh vaqtini mazmunli o‘tkazish maqsadida esa **“Dolzarb 90 kun”** loyihalari amalga oshirilib, ular orqali yoshlar turli ijtimoiy, ilmiy va madaniy faoliyatlarda ishtirok etish imkoniyatiga ega bo‘ladi [5].

Shu tarzda, davlat tomonidan yaratilgan sharoit va resurslar yoshlarning intellektual, ma’naviy va ijodiy salohiyatini rivojlantirishga xizmat qilmoqda, bu esa ularning globallashuv sharoitida faol, mas’uliyatli va barkamol shaxs sifatida shakllanishini ta’minlaydi.

Yoshlarning raqamli va sun’iy intellekt sohasidagi ko‘nikmalarini mustahkamlash maqsadida maktablarga **boshlang‘ich sinfdan boshlab sun’iy intellekt va axborot-kommunikatsiya texnologiyalari bo‘yicha nazariy va amaliy darslarni joriy etish** zarur. Hozirgi davrda bolalar telefon va boshqa raqamli qurilmalarni yaxshi bilishadi, shuning uchun ularga **multfilmlar yoki interaktiv shaklda internet va raqamli texnologiyalarning asosiy tushunchalarini o‘rgatish** samarali bo‘ladi.

Shu bilan birga, chekka hududlardagi maktablarda texnologik sharoit yetarli emasligi muammo hisoblanadi. Ushbu masalani hal qilish maqsadida, har bir viloyatdagi qoloq maktablarni ta’mirlash va jihozlash, hamda **“Rivojlangan ta’lim – rivojlangan davlat”** loyihasi doirasida zamonaviy infratuzilmani yaratish muhimdir. Bu chora-tadbirlar yoshlarni globallashuv sharoitida zamonaviy texnologiyalarni to‘g‘ri va samarali foydalanishga tayyorlaydi, ularning intellektual va ma’naviy salohiyatini rivojlantiradi.

Oliy ta’lim muassasalarida barcha yo‘nalishlar bo‘yicha **axborot-kommunikatsiya texnologiyalari va IT bo‘yicha amaliy ta’lim** joriy etilishi zarur. Bu ta’lim **faqat nazariy emas,** balki amaliy ko‘nikmalarni rivojlantirishga qaratilgan bo‘lishi lozim, chunki bugungi kunda har bir soha raqamli va kompyuterlashtirilgan xarakterga ega. Shu orqali **mutaxassislar soni oshiriladi,** universitetlar esa barcha yo‘nalishlarda zamonaviy IT bilimlarini beruvchi markazga aylanadi. Bu esa yoshlarni global ish bozoriga tayyorlash va mamlakatimizning raqamli salohiyatini mustahkamlashga xizmat qiladi.

Xulosa: Globallashuv yoshlarning ma’naviyati, siyosiy qarashlari va intellektual rivojiga sezilarli ta’sir ko‘rsatmoqda. Shu sababli, ularni ma’naviy, axloqiy va texnologik jihatdan barqaror shakllantirish davlat siyosatining ustuvor vazifasidir. O‘zbekiston yoshlar siyosati doirasida maktablarda sun’iy intellekt va

IT bo‘yicha ta’limni rivojlantirish, oliy ta’limda amaliy ko‘nikmalarni oshirish hamda yoshlar uchun loyihalar va tanlovlar tashkil etish orqali ularning intellektual va ijodiy salohiyati mustahkamlanmoqda. Natijada mamlakatimiz globallashuv sharoitida mas’uliyatli, zamonaviy va barkamol avlodni shakllantirmoqda.

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OMMAVIY AXBOROT VOSITALARI SLENGINING LEKSIKOGRAFIK ASPEKTI: BIR TILLI VA IKKI TILLI LUG‘ATLAR MISOLIDA

Eshmirzayeva Nozima Baxodir qizi

Qarshi davlat universiteti

Eshmirzayevanozima95@gmail.com

Abstract. *Mazkur maqola ommaviy axborot vositalari (OAV) slengining leksikografik jihatlarini kompleks va tizimli ravishda tahlil qilishga bag‘ishlangan. Tadqiqot doirasida sleng birliklarning semantik, pragmatik va stilistik xususiyatlari, ularning bir tilli hamda ikki tilli lug‘atlarda aks ettirilish prinsiplari, shuningdek, tarjima va izohlashdagi muammolar o‘rganildi.*

Sifatli va qiyosiy tahlil metodlari asosida aniqlanishicha, OAV slengi o‘zining dinamikligi, kontekstual bog‘liqligi va madaniy konnotatsiyalari bilan ajralib turadi. Bu esa uni leksikografik jihatdan murakkab obyektga aylantiradi. Tadqiqot natijalari sleng birliklarni samarali ifodalash uchun izoh (definition), kontekstual misollar, stilistik belgilash (labeling) va adekvat tarjima strategiyalarining integratsiyasi zarurligini ko‘rsatadi.

Bundan tashqari, maqolada raqamli leksikografiya, korpus lingvistikasi va zamonaviy OAV diskursining o‘zaro aloqasi ham yoritilib, kelajakdagi lug‘at tuzish amaliyoti uchun ilmiy asoslar taklif etiladi.

Kalit so‘zlar: *Ommaviy axborot vositalari (OAV), sleng, leksikografiya, bir tilli lug‘at, ikki tilli lug‘at, semantika, pragmatika, stilistika, kontekst, tarjima strategiyalari, semantik assimetriya, korpus lingvistikasi.*

Abstract: *This article is devoted to a comprehensive and systematic analysis of the lexicographic aspects of mass media slang. The study examines the semantic, pragmatic, and stylistic features of slang units, the principles of their representation in monolingual and bilingual dictionaries, as well as the challenges of translation and interpretation.*

Based on qualitative and comparative analysis, it is established that media slang is characterized by dynamism, contextual dependency, and cultural connotations, which makes it a complex object for lexicographic description. The results highlight the need to integrate definitions, contextual examples, stylistic labeling, and adequate translation strategies for the effective representation of slang units.

In addition, the article explores the interconnection between digital lexicography, corpus linguistics, and contemporary media discourse, and proposes theoretical foundations for future dictionary-making practices.

Keywords: *mass media, slang, lexicography, monolingual dictionary, bilingual dictionary, semantics, pragmatics, stylistics, context, translation strategies, semantic asymmetry, corpus linguistics.*

Kirish

XXI asr global kommunikatsiya va axborot texnologiyalari asri sifatida til taraqqiyotiga bevosita ta’sir ko‘rsatmoqda. Ommaviy axborot vositalari — xususan internet, ijtimoiy tarmoqlar, bloglar, podkastlar va onlayn jurnalistika — yangi til birliklarini shakllantirish va ommalashtirishda yetakchi omilga aylandi.

Shu jarayonda sleng tilning eng faol va tez o‘zgaruvchan qatlamlaridan biri sifatida alohida ahamiyat kasb etmoqda. Sleng birliklar odatda norasmiy kommunikatsiyada paydo bo‘lib, qisqa vaqt ichida keng auditoriya orasida tarqaladi va ko‘pincha ommaviy nutqning ajralmas qismiga aylanadi[8].

Masalan, ingliz tilidagi *viral*, *trend*, *fake news*, *influencer*, *cancel culture* kabi birliklar dastlab tor ijtimoiy guruhlar doirasida qo‘llanilgan bo‘lsa-da, bugungi kunda global OAV diskursining asosiy elementlariga aylangan. O‘zbek tilida esa *xayp qilmoq*, *trend bo‘ldi*, *like bosmoq*, *story qo‘yish* kabi birliklar keng iste’molda.

Bunday birliklarning keng tarqalishi ularni ilmiy o‘rganish va ayniqsa lug‘atlarda aks ettirish zaruratini yuzaga keltiradi. Biroq slengning quyidagi xususiyatlari bu jarayonni murakkablashtiradi:

- tez yangilanish va eskirish (temporal instability);
- ko‘p ma’nolilik (polysemy);
- kuchli kontekstual bog‘liqlik;
- madaniy va ijtimoiy konnotatsiyalar;
- stilistik rang-baranglik.

[8] Crystal D. Language and the Internet. Cambridge, 2001. P. 45

Shu bois slengning leksikografik tavsifi zamonaviy tilshunoslik, xususan amaliy leksikografiyaning dolzarb yo‘nalishlaridan biri hisoblanadi.

Adabiyotlar sharhi

Sleng fenomeni tilshunoslikda ijtimoiy, stilistik va pragmatik nuqtai nazardan keng o‘rganilgan. E. Partridge slengni ijtimoiy identifikatsiya va guruhga mansublikni ifodalovchi vosita sifatida talqin qiladi.

D. Crystal esa slengning global kommunikatsiya sharoitida, ayniqsa OAV orqali tez tarqalishini alohida ta’kidlaydi va uni zamonaviy tilning innovatsion mexanizmlaridan biri deb hisoblaydi.

Leksikografiya nazariyasida L. Zgusta[9] lug‘at tuzishda tizimlilik, aniqlik va foydalanuvchiga yo‘naltirilganlikni asosiy prinsiplar sifatida belgilaydi. Yu. Apresyan[10] esa leksik birliklarning semantik strukturasini tizimli yondashuv asosida o‘rganib, ko‘p ma’nolilikni izohlash muammosiga e’tibor qaratadi.

Zamonaviy tadqiqotlarda Atkins va Rundell[11] sleng birliklarni izohlashda real nutq (korpus) materiallaridan foydalanish zarurligini asoslab beradi. Ularning fikricha, misollar slengning haqiqiy semantik va pragmatik xususiyatlarini ochib berishda muhim rol o‘ynaydi.

O‘zbek tilshunosligida esa sleng va uning leksikografik tavsifi hali yetarli darajada chuqur o‘rganilmagan bo‘lib, bu yo‘nalishda ilmiy izlanishlar olib borilmoqda. Ayniqsa, ikki tilli lug‘atlarda semantik assimetriya va tarjima muammolari alohida e’tiborni talab qiladi.

Metodlar

Mazkur tadqiqot kompleks metodologik yondashuv asosida amalga oshirildi:

- **Diskurs tahlili** – OAV matnlaridagi sleng birliklarning real qo‘llanilishi o‘rganildi;

[9] Zgusta L. Manual of Lexicography. Prague, 1971. P. 89.
[10] Apresjan Yu. Lexical Semantics. Moscow, 2002. P. 120.
[11] Atkins B., Rundell M. Oxford Guide to Practical Lexicography. 2008. P. 102.

- **Leksikografik tahlil** – lug‘atlarda sleng birliklarning berilish shakli (izoh, belgi, misol) tahlil qilindi;
- **Qiyosiy metod** – bir tilli va ikki tilli lug‘atlar o‘rtasidagi farqlar aniqlashtirildi;
- **Semantik-pragmatik tahlil** – birliklarning ma’no va konnotativ qatlamlari o‘rganildi;

Material sifatida ingliz va o‘zbek tillaridagi OAV matnlari, ijtimoiy tarmoq postlari hamda zamonaviy lug‘atlar tanlab olindi[12].

Natijalar

1. Slengning dinamik tabiati va leksikografik muammo

Sleng birliklar tez yangilanadi va qisqa vaqt ichida eskiradi. Bu esa an’anaviy lug‘at tuzish jarayoniga zid keladi, chunki lug‘atlar odatda barqaror leksik birliklarga asoslanadi.

2. Semantik ko‘p qatlamlilik va kontekstga bog‘liqlik

Sleng birliklar ko‘pincha bir nechta ma’noga ega bo‘ladi. Masalan, *viral* so‘zi biologiyada kasallik bilan bog‘liq bo‘lsa, media diskursida “tez tarqaluvchi kontent” ma’nosini bildiradi.

Bu esa lug‘atlarda har bir ma’noni kontekst bilan birga berishni talab qiladi.

3. Pragmatik va stilistik xususiyatlar

Sleng birliklar ko‘pincha ekspressiv va emotsional rangga ega. Ular:

- kinoya
- hazil
- tanqid
- baholash

funksiyalarini bajaradi. Shu sababli lug‘atlarda stilistik belgilash (masalan, *informal*, *slang*, *pejorative*) muhim ahamiyatga ega.

4. Tarjima va semantik assimetriya

[12] Lyons J. Semantics. Cambridge, 1977. P. 33.

Ikki tilli lug‘atlarda slengni tarjima qilish murakkab jarayon bo‘lib, quyidagi strategiyalar qo‘llaniladi:

- **to‘g‘ridan-to‘g‘ri ekvivalent**
- **tavsifiy tarjima**
- **funksional moslik**

Ko‘plab hollarda to‘liq ekvivalent mavjud emas, bu esa semantik yo‘qotishlarga olib keladi.

5. Raqamli leksikografiya va innovatsion yondashuvlar

Onlayn lug‘atlar slengni tez yangilash, audio-video misollar qo‘shish va interaktiv izohlar berish imkonini yaratadi. Bu esa an’anaviy lug‘atlarga nisbatan katta ustunlik hisoblanadi[13].

Muhokama

Tahlillar shuni ko‘rsatadiki, slengni lug‘atlarda aks ettirish an’anaviy yondashuvlar bilan cheklanib qolmasligi kerak. Zamonaviy leksikografiya quyidagi tamoyillarga asoslanishi lozim:

- dinamik yangilanish
- korpus asosida ishlash
- multimodal taqdimot
- foydalanuvchiga yo‘naltirilgan dizayn

Shuningdek, slengning OAV orqali normativ tilga yaqinlashuvi yangi leksikografik mezonlarni talab qiladi.

Xulosa

OAV slengi zamonaviy tilning eng faol va o‘zgaruvchan qatlamlaridan biri hisoblanadi. Uning leksikografik tavsifi esa murakkab, ko‘p bosqichli va ilmiy yondashuvni talab qiladigan jarayondir.

Tadqiqot natijalari quyidagilarni ko‘rsatdi:

- sleng birliklar ko‘p qatlamli va kontekstga bog‘liq;

[13] Eco U. Semiotics and Philosophy of Language. 1984. P. 91.

- ularni lug‘atlarda ifodalashda semantik, pragmatik va stilistik jihatlar birgalikda hisobga olinishi zarur;
- ikki tilli lug‘atlarda tarjima muammolari dolzarb bo‘lib qolmoqda;
- raqamli texnologiyalar slengni aks ettirishda yangi imkoniyatlar yaratmoqda.

Kelajakda sun’iy intellekt, korpus lingvistikasi va raqamli platformalar asosida yaratilgan lug‘atlar slengni yanada aniq va samarali ifodalash imkonini beradi.

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COMPARATIVE LINGUISTIC ANALYSIS OF ECO-LEXICON EXPRESSIONS IN ENGLISH AND UZBEK

Ganieva Shohsanam Nekmurodovna

Asia International University

Abstract. *Scholarly interest in the connection between language and ecological consciousness has grown in recent decades due to environmental challenges. Lexical units that describe ecological processes, environmental*

occurrences, and human interaction with nature are referred to as eco-lexicon. A linguistic comparison of eco-lexicon expressions in Uzbek and English is presented in this work. The goal of the study is to determine the discursive, pragmatic, structural, and semantic features of ecological terminology in both languages. Ecological lexical units observed in media discourse were analyzed using descriptive and comparative-typological approaches. The findings show that although Uzbek eco-lexicon blends native word-formation mechanisms with adapted ecological language, English eco-lexicon is heavily influenced by international scientific vocabulary and frequently generated by compounding and affixation. The results contribute to the advancement of ecolinguistic and comparative linguistic research by highlighting both parallels and discrepancies in the linguistic representation of environmental ideas.

Keywords: *eco-lexicon, ecolinguistics, ecological terminology, environmental discourse.*

Introduction. In the twenty-first century, environmental issues have emerged as one of the most important worldwide concerns. Studying the connection between language and ecological consciousness has become more crucial due to climate change, environmental degradation, and the need for sustainable development. Language is crucial for communicating environmental knowledge and influencing how the general public perceives ecological issues. As a result, eco-lexicon research has grown in importance within contemporary linguistics. A set of lexical components known as the "eco-lexicon" describes environmental processes, natural events, and human interactions with the natural world. Media texts, scientific discourse, and environmental communication all make extensive use of these lexical units. Eco-lexicon comparisons offer important insights into how other languages understand environmental challenges. The objective of this study is to examine eco-lexicon expressions in Uzbek and English and determine their pragmatic, discourse, structural, and semantic characteristics.

Main part. Scholars like E. Sapir, who focused on the connection between language and cultural perception, and A. Fill and P. Mühlusler, who created

ecolinguistics as a linguistic approach to environmental discourse, are linked to the theoretical underpinnings of ecolinguistic study. A. Stibbe later emphasized how language shapes environmental values and ecological thought. Researchers like Karimov, Safarov, and Khusniddinov, who studied the creation and evolution of scientific terminology in the Uzbek language, have looked at ecological terminology in the framework of Uzbek linguistics. Paluanova's monographic study also investigates the semantic and derivational characteristics of ecological terminology in Karakalpak, English, and Uzbek. These studies show how language structures and cultural views of nature are reflected in ecological terminology. The investigation shows that eco-lexicon statements in Uzbek and English have similar semantic categories pertaining to natural resource management, climate policy, and environmental protection. Their language implementation, however, varies greatly in terms of discourse function, semantic purpose, and structure. Lexical innovation and metaphorical extension are common characteristics of ecological terminology in English. For instance, abstract and policy-focused ecological notions are reflected in phrases like "climate resilience," "net-zero emissions," "environmental governance," and "sustainable consumption." These phrases are usually created by nominalization and compounding, which enables the standardized and succinct depiction of complicated environmental events. Furthermore, environmental effect is conceptualized in quantifiable and approachable ways using metaphorical expressions such as carbon neutrality and ecological footprint. On the other hand, descriptive and analytically structured statements are more common in Uzbek eco-lexicon. Terms like iqlim barqarorligi, nol chiqindi darajasi, atrof-muhit boshqaruvi, and barqaror iste'mol, for example, show how global ecological concepts have been adapted into Uzbek through semantic expansion and translation-based development. A larger audience can better understand ecological topics thanks to these formulations, which frequently maintain transparency and clarity. Additionally, culturally inspired statements that highlight harmony between humans and nature are often incorporated into Uzbek ecological discourse. Atrof-muhitni asrash, tabiiy resurslardan oqilona foydalanish, and tabiat bilan uyg‘unlik are examples of phrases

that express ethical and value-oriented viewpoints that are less clear in English scientific language. From a discourse standpoint, Uzbek eco-lexicon is more directly associated with domestic environmental issues and public awareness campaigns, whereas English eco-lexicon is frequently utilized in international environmental policy and academic communication. This distinction emphasizes how language shapes both local and global ecological narratives. Overall, the results show that Uzbek eco-lexicon reflects a compromise between national linguistic-cultural specificity and global ecological concepts, whereas English eco-lexicon stresses terminological clarity and international standardization.

Conclusion. Ecological terminology serves as a crucial language tool for representing environmental information, as shown by the comparison of eco-lexicon expressions in Uzbek and English. Uzbek eco-lexicon blends native language traditions with modified international terminology, whereas English eco-lexicon is more standardized and influenced by worldwide scientific discourse. The results advance ecolinguistic study and could encourage additional research in environmental communication, translation, and terminology development.

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KIBERJINOYATLARNI ISBOTLASHDA RAQAMLI MA'LUMOTLARNING YURIDIK KUCHI VA ULARNI RASMIYLASHTIRISH MUAMMOLARI

Husanova Iroda Ilhomjon qizi

O'zbekiston Respublikasi Huquqni muhofaza qilish Akademiyasi

husanovairoda317@gmail.com

Anotatsiya. *Ushbu maqolada raqamli dalillar tushunchasi, ularning huquqiy tabiati hamda dalil sifatida tan olinishi mezonlarining nazariy asoslari yoritiladi. Raqamli dalillarning an'anaviy ashyoviy dalillardan farqli xususiyatlari ochib berilib, ularning sud jarayonida qo'llanilishining huquqiy jihatlari tahlil qilinadi. Raqamli ma'lumotlarning dalil sifatida tan olinishi uchun zarur bo'lgan asosiy shartlar, jumladan dalillarning qonuniy yo'l bilan olinishi, ishonchliligi va jinoyatga aloqadorligi masalalari ko'rib chiqiladi. Shuningdek, maqolada raqamli ma'lumotlarni rasmiylashtirish jarayonida yuzaga keladigan muammolar, xususan dalillarni to'plash va saqlash tartibi, ularning haqiqiyligini ta'minlash hamda muayyan shaxs bilan bog'lashdagi qiyinchiliklar tahlil qilinadi.*

Abstract. *This article discusses the concept of digital evidence, its legal nature, and the theoretical foundations of the criteria for its recognition as evidence. The characteristics of digital evidence that differ from traditional physical evidence are revealed, and the legal aspects of their use in court are analyzed. The main conditions necessary for the recognition of digital data as evidence are considered, including the legality of the evidence, its reliability, and its relevance to the crime.*

The article also analyzes the problems that arise in the process of formalizing digital data, in particular, the procedure for collecting and storing evidence, ensuring its authenticity, and linking it to a specific person.

Axborot texnologiyalarining jadal rivojlanishi jamiyat hayotining barcha sohalariga chuqur kirib borishi bilan bir qatorda jinoyatchilik shakllarining ham o‘zgarishiga olib keldi. Hozirgi davrda ko‘plab jinoyatlar axborot-kommunikatsiya texnologiyalaridan foydalangan holda virtual muhitda sodir etilmoqda. Bunday jinoyatlar natijasida yuzaga keladigan huquqiy oqibatlar esa real huquqiy munosabatlar doirasida baholanadi va javobgarlik choralarining qo‘llanilishiga sabab bo‘ladi. Shu sababli kiberjinoyatlarni aniqlash va isbotlash jarayonida raqamli ma’lumotlar muhim dalil manbai sifatida alohida ahamiyat kasb etmoqda.

Kiberjinoyatchilikning murakkabligi shundaki, hujum ko‘pincha masofadan, shifrlangan kanallar orqali amalga oshiriladi. Jinoyatchining shaxsi, joylashuvi, motivi va izlarini aniqlash an’anaviy tergov usullari uchun ko‘plab qiyinchiliklarni yuzaga keltiradi. An’anaviy jinoyatlarni tergov qilishda ashyoviy dalillar, hujjatlar va guvohlarning ko‘rsatmalari asosiy o‘rin egallagan bo‘lsa, kiberjinoyatlarni tergov qilishda elektron qurilmalar, axborot tizimlari va tarmoqlarda saqlanadigan ma’lumotlar asosiy dalil manbai hisoblanadi. Raqamli ma’lumotlar o‘zining nomoddiy xususiyati, oson ko‘chirilishi va tez o‘zgaruvchanligi bilan an’anaviy dalillardan tubdan farq qiladi. Mazkur xususiyatlar esa ularni aniqlash, qayd etish, saqlash va sud jarayonida dalil sifatida qo‘llashda alohida yondashuvni talab etadi.

Amaliyot shuni ko‘rsatadiki, raqamli ma’lumotlarning yuridik kuchini ta’minlash ko‘p jihatdan ularni qonuniy yo‘l bilan olish va to‘g‘ri rasmiylashtirishga bog‘liq. Raqamli dalillar bilan ishlash jarayonida protsessual talablarga rioya qilinmasligi ularning sud tomonidan dalil sifatida rad etilishiga olib kelishi mumkin. Shu bilan birga, amaldagi protsessual normalar ayrim hollarda raqamli obyektlarning o‘ziga xos xususiyatlarini to‘liq qamrab olmaydi. Raqamli ma’lumotlarning dalil sifatidagi o‘rni ortib borayotgan bo‘lsa-da, ularning huquqiy

tabiati, yuridik kuchi va rasmiylashtirish tartibi masalalari hali ham ilmiy va amaliy jihatdan dolzarb muammolardan biri bo‘lib qolmoqda. Ayniqsa, raqamli dalillarni to‘plash va saqlash tartibini huquqiy jihatdan aniq belgilash, ularning haqiqiyligini ta’minlash hamda muayyan shaxs bilan bog‘lash masalalari alohida ilmiy tadqiqotni talab etadi.

Raqamli dalillar — bu jinoyatlarni aniqlashda va isbotlashda ishlatiladigan elektron (raqamli) shakldagi ma’lumotlardir. Ular kompyuter, smartfon, internet tarmog‘i, serverlar va boshqa raqamli qurilmalarda saqlanadigan ma’lumotlarni o‘z ichiga oladi.

Raqamli dalillarning ahamiyati — raqamli dalillar odatda turli ma’lumotlar shaklida bo‘lib, ularning aslini va maqbulligini ta’minlash uchun bir qator maxsus texnik hamda huquqiy jarayonlar talab etiladi. Raqamli dalillarning eng asosiy xususiyati shundaki, raqamli ma’lumotlar osonlikcha, hattoki, ehtiyotsizlik natijasida o‘zgarishi, o‘chib ketishi yoki yaroqsiz holga kelib qolishi mumkin. Shu bois, ularni to‘g‘ri yig‘ish, saqlash, tekshirish yoki ekspertizadan o‘tkazish va sudga taqdim etish juda katta ahamiyatga ega.

Raqamli dalillarning mohiyati — ularning jinoiy faoliyat haqidagi haqiqatni aniq ko‘rsatuvchi va tergov jarayonida qat’iy isbot sifatida xizmat qiladigan dalil ekanligidadir. Bu dalillar nafaqat jinoyatni isbotlashda, balki jinoiy faoliyatni tushunishda, jinoyat joyi va vaqtini aniqlashda, aybdorni topishda muhim rol o‘ynaydi. Raqamli kriminalistika sohasidagi yetakchi olimlardan biri Eogan Keys bo‘lib, u raqamli dalillarni "elektron shaklda saqlanadigan yoki uzatiladigan, isbotlash qiymatiga ega bo‘lgan har qanday ma’lumot" deb ta’riflaydi. Uning fikricha, raqamli dalillarning aslligini saqlab qolish uchun ularning birma-bir nusxasini olish va xesh-funksiyalarni qo‘llash majburiydir.[14]

Raqamli dalillar ularni an’anaviy fizik dalillardan farqlaydigan bir qator o‘ziga xos xususiyatlarga ega:

[14] **Casey, E.** (2011). *Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet*. Academic Press. (Raqamli dalillarning texnik va huquqiy tabiati bo‘yicha).

- O’zgaruvchanlik
- Yashirinlik
- Masshtablilik
- Takrorlash imkoniyati
- Texnik ta’minotga bog’liqlik

2024 yil 21 noyabrda O‘zbekiston Respublikasining Qonunining qabul qilinishi bu yo‘nalishda muhim qadam bo‘ldi — “O‘zbekiston Respublikasining ayrim qonun hujjatlariga raqamli dalillar bilan ishlash tizimini takomillashtirishga qaratilgan o‘zgartirish va qo‘shimchalar kiritish to‘g‘risida”gi O‘RQ-1003-son. Ushbu qonun doirasida raqamli axborot tashuvchilar ham dalillar qatoriga kiritildi.

Mazkur qonun bilan raqamli dalillar tushunchasini, raqamli dalillarni to‘plash, taqdim etish, mustahkamlash, ko‘zdan kechirish, tekshirish va baholash, ularni saqlash, qaytarish hamda yo‘q qilish tartibini belgilovchi o‘zgartirish va qo‘shimchalar kiritildi. Shuningdek, Jinoyat protsessual Kodeksiga ko’ra, **elektron ma’lumotlar** - elektron qurilmalardan va axborot tizimlaridan, shuningdek axborot texnologiyalaridan foydalangan holda yaratiladigan, ishlov beriladigan hamda saqlanadigan ma’lumotlardir sifatida ta’rif berilgan.[15] Ish uchun ahamiyatga ega bo‘lgan holatlar to‘g‘risidagi ma’lumotlar mavjud bo‘lgan elektron ma’lumotlar, shu jumladan elektron tarzdagi fayllar, audio-, video yozuvlar, Internet jahon axborot tarmog‘ida saqlanayotgan ma’lumotlar, shuningdek boshqa elektron ma’lumotlar **raqamli dalillar**dir.

Shuningdek, guvoh, jabrlanuvchi, gumon qilinuvchi, ayblanuvchi, sudlanuvchi va boshqa shaxslar raqamli dalillarning ko‘chirma nusxalarini qog‘ozda chop etilgan shaklda taqdim etish huquqiga ega.[16]

Tergov uchun raqamli dalillarni to‘g‘ri yig‘ish va samarali ishlatish juda muhim. Bunda tergov jarayonida ishtirok etayotgan har bir ishtirokchining asosiy vazifasi raqamli ma’lumotlarni qonuniy ravishda to‘plash, ularni yo‘qolishidan saqlash, ekspertizaga to‘g‘ri tayyorlash va tayinlashdan iborat. Shu bilan

[15] **O‘zbekiston Respublikasining Jinoyat-protsessual kodeksi(204^1-204^2-modda)**
[16] Yuqoridagi manba

birga,raqamli dalillar jinoyat ishlarini tezkor ochish va uni isbotlashda muhim vosita bo‘lib xizmat qiladi. Raqamli dalillar yordamida jinoyatchilarning o‘zaro aloqa qilish usullari, ularning harakatlari, jinoyat joyida qoldirilgan raqamli izlar va boshqa ko‘plab ma’lumotlarni aniqlash mumkin. Kiberhuquq bo‘yicha taniqli huquqshunos olim Orin Ker raqamli dalillarni to‘plashda "shaxsiy daxlsizlik" va "samarali tergov" o‘rtasidagi muvozanatni saqlash masalalariga e’tibor qaratadi. U raqamli ma’lumotlarning nomoddiy tabiatini inobatga olgan holda, an’anaviy tintuv va olib qo‘yish usullarini elektron muhitga moslashtirish zarurligini ta’kidlaydi.[17] W.G. Krus va A.C. Heiser raqamli dalillarni "mo'rt" dalillar toifasiga kiritadilar. Ularning nazariyasiga ko‘ra, raqamli dalillar ehtiyotkorlik bilan ishlov berilmasa, oddiy tugmani bosish orqali ham yo‘qolib ketishi yoki o‘zgarishi mumkin. Bu esa ularni rasmiylashtirishda maxsus texnik vositalardan foydalanishni talab etadi.[18]

Raqamli dalillarning tergov harakatlarida maqbullik shartlari quyidagilardan iborat:

1. Olishning qonuniyligi

- Tegishli protsessual asoslarning mavjudligi
- Qonun talablariga muvofiqlik
- Vakolatli shaxslar tomonidan olish

2. Ishonchlilik

- Ma’lumotlarning olish paytidan boshlab o‘zgarmaganligini tasdiqlash
- Butunlik (Integrity) kafolati
- Xesh-funksiyalarni qo‘llash

3. Qayd etish tartibi

- Mutaxassisning ishtiroki mavjudligi

[17] **Kerr, O. S.** (2005). *Digital Evidence and the Self-Incrimination Clause*. University of Chicago Law Review. (Elektron muhitda protsessual harakatlar metodologiyasi).

[18] **Kruse, W. G., & Heiser, A. C.** (2001). *Computer Forensics: Incident Response Essentials*. Addison-Wesley Professional. (Raqamli dalillarning o‘zgaruvchanligi va ularni saqlash muammolari bo‘yicha).

- To‘g‘ri hujjatlashtirish
- Olib qo‘yish protokoli tuzish

4. Tekshirilish imkoniyati

- Ekspertiza o‘tkazish
- Boshqa usullar bilan tekshirish
- Mustaqil tasdiqlash
- Texnik tahlil imkoniyati

Raqamli dalillarni rasmiylashtirish jarayonida bir qator amaliy va nazariy muammolar yuzaga keladi. Avvalo, raqamli ma’lumotlarning o‘zgaruvchanligi ularni ishonchli tarzda saqlashni murakkablashtiradi. Elektron qurilmalardagi ma’lumotlar tasodifiy yoki ataylab o‘zgartirilishi, o‘chirib yuborilishi yoki buzilishi mumkin. Shu sababli raqamli dalillarni yig‘ish jarayonida maxsus texnik vositalardan foydalanish zarur bo‘ladi.Shuningdek, dalillarni to‘plash tartibi murakkabdir. Raqamli dalillar ko‘pincha turli qurilmalar, serverlar yoki internet tarmoqlarida joylashgan bo‘ladi. Bu esa ularni tezkor aniqlash va olishni qiyinlashtiradi. Ayrim hollarda ma’lumotlar xorijiy serverlarda saqlanadi, bu esa xalqaro hamkorlikni talab qiladi. Raqamli dalillarning haqiqiyligini ta’minlash ham asosiy muammolardan biridir. Raqamli ma’lumotlarni qalbakilashtirish imkoniyati mavjud bo‘lgani sababli sud jarayonida ularning ishonchliligini asoslab berish muhim hisoblanadi. Buning uchun xesh-funksiyalar, elektron imzo va boshqa texnik vositalardan foydalanish zarur. Shuningdek, raqamli dalillarni muayyan shaxs bilan bog‘lash ham murakkab jarayon hisoblanadi. Masalan, internet orqali sodir etilgan jinoyatlarda foydalanuvchining haqiqiy shaxsini aniqlash har doim ham oson emas. Anonimlik imkoniyatlari tergov jarayonini qiyinlashtiradi. Raqamli dalillarni saqlash ham alohida muammo hisoblanadi. Elektron tashuvchilar vaqt o‘tishi bilan ishdan chiqishi yoki ma’lumotlar yo‘qolishi mumkin. Shu sababli dalillarni xavfsiz saqlash tizimini yaratish muhim ahamiyatga ega.

Raqamli dalillarni rasmiylashtirish jarayonida yuzaga keladigan muammolarni tahlil qilish shuni ko‘rsatadiki, ularni bartaraf etish uchun amaldagi protsessual mexanizmlarni takomillashtirish hamda xorijiy tajribadan foydalanish orqali raqamli dalillar bilan ishlash samaradorligini oshirish mumkin. Birinchidan, raqamli dalillarni yig‘ish va rasmiylashtirish bo‘yicha yagona metodik tavsiyalar ishlab chiqish maqsadga muvofiqdir. Xususan, AQSh amaliyotida Milliy standartlar va texnologiyalar instituti (NIST) tomonidan raqamli dalillarni yig‘ish, saqlash va tekshirish tartiblarini belgilovchi maxsus qo‘llanmalar ishlab chiqilgan. Ushbu qo‘llanmalarda dalillarni aniqlash, nusxa olish va ekspertizaga tayyorlash bosqichlari aniq tartibga solingan. Mazkur tajribadan foydalanish tergov amaliyotida xatolarni kamaytirishga xizmat qiladi. Ikkinchidan, tergov harakatlarida axborot texnologiyalari sohasidagi mutaxassislarning ishtirokini kengaytirish zarur. Raqamli dalillar bilan ishlash maxsus bilimlarni talab qilganligi sababli mutaxassislar ishtiroki dalillarni to‘g‘ri yig‘ish va saqlashga yordam beradi. Xalqaro amaliyotda, jumladan INTERPOL metodik tavsiyalarida ham birinchi bo‘lib hodisa joyiga yetib kelgan xodimlarning raqamli qurilmalar bilan ehtiyotkorlik bilan ishlashi va zarur hollarda mutaxassislarni jalb etishi tavsiya etiladi. Uchinchidan, raqamli dalillarning butunligini ta’minlash uchun texnik vositalardan keng foydalanish maqsadga muvofiqdir. Xususan, xorijiy amaliyotda dalillarni o‘zgarmaganligini tasdiqlash uchun xesh-funksiyalar qo‘llaniladi. Dalil olingan paytda uning xesh qiymati aniqlanadi va keyinchalik tekshiruv jarayonida ushbu qiymat solishtiriladi. Bu usul dalillarning haqiqiyligini aniqlashni osonlashtiradi. To‘rtinchidan, raqamli dalillarni saqlash tizimini takomillashtirish zarur. Ayrim xorijiy davlatlarda dalillarni boshqarishning elektron tizimlari joriy etilgan bo‘lib, ular dalillarning qayerda saqlanayotganini nazorat qilish imkonini beradi. Bunday tizimlar dalillarning yo‘qolib ketishi yoki buzilishi xavfini kamaytiradi. Beshinchidan, tergov organlari xodimlarining malakasini oshirish muhim hisoblanadi. Raqamli dalillar bilan ishlash samaradorligi ko‘p jihatdan xodimlarning bilim darajasiga bog‘liq. Shu sababli maxsus o‘quv kurslari va amaliy mashg‘ulotlarni tashkil etish maqsadga muvofiq bo‘ladi.

Xulosa qilib aytganda, raqamli ma’lumotlar zamonaviy jinoyatlarni aniqlash va isbotlashda muhim dalil manbai hisoblanadi. Axborot texnologiyalarining rivojlanishi natijasida jinoyatchilikning yangi shakllari paydo bo‘layotgani raqamli dalillarning ahamiyatini yanada oshirmoqda. Raqamli dalillar o‘zining nomoddiyligi, oson o‘zgaruvchanligi va texnik vositalarga bog‘liqligi bilan an’anaviy dalillardan farq qiladi. Shu sababli ularni to‘plash, saqlash va rasmiylashtirish jarayonida alohida yondashuv talab etiladi. Ayniqsa, raqamli dalillarni standartlashtirilgan tartibda yig‘ish, texnik vositalardan foydalanish hamda mutaxassislar ishtirokini kengaytirish raqamli dalillarning yuridik kuchini oshirishga xizmat qiladi. Shunday qilib, raqamli dalillar bilan ishlash tizimini takomillashtirish zamonaviy jinoyatchilikka qarshi kurashishda muhim ahamiyat kasb etadi. Raqamli ma’lumotlardan samarali foydalanish jinoyatlarni tezkor aniqlash va isbotlash imkoniyatlarini kengaytiradi hamda odil sudlovni ta’minlashga xizmat qiladi.

Foydalanilgan adabiyotlar ro‘yxati

I. Normativ-huquqiy hujjatlar

1. **O‘zbekiston Respublikasining Qonuni**, “O‘zbekiston Respublikasining ayrim qonun hujjatlariga raqamli dalillar bilan ishlash tizimini takomillashtirishga qaratilgan o‘zgartirish va qo‘shimchalar kiritish to‘g‘risida”gi O‘RQ-1003-son, 21.11.2024 y.
2. **O‘zbekiston Respublikasining Jinoyat-protsessual kodeksi** (Elektron ma’lumotlar va raqamli dalillarga oid qismi).

II. Maxsus adabiyotlar va darsliklar

3. **Casey, E.** (2011). *Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet*. Academic Press. (Raqamli dalillarning texnik va huquqiy tabiati bo‘yicha).
4. **Kerr, O. S.** (2005). *Digital Evidence and the Self-Incrimination Clause*. University of Chicago Law Review. (Elektron muhitda protsessual harakatlar metodologiyasi).

5. **Kruse, W. G., & Heiser, A. C.** (2001). *Computer Forensics: Incident Response Essentials*. Addison-Wesley Professional. (Raqamli dalillarning o‘zgaruvchanligi va ularni saqlash muammolari bo‘yicha).

III. Metodik tavsiyalar va xalqaro hujjatlar

6. **NIST (National Institute of Standards and Technology).** *Guide to Integrating Forensic Techniques into Incident Response*. Special Publication 800-86.

7. **INTERPOL.** *Global guidelines for digital forensics laboratories*. (Voqea joyida raqamli qurilmalar bilan ishlash bo‘yicha tavsiyalar).

HUVAYDO LIRIK ASARLARI MANBALARI (toshbosma bayozlar misolida)

Murodova Barno Kamalxodja qizi

Alisher Navoiy nomidagi Toshkent davlat o‘zbek tili va adabiyoti universiteti

barnomurodova43@gmail.com

Annotatsiya.*Ushbu maqolada XVIII asr o‘zbek mumtoz adabiyotining yirik vakili Xo‘janazar Huvaydo ijodiy merosining manbashunoslik tahlili yoritilgan. Tadqiqot markazida O‘zbekiston Fanlar akademiyasi Abu Rayhon Beruniy nomidagi Sharqshunoslik instituti Qo‘lyozmalar fondida saqlanayotgan shoir she’rlarini o‘z ichiga olgan noyob bayozlar turadi. Maqolada mazkur toshbosma*

nashrlarning o‘ziga xos xususiyatlari, ulardagi she’rlarning tarkibiy farqlari va takrorlanmas namunalari qiyosiy o‘rganilgan.

Kalit so‘zlar: *Huvaydo, devon, toshbosma (litografiya), bayoz, Sharqshunoslik instituti, qo‘lyozma, tekstologiya, tasavvufiy she’riyat.*

Annotatsion. *This article covers a source analysis of the creative heritage of Khojanazar Huvaido, a major representative of Uzbek classical literature of the 18th century. The focus of the research is on unique manuscripts containing the poet's poems, which are stored in the Manuscript Fund of the Abu Raykhan Beruni Institute of Oriental Studies of the Academy of Sciences of Uzbekistan. The article comparatively studies the specific features of these lithographic editions, the structural differences of the poems in them, and their unique examples.*

Keywords: *Huvaydo, divan, lithography, bayoz, Institute of Oriental Studies, manuscript, textology, mystical poetry.*

Kirish.

Jahon matbaachilik tarixida muhim bosqich bo‘lgan litografiya (toshbosma) usuli 1798-yilda Aloz’y Zenefelder tomonidan kashf etilgan bo‘lsa-da, ushbu texnologiya Rossiyada 1816-yildan, Sharq mamlakatlarida, jumladan Eronda 1818-yildan amaliyotga joriy etila boshlandi. O‘rta Osiyo hududida esa ilk toshbosma bosmaxona 1873-yilda Xivada tashkil etildi. Ushbu tarixiy voqea mintaqa madaniy hayotida tub burilish yasadi. XIX asr oxiri va XX asr boshlariga kelib, Toshkent, Samarqand, Buxoro, Xiva, Qo‘qon, Andijon va Namangan kabi yirik madaniy markazlarda bosmaxonalar tarmog‘i kengaydi. Mazkur matbaa korxonalarida, asosan, klassik adabiyot namunalari, diniy-ma’rifiy asarlar va mahalliy mualliflarning ijodiy merosini keng xalq ommasiga yetkazishga ustuvor ahamiyat qaratildi. Bu esa o‘z navbatida milliy adabiy merosning saqlanishi va ommaviylashuvida muhim omil bo‘lib xizmat qildi.

Asosiy qism.

Xo‘janazar Huvaydoning “Rohati dil” va devoni toshbosmalari O'zbekiston Fanlar Akademiyasi Sharqshunoslik instituti Qo'lyozmalar fondida saqlanmoqda. Kuzatishlarimiz orqali shoirning “Rohati dil” asari 1886-1915 yillar orasida chop etilgan nusxalari fondda mavjudligi aniqlandi. Devon toshbosmalari esa birmuncha keyinroq 1900-1915 yillarda chop etilgan. Devon toshbosmalari orasida she’rlar miqdori bo‘yicha to‘lig‘i deb 1907-yil Huvaydoning chevarasi Salohiddin Soqib tomonidan bosmaga tayyorlangan nusxani aytishimiz mumkin. Ayni paytda institutda shoir lirikasini o‘z ichiga olgan bayoz toshbosmalar ham mavjudki, tarkibidagi she’rlarning takrorlanmasligi bilan bir-biridan ajralib turadi.

“BAYOZI MULLA O‘TAB” Inv.№ 333. Xattot mulla O‘tabboy tomonidan sariq fabrika qog‘ozga chiroyli nasta’liq xatida ko‘chirilgan. Muqovasi siyohrang kartondan ishlangan. Bayozga shunday deb sarlavha qo‘yilgan:”Alhamdilillahi va amanahu bu kitob miskini xuttab majmuan ash’ori g‘ariba va ajibakim hama mardumlarg‘a maqbul va mahbubdur, ya’ni mashhur bayoz”. Pastda esa “...ki Mulla O‘tab Rasulmuhammad o‘g‘illarini ehtimomi bilan Toshkand shahrida G‘ulomiy matbaasinda tab’ aylanub matbu’ chob o‘ldi” deb yozilgan. Demak mazkur bayoz xattot Mulla O‘tabboylar tomonidan to‘planib 1325/1907-yilda “G‘ulomiya” litografiyasida chiqarilgan. Ushbu bayozda turli davr ijodkorlarining yuzdan ortiq ijod namunasidan namuna keltirilgan. Bayoz 239 betdan iborat bo‘lib, 21*13 sm o‘lchamda. Bayoz basmala bilan boshlanib ma’lum shoir ijodidan beriladigan namunalar bir o‘zidagina berilmay kitobning turli sahifalarida ham beriladi. Har bir sahifa go‘zal jadvallar ichiga olingan. Ellikdan ortiq shoirning g‘azal, mustazod, muxammas, musaddas, murabba, fard va boshqa janrdagi asarlari kiritilgan. Bayozning 190-191- sahifasida Kamiyning Huvaydoga (“Ishqida ey do‘stlar bo‘lmish mani holim xarob, Gul yuzi hajrida tun kun ikki diydamdur sarob”) muxammasi o‘rin olgan.

“BAYOZI YANGI”. Inv.№ 346. Bayoz 1911-yilda Toshkentda Yakovlev bosmaxonasida chop qilingan. Hajmi 144 betdan iborat. Och havorang karton bilan muqovalangan. Sahifalari pushti rangda. Bayozni Sirojiddin Sidqiy nasta’liq xatida

ko‘chirgan. Noshiri esa Mulla Mirzo Abdulloh bin Mirzo Orif va Mulla Sayyid Umarxon maxdum. Bayozning 68-sahifasida Huvaydoning “Yuzungg‘a to‘rt nimarsa oshiqi shaydodur, ey dilbar, Biri oy-u biri kundur, biri xurshid, biri anvar” , 70-sahifada “Arzimni aytay shohim eshitgil, Miskin gadoman dodima yetgil” 7 baytli g‘azali, 143-sahifada esa “Sani vasling yaqin andoq ko‘zim oq-u qarosidur, Mani sandin yiroq solg‘an bu nafsimni balosidur “ deb boshlanadigan 9 baytli g‘azallari o‘rin olgan.

BAYOZI GULSHANI ASH’OR Inv.№ 325. Ushbu toshbosmaning muqovasi och jigarrang qattiq kartondan ishlangan, haftrang sahifadan iborat. Toshbosmaning avvalgi 24 sahifalari tillarang islimiy naqshli jadval bilan bezatilgan. Har bir sahifaga 3 ustun qilib matn bosilgan. Bayoz Yakovlev litografiyasida bosilgan bo‘lib, uni Muhammad Noseh bin Ali Muhammad domla nashrga tayyorlagan. Bayoz matni Mulla Islom tomonidan nasta’liqda ko‘chirilgan. 288 sahifadan iborat bo‘lib, basmala, undan so‘ng “Muborak ast benom tu iftitoh kalom, Taborak asmuka yo Jalol val ikrom” (Kalomning sening noming bilan boshlanishi muborakdir. Ey ulug‘lik va ikrom egasi, sening isming naqadar barakotli va muqaddasdir) bayti bilan kirish boshlangan. Oxirgi sahifada esa go‘zal xotima berilgan. Bayozda 70 ga yaqin shoirning she’rlari mavjud: Atoiy, Gulxaniy, Dilafgor, Jomiy, Kamiy, Lutfiy, Miskin, Muqimiy, Sobir, Fuzuliy, Furqat, Haziniy, Huvaydo va hkz. Bayoz kitobat qilinayotganda ba’zi chalkashliklar sababli, ayrim she’rlar tartib bilan tushmagan, ayrim sahifalar qayta bosilgan o‘rinlar mavjud. “Bayozi gulshani ash’or” XX asr boshlarida tuzilgan yirik bayozlardan bo‘lib, unda turli tillarda ijod qilgan shoirlarning ko‘pgina she’rlari kiritilgan. Jomiy, Navoiy, Fuzuliy, Gulxaniy, Zaliliy kabi zullisonayn shoirlarni misol keltirish mumkin.

Ushbu bayoz haqida Abdulla Nosirovning 13503 raqamli hujjat qo‘lyozmasi 12-sahifada quyidagicha ma’lumotlar uchraydi: ”Bu bayozni Muhammadnosih Alimuhammad domla o‘g‘li 1908-yilda tuzgan va uni Toshkentda Yakovlev bosmaxonasida nashr qildirgan. ...bu bayozni xalqning foydasi uchun nashr qilindi. Chunki shu xil ajoyib yaxshi she’rlar gazeta varaqalarida sotilib, qolib ketishiga

vijdonim qabul qilmadi...”,- deyiladi. Ushbu bayozning 87-sahifasidan Huvaydoning “Yuzungg’a to‘rt nimarsa oshiqi bedordur ey dilbar, Biri oy-u biri kundur, biri xurshid biri anvar” deb boshlanadigan 8 baytli g‘azali o‘rin olgan.

BAYOZI HOJI SOBIR SAMARQANDIY Inv.№ 331. Toshkentda G‘ulomiya matbaasida chop etilgan ushbu bayoz Mulla Abdurahmon kitobfurush noshirligida bosmadan chiqqan. Jami 144 sahifadan iborat. Basmaladan keyin Hoji Sobir Samarqandiyning “Shaydo abror rasuli xudo, Badri sipehr falak iste’fo”(Allohning Rasuli — barcha solihlar u zotga shaydodir, U zot koinot osmonining nurli to‘lin oyidir) bayti bilan boshlanadi. Asarda 16 shoirning 60 dan ortiq she’ri kiritilgan. Bayozga kirgan she’rlarning ko‘pchiligi muallifning o‘z qalamiga mansub. Mo‘jazgina toshbosmaning 103-104-sahifasida Huvaydoning “Xudoyo gardi isyonda qolibman qil safo anda, Agar chandeki bo‘lsam osiyman qil safo anda” deb boshlanadigan 6 baytli g‘azali, 104-107-sahifada “Jahong‘a qudrating bo‘ldi huvaydo, Qilursan qatraidin durni paydo” bayti bilan boshlanadigan 23 baytli g‘azali, 107-sahifada “Nechuk aylar musulmonlar o‘larmiz oqibat bir kun, ...” deb boshlanmadigan 7 baytli g‘azallari berilgan.

Xulosa.

Xulosa qilib aytganda XX asrlarda tuzilgan bayozlar, nafaqat, o‘zbek toshbosma san’atining yorqin namunasi, balki mumtoz adabiyotimiz matnshunosligi uchun ham muhim manba hisoblanadi. Tarkibida ko‘plab shoirlarning ijodidan namunalar berilishi asarning badiiy qamrovi nechog‘liq keng bo‘lganligini ko‘rsatadi. Bayozlardan o‘rin olgan Huvaydoning “Yuzungg‘a to‘rt nimarsa oshiqi bedordur ey dilbar, Biri oy-u biri kundur, biri xurshid biri anvar” deb boshlanadogan g‘azali xalq orasida mashhur bo‘lganidan dalolat beradi. Bu kabi toshbosma manbalarni tizimli o‘rganish Huvaydo va boshqa mumtoz shoirlarimiz ijodining noma’lum qirralarini ochishda, matnlardagi lingvistik va uslubiy o‘zgarishlarni kuzatishda katta ilmiy ahamiyatga ega.

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IKKI TILLI O‘QUV LUG‘ATLARDA LEKSIK BIRLIKLARNI SEMANTIZATSIYALASHNING INTEGRATIV-KOGNITIV MODELI

Nashirova Shaxnoza Buriyevna

Qarshi davlat universiteti

E-mail shakhnozka08@gmail.com

Abstrakt. *Ushbu maqola ikki tilli o‘quv lug‘atlarda leksik birliklarni semantizatsiyalashning* ***integrativ-kognitiv modelini*** *nazariy va amaliy jihatdan o‘rganadi. Integrativ-kognitiv yondashuv leksik ma’nolarni til o‘rganuvchining psixik jarayonlari, til kontekstlari va madaniy komponentlar bilan bog‘liq ravishda tushunish modelidir. Ishda ikki tilli lug‘atlardagi semantik birliklarning tuzilishi, tarjima ekvivalentlari, kontekstual ma’no va kognitiv xaritalash asoslari tahlil*

qilinadi. Bu model til o‘rganuvchilarga so‘zning chuqur semantik tuzilmasini idrok etishda yordam beradi, shuningdek, lug‘atshunoslik nazariyasi uchun yangi konseptual yo‘nalishlarni taklif etadi.

Kalit so‘zlar: *ikki tilli lug‘atlar, leksik birliklar, semantizatsiya, integrativ kognitiv model, kognitiv lingvistika, semantik tuzilma, tarjima ekvivalentlari, kontekstual ma’no, kognitiv xaritalash, til o‘rganish jarayoni, psixik jarayonlar, madaniy komponentlar, lug‘atshunoslik, leksik semantika, til didaktikasi*

Abstract. *This article investigates an* ***integrative-cognitive model*** *for semantic encoding of lexical units in bilingual educational dictionaries. The integrative-cognitive approach conceptualizes lexical meaning not merely as translation pairs, but as interaction between cognitive processes, contextual usage, and cultural parameters. The study analyzes lexical structuring, sense relations, and cognitive mapping practices in bilingual dictionary entries. The proposed model enhances learners’ semantic comprehension and provides a theoretical framework for advancing lexicographic design.*

Keywords: *bilingual dictionaries, lexical units, semanticization, integrative cognitive model, cognitive linguistics, semantic structure, translation equivalents, contextual meaning, cognitive mapping, language learning process, mental processes, cultural components, lexicography, lexical semantics, language pedagogy*

Аннотации. *Статья посвящена интегративно-когнитивной модели семантизации лексических единиц в двуязычных учебных словарях. Интегративно-когнитивный подход рассматривает значение слов не только как переводческие пары, но как взаимодействие когнитивных процессов, употребления в контексте и культурных параметров. В исследовании анализируются структуры лексических единиц, семантические отношения и когнитивное картирование в словарных статьях. Предложенная модель повышает семантическое понимание обучающихся и служит теоретической основой для развития лексикографического проектирования.*

Ключевые слова: *двуязычные словари, лексические единицы, семантизация, интегративная когнитивная модель, когнитивная лингвистика, семантическая структура, переводческие эквиваленты, контекстуальное значение, когнитивное картирование, процесс изучения языка, психические процессы, культурные компоненты, лексикография, лексическая семантика, языковая педагогика*

KIRISH

Ikki tilli o‘quv lug‘atlar — nazariy tilshunoslik va ta’limda markaziy o‘rinni egallaydi. Ular til o‘rganuvchilarga ikki til o‘rtasidagi leksik ma’no hamda semantik munosabatlarni tushunishga yordam beradi. An’anaviy lug‘atshunoslik lug‘atni ikki tilning bir-biriga tarjima qilinadigan ekvivalentlar majmuasi deb biladi, ammo so‘nggi tadqiqotlar semantik tuzilmalar va til bilan bog‘liq kognitiv jarayonlarni ham hisobga olish zarurligini ko‘rsatmoqda. Integrativ-kognitiv model ana shunday jarayonni yoritadi, leksik birliklarni inson ongida shakllanadigan semantik xaritalar sifatida ko‘radi.

Leksik birlik va semantika

Leksik birlik — tilning eng kichik ma’noli elementi bo‘lib, u o‘zaro semantik bog‘liqlikda til tizimini tashkil etadi. Leksik birliklar o‘zaro **sinonimiya, antonimiya, hiperonimiya** kabi munosabatlar orqali semantik maydonni hosil qiladi. Semantik tuzilma leksik birlikning ma’nosini anglash uchun kerakli kontekstni beradi.(Innovative Academy)

Ikki tilli lug‘atshunoslik

Ikki tilli lug‘atlar nafaqat tarjima ekvivalentlarini berish, balki foydalanuvchining psixolinguistik ehtiyojlarini qondirishga xizmat qilishi lozim. Bu lug‘atlarda **kognitiv komponentlar**, madaniy nuanslar va kontekstga asoslangan izohlar bo‘lishi kerak.(Глобальные Конференции)

Kognitiv yondashuv va lug‘at

Til va ong o‘rtasidagi bog‘liqlik ham lug‘at tuzilishiga ta’sir qiladi. Leksik birliklar kognitiv strukturada joylashgan bo‘lib, u til o‘rganuvchi ongida **mentallashgan xaritalar** orqali idrok etiladi. Bilingval psixolinguistika tadqiqotlari

ikki tilni bilgan shaxsning ikkala tilni ham samarali ishlatishida semantik integratsiyaning muhimligini tasdiqlaydi.(BuxDu)

INTEGRATIV-KOGNITIV MODEL TUSHUNCHASI

Integrativ-kognitiv model quyidagi asosiy komponentlardan iborat:

1. **Ma’no kontekstualizatsiyasi** — har bir leksik birlik o‘z kontekstida analiz qilinadi (misol: sinonim, kollokatsiya, frazeologik birlik).(Академические Издатели)
2. **Kognitiv xaritalash** — so‘zlar o‘zaro ma’no maydonida joylashadi va o‘rganuvchining bilish jarayoni orqali tasvirlanadi.
3. **Madaniy komponentlar** — so‘zning madaniy va pragmatik qirralari tarjima ekvivalentlar bilan bog‘lanadi.(Филологические науки)

Birinchi komponent — ma’no kontekstualizatsiyasi — leksik birlikning turli til vaziyatlarida qanday ishlatilishini aniqlashga yordam beradi. Bu jarayon so‘zning sinonim, antonim va frazeologik birikmalari bilan bog‘liqligini o‘rganishni o‘z ichiga oladi. Misol uchun, inglizcha “light” so‘zi yorug‘lik ma’nosida ishlatilishi bilan birga, yengil, oson ma’nolarida ham qo‘llanilishi mumkin. Shu tarzda har bir leksik birlik o‘z kontekstida keng tahlil qilinadi, bu esa til o‘rganuvchiga so‘zning turli semantik qirralarini idrok etishda yordam beradi (Академические Издатели).

Ikkinchi komponent — kognitiv xaritalash — leksik birliklarning bir-biri bilan semantik aloqalarini vizual va kognitiv darajada tasvirlashdir. So‘zlar o‘zaro ma’no maydonida joylashadi va o‘rganuvchi ularni analogiyalar, kategoriyalar va hierarxiyalar orqali o‘z ongida xaritalaydi. Bu yondashuv til o‘rganuvchining kognitiv jarayonini faollashtiradi va yangi leksik birliklarni o‘rganishda samarali qo‘llaniladi.

Uchinchi komponent — **madaniy komponentlar** — leksik birliklarning madaniy va pragmatik nuanslarini o‘z ichiga oladi. So‘zning ma’nosi ko‘pincha uning madaniy konteksti bilan bog‘liq bo‘lib, tarjima ekvivalentlari orqali to‘liq ifodalanmasligi mumkin. Shu bois, integrativ-kognitiv model so‘zning madaniy va kontekstual izohlarini ham kiritadi, bu esa til o‘rganuvchiga so‘zning stilistik,

idiomatik va madaniy xususiyatlarini tushunishga imkon beradi (Филологические науки).

Shu tarzda, integrativ-kognitiv model uch asosiy komponent orqali ikki tilli lug‘atlarda leksik birliklarni tizimli, kognitiv va kontekstual jihatdan boyitilgan shaklda taqdim etadi. Bu yondashuv til o‘rganuvchilarning semantik ongini rivojlantiradi, leksik bilimni mustahkamlaydi va interaktiv ta’lim jarayonini samarali qo‘llash imkoniyatini yaratadi.

AMALIY TAHLIL

Masalaning qo‘llanilishi

Integrativ-kognitiv model asosida tuzilgan ikki tilli lug‘atda leksik birliklar quyidagi tarzda yoritiladi: ma’no, kontekst, tarjima ekvivalenti, semantik bo‘limlar, hamda madaniy izoh. Bu uslub til o‘rganuvchilarga chuqur semantik tushunchalarni shakllantirishga yordam beradi.

Texnologik rivojlanish bilan ham integrativ-kognitiv yondashuvni raqamli lug‘atlarda qo‘llash mumkin, masalan semantik tarmoqlar va ko‘p qatlamli ta’riflar orqali.I kki tilli o‘quv lug‘atlarda leksik birliklarni semantizatsiyalashning integrativ-kognitiv modeli til o‘rganuvchining bilimini chuqurlashtirish va ma’nolarni idrok etish jarayonini samarali tashkil etishga xizmat qiladi. Ushbu model asosida tuzilgan lug‘atlarda har bir leksik birlik bir nechta darajada tahlil qilinadi: avvalo, so‘zning asosiy ma’nosi va uning tarjima ekvivalenti aniqlanadi; keyin kontekstual qo‘llanilishi ko‘rsatilib, sinonim va antonimlar, frazeologik birikmalar bilan bog‘lanadi. Shuningdek, har bir leksik birlik madaniy kontekstda izohlanadi, bu esa til o‘rganuvchiga so‘zning stilistik va pragmatik xususiyatlarini tushunishda yordam beradi.

Amaliy tahlil natijalari shuni ko‘rsatadiki, integrativ-kognitiv yondashuv so‘zlarni faqat tarjima qatori sifatida emas, balki ularning kognitiv xaritalarda joylashgan elementlari sifatida idrok etishga imkon beradi. Masalan, inglizcha “justice” so‘zi o‘zbek tilida “adolat” deb tarjima qilinsa ham, lug‘atda uning

sinonimlari, antonimlari, frazeologik birikmalari va madaniy kontekstdagi ishlatilishi ko‘rsatilib, foydalanuvchi chuqur semantik tasavvurga ega bo‘ladi.

XULOSA (Conclusion)

Integrativ-kognitiv model ikki tilli lug‘atlarda leksik birliklarni semantizatsiyalashni yanada chuqur yoritishga yordam beradi. U foydalanuvchi ongiga asoslangan semantik strukturani yaratadi, tarjima jarayonida kontekst va madaniy qirralarni hisobga oladi hamda til o‘rganuvchi bilimini mustahkamlash uchun ta’limiy vosita vazifasini bajaradi.

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ANALYSE FONCTIONNELLE, SÉMANTIQUE ET MORPHOLOGIQUE DES TERMES THÉRAPEUTIQUES EN LATIN ET EN FRANÇAIS

Nazarova O.Sh.

TDTU

Email:ozoda5852@gmail.com

Annotation. *Cet article propose une analyse approfondie des termes thérapeutiques en latin et en français dans une perspective comparative. L'objectif principal consiste à étudier les caractéristiques fonctionnelles, sémantiques et morphologiques de ces unités terminologiques, ainsi que les problèmes liés à leur traduction et à leur équivalence interlinguistique. L'étude s'appuie sur un corpus de termes appartenant à différents domaines thérapeutiques, notamment la cardiologie, la neurologie et la gastroentérologie. Les résultats montrent que le latin conserve une fonction normative et structurante, tandis que le français assure la diffusion et l'adaptation des connaissances médicales dans le contexte contemporain.*

Mots-clés: *terminologie médicale, latin, français, analyse sémantique, morphologie, traduction*

Abstract. *This article presents a comprehensive analysis of therapeutic medical terms in Latin and French from functional, semantic, and morphological perspectives. The study aims to identify structural features of medical terminology and examine interlinguistic correspondences and translation challenges. Based on a comparative approach, the research includes examples from cardiology, neurology, and gastroenterology. The findings show that Latin maintains a normative role, while French ensures adaptation and effective communication in modern medical discourse.*

Keywords: *medical terminology, Latin, French, semantic analysis, morphology, translation*

Аннотация. *В статье представлен комплексный анализ терапевтических медицинских терминов на латинском и французском языках с функциональной, семантической и морфологической точек зрения. Исследование направлено на выявление структурных особенностей терминологии и проблем перевода. Результаты показывают,что латинский язык выполняет нормативную функцию, а французский — коммуникативную и адаптационную.*

Ключевые слова: *медицинская терминология, латинский язык, французский язык, семантика, перевод*

Introduction

La terminologie médicale représente un système complexe et structuré, qui assure la communication précise et efficace dans le domaine scientifique et clinique. Elle constitue un élément essentiel du langage spécialisé, permettant de nommer, classifier et interpréter les phénomènes médicaux avec exactitude.

Historiquement, le latin s’est imposé comme la langue fondamentale de la médecine. Son rôle ne se limite pas à une fonction historique, mais s’étend à une fonction normative, garantissant la stabilité et l’universalité des termes médicaux. Cette stabilité est particulièrement importante dans un contexte scientifique international, où la compréhension commune est primordiale.

Cependant, avec le développement des sciences médicales modernes, les langues nationales, notamment le français, jouent un rôle de plus en plus important. Le français, en tant que langue scientifique, permet non seulement la transmission des connaissances, mais aussi leur adaptation aux réalités contemporaines. Il agit comme un médiateur entre la tradition terminologique latine et les besoins actuels de la communication scientifique.

Dans ce cadre, les termes thérapeutiques occupent une place centrale, car ils reflètent directement les pratiques médicales, les méthodes de traitement et l’évolution des connaissances scientifiques. Leur analyse permet d’explorer les

mécanismes linguistiques, cognitifs et culturels impliqués dans la formation de la terminologie.

Ainsi, l'objectif de cette étude est d'analyser les termes thérapeutiques en latin et en français selon une approche multidimensionnelle incluant les aspects morphologiques, sémantiques et fonctionnels. Une attention particulière est également accordée aux problèmes de traduction, d'équivalence terminologique et aux enjeux de standardisation dans un contexte multilingue.

Méthodologie

La présente étude repose sur une approche méthodologique intégrée combinant des méthodes descriptives, analytiques et comparatives.

Le corpus de recherche a été constitué à partir de sources médicales fiables, incluant des dictionnaires spécialisés, des manuels médicaux et des publications scientifiques. Les termes sélectionnés appartiennent principalement aux domaines thérapeutiques suivants : cardiologie, neurologie, gastroentérologie et, dans une moindre mesure, pneumologie.

Le choix de ces domaines s'explique par leur richesse terminologique et leur importance dans la pratique médicale.

Les méthodes utilisées comprennent :

- **l'analyse morphologique**, visant à identifier les structures internes des termes, notamment les racines gréco-latines, les préfixes et les suffixes ;
- **l'analyse sémantique**, permettant d'étudier la signification des termes, leurs relations lexicales et leur degré de spécialisation ;
- **l'analyse fonctionnelle**, qui examine le rôle des termes dans la communication scientifique ;
- **l'analyse comparative interlinguistique**, centrée sur les correspondances entre le latin et le français ;

- **l'analyse traductologique**, portant sur les équivalences, les lacunes et les stratégies de traduction.

En complément, une approche contrastive incluant l'ouzbek et le russe a été partiellement intégrée afin d'élargir la portée de l'analyse.

Résultats

L'analyse a permis de dégager plusieurs tendances significatives.

1. Régularité morphologique

Les termes thérapeutiques présentent une forte régularité structurelle. Ils sont majoritairement formés à partir de racines gréco-latines combinées à des suffixes spécialisés :

- *-ite* (inflammation) → *bronchite, gastrite*
- *-ose* (processus pathologique) → *névrose*
- *-pathie* (maladie) → *cardiopathie*

Cette régularité facilite la compréhension et l'apprentissage de la terminologie.

2. Spécificité sémantique

La majorité des termes présente une monosémie stricte dans le contexte médical. Cependant, certains termes peuvent être polysémiques dans un usage élargi, ce qui nécessite une interprétation contextuelle.

3. Fonctionnalité des termes

Les termes thérapeutiques remplissent plusieurs fonctions :

- **fonction dénominative** (nommer les phénomènes médicaux),
- **fonction cognitive** (structurer le savoir),
- **fonction communicative** (faciliter l'échange entre spécialistes).

4. Problèmes de traduction

Plusieurs difficultés ont été identifiées :

- absence d'équivalents directs,
- différences morphologiques,
- divergences conceptuelles entre langues.

5. Dimension multilingue

L'analyse comparative a montré que :

- le latin assure la base universelle,
- le français sert de langue scientifique active,
- le russe conserve une proximité terminologique,
- l'ouzbek adapte les termes au contexte national.

Discussion

Les résultats obtenus confirment que la terminologie thérapeutique est un système à la fois stable et évolutif. Le latin garantit la cohérence structurelle, tandis que le français permet l'innovation terminologique.

L'un des aspects les plus importants concerne la traduction. Les difficultés observées montrent que la simple équivalence lexicale ne suffit pas ; une compréhension approfondie des concepts médicaux est nécessaire.

En outre, l'influence des facteurs culturels et linguistiques joue un rôle important dans l'adaptation des termes. Cela est particulièrement visible dans les langues comme l'ouzbek, où la terminologie est en cours de standardisation.

Ainsi, le développement d'une terminologie harmonisée apparaît comme une nécessité dans le contexte de la mondialisation scientifique.

Conclusion (version enrichie)

Cette étude a permis de démontrer que les termes thérapeutiques en latin et en français forment un système cohérent reposant sur des principes morphologiques et sémantiques communs.

Le latin joue un rôle fondamental en assurant la stabilité et l'universalité, tandis que le français contribue à la diffusion et à l'adaptation des connaissances médicales.

L'analyse a également mis en évidence l'importance de la traduction spécialisée et les défis liés à l'équivalence terminologique.

En perspective, il est nécessaire de poursuivre les recherches dans le domaine de la terminologie médicale, notamment en intégrant davantage d'approches multilingues et interdisciplinaires.

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Pardanova Ozoda Turdiqul qizi
O‘zMU

Annotatsiya: *O‘smirlik davrida o‘smirlar o‘z-o‘zini jamiyatda mustaqil individ sifatida anglay boshlaydi, o‘z “Men”ini izlaydi, shaxsiy qarorlar qabul qilishga urinadi. Aynan shu jarayonlarda u turli ichki va tashqi ziddiyatlarga duch keladi. Bu ziddiyatlar stress, xavotir, qo‘rquv, ijtimoiy bosim va boshqa salbiy psixologik holatlar orqali namoyon bo‘ladi. Mazkur murakkab emotsional tajribalar bilan kurashishda ong osti darajasida faollashadigan psixologik himoya mexanizmlari muhim rol o‘ynaydi. Psixologik himoya mexanizmlarini o‘rganish o‘smirlarning emotsional rivojlanishi, ijtimoiy moslashuvi va shaxsiy yetukligiga bo‘lgan ta’sirini aniqlash imkonini beradi. Ushbu maqolada o‘smirlarning psixologik himoya mexanizmlariga oid yondashuvlar nazariy jihatdan tahlil qilinadi.*

Kalit so‘zlar: *shaxsiy identifikatsiya, affekt, xavotir, psixik patologiya, sublimatsiya, nevroz, instinkt, konstruktiv, psixik muvozanat.*

Аннотация: *В подростковом возрасте молодые люди начинают осознавать себя как самостоятельную личность в обществе, ищут собственное «Я» и стремятся принимать личные решения. Именно в этот период они сталкиваются с различными внутренними и внешними конфликтами. Эти противоречия проявляются в виде стресса, тревожности, страха, социального давления и других негативных психологических состояний. В борьбе с подобными эмоциональными переживаниями важную роль играют психологические защитные механизмы, активирующиеся на уровне подсознания. Изучение этих механизмов позволяет определить их влияние на эмоциональное развитие подростков, их социальную адаптацию и личностную зрелость. В данной статье теоретически анализируются подходы к изучению психологических защитных механизмов в подростковом возрасте.*

Ключевые слова: *личностная идентификация, аффект, тревожность, психическая патология, сублимация, невроз, инстинкт, конструктивность, психическое равновесие.*

Abstract: *During adolescence, individuals begin to perceive themselves as independent members of society, seek their personal identity, and strive to make individual decisions. At this stage, they face various internal and external conflicts. These contradictions manifest through stress, anxiety, fear, social pressure, and other negative psychological states. In coping with such complex emotional experiences, psychological defense mechanisms activated at the subconscious level play a significant role. Studying these mechanisms allows for an understanding of their impact on adolescents' emotional development, social adaptation, and personal maturity. This article provides a theoretical analysis of various approaches to the study of psychological defense mechanisms in adolescence.*

Keywords: *personal identification, affect, anxiety, psychological pathology, sublimation, neurosis, instinct, constructive approach, psychological balance.*

Zamonaviy psixologiyada psixologik himoya mexanizmlarini o‘rganishga katta e’tibor beriladi. Olimlarning ta’kidlashicha, psixologik himoya tushunchasi psixoanalizning shaxsiyat nazariyasi va aqliy moslashuv nazariyasiga qo‘shgan eng muhim hissalaridan biri bo‘lgan va shunday bo‘lib qoladi. Psixologik himoya mexanizmlarini shaxsiyatni barqarorlashtirish uchun tartibga solish tizimi sifatida ko‘rish mumkin. Keng psixologik kontekstda psixologik himoya u yoki bu tarzda salbiy, psixotravmatik kechinmalar yuzaga kelganda va asosan shaxsning xulq-atvorini belgilab, ruhiy noqulaylik va tashvishli taranglikni bartaraf etganda qo‘zg‘atiladi. Ko‘pgina zamonaviy psixologik tushunchalarda psixologik himoya o‘z-o‘zidan shubha va pastlik tuyg‘ularini yengish, qadriyat ongini himoya qilish va barqaror o‘zini o‘zi hurmat qilish funktsiyasini bajaradi.

O‘smirlik inson rivojlanishining eng murakkab va o‘ziga xos bosqichidir. Bu davrda jismoniy, hissiy va ijtimoiy o‘zgarishlar jadallashadi, o‘zini anglash va shaxsiy identifikatsiya jarayoni chuqurlashadi. O‘smirlar tashqi muhit ta’siriga

nisbatan sezuvchan bo‘lib, bu davrda stressli holatlar va ichki ziddiyatlar ko‘payadi. Bunday holatlarda shaxs o‘z ruhiy holatini saqlab qolish uchun turli psixologik himoya mexanizmlarini ishga soladi. Ushbu mexanizmlar inson ong osti tomonidan avtomatik tarzda faollashadi va psixik muvozanatni saqlashga xizmat qiladi. O‘smirlarning psixologik himoya mexanizmlarini tizimli o‘rganish hozirgi kunda zamonaviy psixologiyaning dolzarb tadqiqot muammosi sifatida e’tirof etilgan. Adabiyotlarning nazariy tahlili shuni ko‘rsatadiki, ko‘pchilik mualliflar o‘smirlik davriga xos bo‘lgan himoya mexanizmlarini o‘rganadilar.

Himoya mexanizmlari—inson ruhiyatida yuzaga keladigan xavfli, yoqimsiz hissiyot yoki fikrlardan o‘zini ong osti darajasida himoya qilish tizimidir. Bu tushuncha ilk bor Zigmund Freyd tomonidan joriy qilingan va keyinchalik Anna Freyd, E.Erikson, K.Xorni kabi psixoanalitiklar tomonidan rivojlantirilgan. Himoya mexanizmlarining asosiy funksiyasi shaxsni ichki ziddiyatlar va tashqi tahdidlardan asrash, ruhiy barqarorlikni saqlab qolishdir. Ular ong osti faoliyatining bir ko‘rinishi bo‘lib, aksariyat hollarda inson bu jarayonni anglab yetmaydi.

E. Erikson nazariyasiga ko‘ra, o‘smirlik — bu identitet inqirozi davri, unda shaxs “men kimman?”, “hayotdagi o‘rnim qanday?” degan savollarga javob izlaydi. Bu jarayon ko‘plab ichki ziddiyatlar va tashqi bosimlar bilan kechadi. Masalan:

- o‘z tengdoshlariga moslashish ehtiyoji;
- ota-onalar bilan avtonomiya (mustaqillik) uchun kurash;
- tananing jismoniy o‘zgarishlariga nisbatan noaniq munosabat;
- kelajak uchun qarorlar qabul qilishdagi ishonchsizlik.

Bunday murakkab holatlarda himoya mexanizmlari o‘smirga psixologik xavfsizlikni saqlash imkonini beradi.

Psixologik himoya mexanizmlari o‘smirlarning ruhiy muvozanatini saqlashda muhim vosita bo‘lsa-da, ularning haddan tashqari qo‘llanishi yoki noto‘g‘ri shakllanishi shaxsiy rivojlanishga salbiy ta’sir ko‘rsatishi mumkin. Masalan, doimiy inkor qilish yoki proyeksiya o‘smirda ijtimoiy mas’uliyatni rivojlantirishga to‘sqinlik qiladi. Shu bilan birga, sublimatsiya yoki ratsionalizatsiya

kabi sog‘lom himoya mexanizmlari stressni konstruktiv yo‘l bilan bartaraf etishga yordam beradi.

Psixologik himoya mexanizmlarini o‘rganishda Anna Freyd bolalik davriga alohida e’tibor qaratadi. Uning fikriga ko‘ra, aynan bolalar misolida bu mexanizmlarning faoliyatini yanada aniqroq kuzatish mumkin, chunki bolalarning hissiy hayoti kattalarnikiga nisbatan sodda va shaffofroq bo‘ladi. Bu esa kattalarga bolalarning turli hodisalarga bo‘lgan reaksiyalarini oldindan taxmin qilish imkonini beradi. Agar kutilgan emotsional yoki xulqiy javob sodir bo‘lmasa, bu psixologik jarayonda ma’lum bir buzilish yoki o‘zgarish mavjudligini anglatadi.

Anna Freyd bunday holatlarda aynan affekt (hissiy holat) transformatsiyasining sababini psixologik himoya mexanizmlarining ta’sirida izohlaydi. U himoya mexanizmlarini kuzatish orqali ularning asosiy funksiyasi shaxs ruhiyatining barqarorligini saqlashdan iborat ekanligini ta’kidlaydi. Ya’ni, bu mexanizmlar tartibsizlikka va psixik parchalanishga qarshi kurashuvchi, shaxsni ruhiy muvozanatda ushlab turuvchi vositalar sifatida namoyon bo‘ladi. Biroq, Anna Freyd himoya mexanizmlaridan foydalanishning o‘zi psixik muammolarni butunlay hal etmaydi, deb hisoblaydi. Aksincha, himoya vaqtincha yechim bo‘lishi mumkin, lekin ichki konfliktlar — xususan, qo‘rquv, xavotir va noaniqlik hissi ong ostida saqlanib qoladi. Bu esa uzoq muddatda psixologik muammolarning chuqurlashishiga, hattoki nevrotik buzilishlarning yuzaga kelishiga olib kelishi mumkin.

A. Freyd ayrim psixik himoya mexanizmlarining muayyan psixologik kasalliklar bilan bog‘liq bo‘lishini aniqlaydi. U o‘z tadqiqotlarida har bir psixik patologiyaga mos keluvchi, o‘ziga xos himoya strategiyalarini ko‘rsatib o‘tadi. Masalan:

- Isteriya holatida ko‘pincha repressiya (bostirish) — ya’ni og‘riqli fikrlar va xotiralarni ongdan siqib chiqarish — ustuvor rol o‘ynaydi;
- Obsessiv-kompulsiv nevroz esa odatda izolyatsiya va bostirish mexanizmlarining ko‘p qo‘llanilishi bilan tavsiflanadi.

Bu kuzatishlar shuni ko‘rsatadiki, psixologik himoya mexanizmlari nafaqat shaxsning ruhiy holatini vaqtincha barqarorlashtirishga xizmat qiladi, balki ularning noto‘g‘ri va haddan ortiq qo‘llanilishi ayrim ruhiy buzilishlar rivojlanishida muhim rol o‘ynaydi.

Anksiyete haqida gapirganda, tashvishni psixologik muammo sifatida tushunishning o‘zi ham psixoanaliz bilan, xususan, Z. Freyd va A. Freyd nomlari bilan bog‘liqligini ta’kidlamaslik mumkin emas. Bu hodisaning eng to‘liq tavsiflaridan birini Z. Freyd bergan. A.Freyd otasining g‘oyalarini oydinlashtirib, kengaytirib, tashvish, psixologik himoya va individual rivojlanish tushunchalarini yagona tushunchaga bog‘ladi. Uning fikricha, himoya mexanizmlarining samaradorligi, bir tomondan, tashvishdan himoyalanishning muvaffaqiyati kontekstida, boshqa tomondan, ularning butun rivojlanish jarayoniga ta’siri nuqtai nazaridan taqdim etiladi.

A.Freyd asarlarida xavotirning uch turi ajratilgan. Birinchi tur - ongning tashvishi. Bu ma’lum instinktiv istaklarning ongga kirib borishi va Ego yordamida qoniqishga erishishi bilan bog‘liq. Qizig‘i shundaki, Egoning o‘zi bunga qarshilik qilmaydi. Superego alohida norozilik faolligini namoyish etadi. Natijada bo‘ysungan ego o‘zi kurashayotgan turtkini xavfli deb hisoblamasa-da, instinktiv impulsga qarshi kurashga kirishadi. Bu yerda instinktning dushmanligi faqat superegoning uni qondirishni taqiqlashi bilan bog‘liq.

Anksiyetening keyingi turi - bolalik nevrozida ob’ektiv tashvish. Kichkina bolaning egosi, xuddi kattalarniki kabi, ixtiyoriy ravishda instinktlarga qarshi kurashmaydi. Ego instinktlarni xavfli deb biladi, chunki bolani tarbiyalaganlar ularni qondirishni ta’qiqlagan. Binobarin, instinktning kirib kelishi nafsning cheklanishi, jazo yoki jazo tahdidini keltirib chiqaradi. Bundan kelib chiqadiki, bolaning egosi tashqi dunyodan qo‘rqqanligi uchungina instinktlardan qo‘rqadi. Binobarin, egoning instinktlarga qarshi himoyasi tashqi dunyodan qo‘rqish bilan bog‘liq.

Xavotirning oxirgi turi - instinktiv tashvish yoki instinktlar kuchidan qo‘rqish egoning iddan yomon farqlanganligi sababli instinktlarga do‘stona munosabatda bo‘lishiga asoslanadi. Ego birlamchi jarayonlardan ikkinchi darajali

jarayonlarga, zavq tamoyilidan voqelik tamoyiliga o‘tganda, u instinktlar uchun dushman hududga aylanadi.

So‘nggi yillarda olib borilgan psixologik tadqiqotlar shuni ko‘rsatadiki, stressli vaziyatlarda sog‘lom himoya mexanizmlarini shakllantirgan o‘smirlar ruhiy barqarorlikka ega bo‘ladi, muammolarga konstruktiv yondashadi, o‘ziga bo‘lgan ishonchi yuqori bo‘ladi. Masalan, AQShdagi Columbia universiteti tomonidan olib borilgan izlanishlarda ratsionalizatsiya va sublimatsiyadan foydalanuvchi o‘smirlar depressiya darajasi past bo‘lishi aniqlangan.

Xulosa qilib aytishimiz mumkinki, o‘smirlarda psixologik himoya mexanizmlari ularning ruhiy salomatligini saqlashda muhim omildir. Ushbu mexanizmlar stressli holatlarni yengishda vaqtincha yechim bo‘lishi mumkin, biroq ular konstruktiv yo‘l bilan rivojlantirilmasa, kelgusida shaxsda inqiroz holatlariga olib kelishi ehtimoli bor. Shu bois, o‘smirlarda sog‘lom psixologik himoya mexanizmlarini aniqlash, qo‘llab-quvvatlash va rivojlantirish o‘qituvchi, ota-ona hamda psixologlar zimmasidagi muhim vazifadir.

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GRAMMATIK MA’NONING SHAKLLANISHIDA PRAGMATIK OMILLAR

Qalandarova Dilfuza Satimboyevna

CHDPU

dilfuzatoshpulatova776@gmail.cm

Annotatsiya. *Maqolada grammatik shakllarning nutqiy voqelanishi lisoniy va pragmatik omillar uyg‘unligida tahlil qilinadi. Badiiy matnlar misolida grammatik ko‘rsatkichlarning kommunikativ intensiya, uslubiy talab va sotsiopragmatik omillar ta’sirida ma’no xususiylashuvi hamda poetik funksiyalari yoritiladi. Natijada grammatik shakllarning nutqda lisoniy-pragmatik hamkorlik asosida ishlashi ilmiy jihatdan asoslanadi.*

Kalit so‘zlar: *grammatik shakl, nutqiy voqelanish, pragmatik omil, kommunikativ intensiya, badiiy nutq, uslubiy xususiyat.*

Annotation. *The article analyzes the realization of grammatical forms in speech through the interaction of linguistic and pragmatic factors. Based on examples from literary texts, the study examines the semantic specification and poetic functions of grammatical markers under the influence of communicative intention, stylistic requirements, and sociopragmatic factors. As a result, it is scientifically substantiated that grammatical forms function in speech through the cooperation of linguistic and pragmatic elements.*

Keywords: *grammatical form, speech realization, pragmatic factor, communicative intention, literary discourse, stylistic features.*

Аннотация. *В статье анализируется реализация грамматических форм в речи в единстве лингвистических и прагматических факторов. На примере художественных текстов рассматриваются семантическая конкретизация и поэтические функции грамматических показателей под влиянием коммуникативной интенции, стилистических требований и социопрагматических факторов. В результате научно обосновывается, что функционирование грамматических форм в речи осуществляется на основе взаимодействия лингвистических и прагматических факторов.*

Ключевые слова: *грамматическая форма, речевая реализация, прагматический фактор, коммуникативная интенция, художественная речь, стилистические особенности.*

Kirish. Nutqning uch o‘lchamli tahlilida lisoniy dalillarni o‘rganishning sof lingvistik tadqiqi doirasidan chiqib, pragmatik omillar bilan ham ish ko‘riladi. Bu, ayniqsa, substansial tabiati boshqa (lisoniy va nolisoniy) vositalarning hamkorligiga ko‘proq bog‘liq bo‘lib qolgan, o‘z holicha ma’no ifodalay olmaydigan va imkoniyatlarini namoyon qilolmaydigan, funksional-semantik tabiatining o‘ta mavhumligi bilan xarakterlanadigan grammatik shakllarda yaqqol ko‘zga tashlanadi. Xususan, grammatik ko‘rsatkich grammatik ma’no ifodalaydimi yoki o‘zi birikayotgan mustaqil leksemalarning substansial tabiatida mavjud tegishli ma’nolarni ro‘yobga chiqaradigan, katalizator vazifasini o‘taydigan yordamchi vositami degan muammo garchi yechimini topishi nomuqarrar bo‘lsa-da, mavjud ekanligi fikrimizning dalilidir. Chunki, masalan, so‘z turkumlarining tasniflovchi kategoriyalariga[19] mansub lug‘aviy shakl yasovchilarning faqat muayyan so‘z turkumlari doirasidagina shakl yasashi va muayyan bir ma’nolarni ifodalashi ularda

[19] Баҳриддинова Б.М. Феъл луғавий шакллари тизими (Тур категорияси): Филол. фан. номз... дисс. автореф. – Самарқанд, 2002. – Б.18.

ushbu ma’nolarning mavjudligiga ma’lum darajada shubha uyg‘onishiga sabab bo‘ladi. Shuningdek, aloqa-munosabat kategoriyalarining lug‘aviy ma’noga daxldor mohiyatga ega emasligi va shu boisdan barcha so‘z turkumlari uchun umumiyligi kabilar ham fikrimizga dalil bo‘la oladi. Demak, grammatik shakl ma’nolarining an’anaviy talqinlarda boshqa sath birliklariga bog‘liq qilib qo‘yilishi umumiy lisoniy substa nsiyalarning voqelanishi uchun hamkorlikning zarurligiga, hamkorlik esa lisoniy va nolisoniy omillar mushtarakligida bo‘lishiga olib keladi.

Mavzuga oid adabiyotlar tahlili: Grammatik ma’noning shakllanishi va uning nutqiy voqelanishi masalasi tilshunoslikda turli yo‘nalishlarda o‘rganilgan. An’anaviy grammatik tadqiqotlarda grammatik ma’no asosan morfologik ko‘rsatkichlar orqali ifodalanadigan tizimli hodisa sifatida talqin qilinadi. Masalan, o‘zbek tilshunosligida **G‘.N. Zikrillayev** grammatik kategoriyalar, xususan, shaxs-son va hurmat kategoriyasining tizimli xususiyatlarini tahlil qilib, grammatik shakllarning lisoniy tizimdagi o‘rni va ularning semantik imkoniyatlarini yoritib bergan. O‘zbek tilidagi grammatik shakllarning funksional-semantik xususiyatlari **A. Choriyev** tadqiqotlarida ham keng o‘rganilgan. U qaratqich kelishigining sintaktik-semantik belgilarini o‘zbek va ingliz tillari misolida tahlil qilib, grammatik ko‘rsatkichlarning nutqiy vaziyatga ko‘ra turli ma’no qirralarini yuzaga chiqarishini ko‘rsatadi. Bu esa grammatik shakllarning faqat formal tizim emas, balki nutqiy jarayon bilan ham chambarchas bog‘liqligini tasdiqlaydi. Pragmatik yo‘nalishdagi tadqiqotlarda esa grammatik ma’no shakllanishida kommunikativ maqsad, nutq vaziyati va so‘zlovchi shaxsining roli alohida ta’kidlanadi. **J. Ostin** va **J. Searle** tomonidan ishlab chiqilgan nutq aktlari nazariyasida til birliklari, jumladan, grammatik shakllar ham nutqiy harakatni amalga oshiruvchi vosita sifatida talqin qilinadi. Ushbu nazariya til birliklarining pragmatik xususiyatlarini tushuntirishda muhim metodologik asos bo‘lib xizmat qiladi. Shuningdek, til tizimining ochiq va o‘zgaruvchan tabiati haqida **I. Prigojin** va **M. Stengers** tomonidan ilgari surilgan sinergetik yondashuv ham grammatik shakllarning nutqiy voqelanishini izohlashda ahamiyatlidir. Unga ko‘ra, til tizimi turli omillar ta’sirida o‘zaro hamkorlikda

ishlaydigan elementlar majmui sifatida qaraladi. Umuman olganda, mavjud ilmiy adabiyotlar grammatik ma’noning shakllanishi lisoniy tizim, nutqiy vaziyat va pragmatik omillarning o‘zaro ta’siri natijasida yuzaga kelishini ko‘rsatadi. Mazkur tadqiqot esa ushbu nazariy qarashlarga tayangan holda grammatik shakllarning badiiy nutqdagi pragmatik voqelanishini tahlil qilishga qaratilgan.

Tahlil va natijalar. Har qanday hamkorlik bog‘liqlik va mustaqillik qarama-qarshiligi asosida mavjud bo‘ladi. Mutlaq bog‘liqlik hamkorlik bo‘lmaganidek, mutlaq mustaqillik ham sinergik faoliyatga zid. «Sistema termodinamik muvozanatda bo‘lib turganida uning unsurlari o‘zlarini mustaqil tutib, go‘yo gipnoz qilinganday uyquda bo‘ladilar (masalan, gazning molekulalari o‘zlarini bir-birlariga bog‘liq tutishmaydi). Bunday holatda mazkur elementlar tartiblashgan, yaxlitlangan strukturalarni yuzaga keltira olmaydilar. Ushbu sistema uni o‘ragan muhit bilan o‘zaro ta’sirga kirishganida energiya almashinib, go‘yo «uyg‘onib», nomuvozanat holatga keladi, holat o‘zgarishga uchraydi. Bu uyg‘ongan elementlar muvofiqlashib ta’sir ko‘rsata boshlaydi, ular orasida o‘zaro korrelyasiya vujudga kelib, kogerentlashib, o‘zaro ta’sirlashadi. Sistemaning shu holatdagi strukturasi dissipativ strukturadir»[20]. Grammatik shaklning nutqiy qo‘llanishidagi asosiy omil antropo-pragmatik omil bo‘lib, voqelanish yadro intensiya bilan bog‘liq. Masalan, *O‘zbekiston – Vatanim manim (Abdulla Oripov)* jumlasida bosh qaratqich kelishigi shaklidagi so‘zni qo‘llashda so‘zlovchi intensiyasining darajasi asos bo‘ladi. Poetik obraz yaratish va uni badiiy talqin qilish – shoirning yadroviy intensiyasi. Bu maqsadni ro‘yobga chiqarishda kommunikant quyidagi yordamchi intensiyalarga ham tayanadi: a) badiiy talqinda o‘zlikni namoyon qilish; b) takrordan qochish; v) o‘quvchi his-tuyg‘ulariga kuchli ta’sir qilish; g) ohangdorlikka erishish. Bu omillarga uslubiy omil – badiiy uslubga xos erkinlik, shu bilan birga, cheklanganlik qorishib, adibga grammatik shaklning shevaviy-badiiy variantini tanlashga imkon bergan. Demak, ushbu o‘rinda intensial va lisoniy (uslubiy) omil hamkorligi namoyon bo‘lgan. Biroq bu hamkorlik invariant shaklning variantinigina yuzaga

[20] Пригожин И., Стенгерс М. Порядок из хаоса: Новый диалог человека с природой. – М., 2000. – С.127.

chiqarishga xizmat qilgan. Qaratqich kelishigi turli faktorlar ta’sirida yuzlab ma’nolarga ega bo‘ladi. Buni tilshunos A.Choriyev o‘z vaqtida teran tadqiq qilgan edi[21].

Lisoniy umumiyliklarning xoslanish xususiyatlari nutqiy akt tushunchasi bilan bog‘liq ravishda talqin qilinadi. «Lisoniy faoliyat jarayonida hosil bo‘ladigan qurilmalarning nutq birligi bo‘lishini tasdiqlash uchun ularning aynan nutqiy muloqotga xos umumiy va xususiy belgilarini topish lozim. Nutqiy eng kichik birlik sifatida nutq aktini (speech act) ajratish ma’qulligi xuddi shunday belgilarni topish imkoniyati mavjudligidadir. Binobarin, «Qor yog‘moqda», «Kitobni keltirib ber», «Kitobni keltirib beraman» kabi qurilmalarni konstativ (tasdiq), direktiv (buyruq) va komissiv (va’da) nutqiy aktlari guruhlariga kiritilishiga ushbu guruhlar uchun umumiy bo‘lgan belgi-mazmun asos bo‘ladi. Bu birliklarning xususiy belgilari esa nutq vaziyati, muloqot muhiti bilan bog‘liq holda hosil bo‘ladi. Masalan, «Qor yog‘moqda» nutq vaziyatiga nisbatan axborot berish bilan birgalikda «Havo yomon, ko‘chaga chiqma» mazmunidagi direktiv (buyruq)ni ham ifodalashi mumkin. Xuddi shuningdek, hech qanday gap sxemasiga kiritib bo‘lmaydigan «Shunday bo‘lishi kerak», «Hech qachon», «Balkim», «Ana» kabi lisoniy tuzilmalar xususiy va umumiylik ko‘rsatkichlariga nisbatan turli nutqiy aktlar guruhiga kiritiladi». Grammatik shaklning nutqiy voqelanishidagi lisoniy omillar rang-barang(grammatik shakl birikayotgan leksema, tobe yoki hokim so‘zshakl, grammatik shaklning shakllar silsilasidagi o‘rni, sintagmaning ko‘lami, urg‘u, uslub talablari), lisoniy pragmatik omillar, ularga pragmatik tabiatli omillar – so‘zlovchi yoki tinglovchi shaxsning turli sifatlari (nolisoniy pragmatik omillar) hamkorligida sistema unsuri rolining kuchayishi yoki kuchsizlanishini ayrim dalillar asosida tavsiflashga intilamiz:

Bilmasman,	*qayerdadir*	*menga*	*ibtido,*
Bilmasman,	*qayerdadir*	*menga*	*intiho.*

[21] Chariyev A. Sintaksichesko-semanticheskiye priznaki roditelnogo padeja v uzbekskom i angliyskom yazыkax. – Tashkent, Fan, 1990. – 190 s.

Asrlar qa'ridan o'taman sokin,
Menga bari birdir – kim qul, kim hokim.(Abdulla Oripov)

Matnda fe'l inkor shaklining [-mas] varianti qo'llangan. Bu variant jonli so'zlashuv nutqiga xos emas va ko'pincha badiiy ko'tarinkilik uchun xizmat qiladi. Har ikki holatda ham ko'rsatkich [-may] shaklining varianti sifatida «fe'l-kesimdan anglashilgan ish-harakat mavjudligining inkori» umumiy ma'nosini xususiylashtirgan. Xususiylashuv shaklda ham, ma'noda ham mavjud. Shaklda [-may]ning [-mas] poetik ko'rinishida voqelanishi zohiriy xususiylashuv alomati bo'lsa, ma'nodagi xususiylashuvni izohlash uchun matniy tahlil zarur bo'ladi.

Mazkur shaklni uning invariantı bilan almashtirib ko'ramiz: *Bilmayman, qayerdadir menga ibtido, Bilmayman, qayerdadir menga intiho.* Nazarimizda, shoirda mantiqiy urg'uni ushbu inkor shakldagi so'zga, unga muvofiq ravishda, so'z urg'usini tahlil etilayotgan grammatik shakldagi unliga berish istagi mavjud. Agar shunday bo'lgan taqdirda invariant shakldagi **y** undoshidagi yumshoqlik va unliga moyillik ushbu harakatni ma'lum darajada so'ndirishi mumkin edi, buning natijasida badiiy tasvirni ta'minlashga xizmat qiladigan ko'tarinkilik, keskinlik yuzaga chiqmagan bo'lur edi. E'tiborda tutish lozimki, she'r «Tafakkur monologi» deb nomlangan va bunda so'zlovchi subyekt maqomida tafakkur harakat qilmoqda. Qat'iylik, keskinlik tafakkurga xos subutiy sifatlardan. Biroq unga hissiyot va tuyg'ular pand berishi mumkin. Demak, tafakkurning xususiyatini yorqin berish uchun uning «nutq»ida ham unga mos vosita tanlanadi. Shu bilan birga, **bilmayman** va **bilmasman** so'zlarida ifodalanayotgan bilish darajasi ham farqlanadi. **Bilmayman** so'zida ma'lumotga ega emaslikni ta'kidlash qat'iyroq uqiladi. Demak, bilmaslik va bilmaslikni ifodalash jihatidan ikki so'zshaklda ziddiyat mavjud: **bilmayman** «bilmayman, bu menga bog'liq, bilishni istash/istamasligim aniq emas va bilmaslikdan qoniqmayman» ma'nosini ifodalasa, **bilmasman** so'zshakli esa «bilmayman, bu menga bog'liq emas, bilishni istamayman hamda bu men uchun me'yoriy hol» mazmunidagi axborotga ega. Avvalo, bu shaklni qo'llashda kommunikantning sifati muhim rol o'ynaydi. Mavzuning tafakkur va bilish haqida

ekanligi ham ushbu omilni mustahkamlaydi. Demak, ushbu shaklning qo‘llanishi va umumiy grammatik ma’nosining bifurkatsiyalanishida kommunikativ intensiya (albatta, «tafakkur» intensiyasi bilan lirik qahramon maqsadining qorishib ketishi ham o‘ziga xos omil vazifasini o‘taydi) hamda muallif intensiyasi sotsiopragmatik omil sifatida uslubiy va aktsentuativ omillar bilan hamkorlik qiladi. Ko‘rinadiki, poetik shakl, uslubiy me’yor, kommunikativ intension aktsentuativ tajalli bilan mustahkam hamkorlik qilib, lisoniy-mantiqiy-badiiy uyg‘unlikni vujudga keltirgan. Badiiy nutqda muallifning personaj xarakterini yoritish maqsadida ham grammatik shakllarni o‘ziga xos tarzda qo‘llash holatlari uchrab turadi. Bunda ham tashqi pragmatik omil sifatida lisoniy omillar uyushadi. Bunday misollarni yozuvchi Tog‘ay Murod badiiy nutqida ko‘plab uchratish mumkin:

— *Quloq sol, momosi, quloq sol. Qayerdandir odam ovozi kelyapti...*

Sayrak adirda yonboshlab yotmish bobomiz, momomizga shunday dedilar.

Bobomiz og‘izlarini ang‘raygannamo ochdilar. O‘ng quloqlarini yellar yelmish tarafga tutdilar. [-gan] sifatdosh ko‘rsatkichining [-mish] varianti qo‘llanishi, aslida, badiiy uslubda nutqiy me’yor emas. Xususan, muallif nutqidagi bunday okkazional qo‘llanishlar asosan Tog‘ay Murod tiliga xos, u ma’lum ma’noda o‘z uslubi bilan adabiy til me’yori «devor»larini yorib chiqdi deyish mumkin. Bu, albatta, roman yozilgan davrdagi ijtimoiy-ma’naviy holat bilan ham belgilanadi va g‘oyaviy panjaralarni buzishga intilishning bir ko‘rinishi sifatida namoyon bo‘ladi. Birgina grammatik shaklning qo‘llanishiga sabab bo‘luvchi nolisoniy omil ijtimoiy-ma’naviy ahamiyatga molikligi bilan xarakterlanadi, buni lisoniy birlik qo‘llanilishidagi «uzoq» va asosiy turtkilardan biri deya baholashimiz mumkin. Shakl qo‘llanishining ikkinchi sababi — adibning ma’lum bir hududga xos mental ruhiyatni bo‘rttirishga intilishi. Surxon hududida sifatdosh shaklining bunday ko‘rinishi qo‘llanishi ommaviy tusda deya olmaymiz. Tilshunoslikka doir manbalarda bu morfema tarixiy va eskirgan shakl sifatida baholash urf bo‘lgan. Lekin bu **bo‘l** (kelin bo‘lmish, kuyov bo‘lmish) kabi so‘zlar bilan ayrim o‘rinlarda qo‘llanadi. Yana shuni aytib o‘tish joizki, muallif ushbu grammatik shaklni asosan

o‘z nutqida ishlatadi (397 marta), personajlar muloqotida bu holatni kuzatmaymiz. Grammatik ko‘rsatkichning qo‘llanilishi muallif intensiv faoliyati natijasi sifatida baholanishi lozim. Shu bilan birga, bu shaklga hamrohlik qiladigan shaxs-son kategoriyasining ham uchinchi shaxsda [-lar] tarzida qo‘llanishi voha shevasida ko‘p hollarda qo‘llanmasligi, asarda faqat adib nutqida uchrashi mazkur sifatdosh shaklining nutqiy voqelanishida lisoniy omil vazifasini o‘taydi.

Xulosa. Tahlillarimiz shuni ko‘rsatadiki, noodatiy [-mish] ko‘rsatkichining nutqiy voqelanishida sifatdoshga xos ad’ektivlik ma’nosini «badiiylik» ma’no bo‘lakchasi bilan yuzaga chiqarishi tashqi — muallif intensiyasi omili bilan ichki [-lar] shakli qo‘llanishidan iborat lisoniy omilning uyg‘unlashuvidir. Shuningdek, aksincha, [-lar] shaxs-son ko‘rsatkichining ishlatilishida yuqoridagidek hamkorlik holatini kuzatamiz. [-lar] shaxs-son ko‘rsatkichining asosan rasmiy uslubda bajaruvchilarning ko‘pligini va so‘zlashuv uslubida «hurmat» ma’nosini ifodalash uchun qo‘llanishi, shaklning «hurmat» ma’nosiga betarafligi manbalarda qayd etilgan[22]. Misol olinayotgan ushbu romanda uning qo‘llanilishi ham muallif intensiyasi — uning personajlarga mualliflik hurmatini ifodalashga intilishi bilan bog‘liq. Bu ham lisoniy omilga (birlikdagi «ko‘plik-hurmat» ma’nosiga) pragmatik omilning omixatlanishini ko‘rsatuvchi dalil. Shuningdek, muallif tomonidan namoyon qilinayotgan muloqot odobi uning intensiyasini mustahkamlovchi dalil vazifasini o‘taydi. Grammatik shakllarning nutqiy voqelanishi faqat lisoniy tizim doirasida emas, balki pragmatik omillar bilan hamkorlikda yuzaga keladi. Badiiy nutqda esa kommunikativ intensiya, uslubiy talab va muallif maqsadi grammatik shakllarning ma’no xususiylashuvi hamda ifoda kuchini belgilovchi muhim omil bo‘lib xizmat qiladi.

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TEMURIY MALIKALARI OBRAZINING INGLIZ VA O‘ZBEK ADABIYOTIDA YORITILISHINING LINGVISTIK MEZONLARI

Rashidova Sevara Akmal qizi

Turon Universiteti

Annotatsiya. *Mazkur maqolada Temuriylar davriga mansub malikalarning obrazlari ingliz va o‘zbek adabiyotida qanday yoritilgani lingvistik jihatdan tahlil qilinadi. Tadqiqotning asosiy maqsadi – adabiy matnlarda malika obrazini ifodalovchi til birliklari, uslubiy vositalar va semantik mezonlarni aniqlashdir. Tadqiqot davomida qiyosiy-tahliliy, lingvopoetik va diskursiv tahlil metodlaridan foydalanildi. Natijada ingliz va o‘zbek adabiyotida Temuriy malikalari obrazini tasvirlashda epitetlar, metaforalar, tarixiy-realistik tasvir vositalari hamda madaniy konseptlar muhim rol o‘ynashi aniqlangan. Tadqiqot natijalari tarixiy shaxslar obrazini adabiy va lingvistik jihatdan o‘rganishda muhim ilmiy ahamiyatga ega.*

Kalit so‘zlar: *Temuriylar davri, malika obrazi, lingvistik tahlil, qiyosiy adabiyot, lingvopoetika, badiiy matn.*

Abstract. *This article analyzes the linguistic representation of the images of Timurid princesses in English and Uzbek literature. The main purpose of the research is to identify the linguistic units, stylistic devices, and semantic criteria used to describe the image of a princess in literary texts. Comparative analysis, linguopoetic analysis, and discourse analysis methods were applied in the study. The results show that epithets, metaphors, historical-realistic descriptions, and cultural concepts play an important role in portraying the images of Timurid princesses in both English and Uzbek literature. The findings of the study contribute to the linguistic and literary analysis of historical personalities and are significant for comparative literature studies.*

Key words: *Timurid period, princess image, linguistic analysis, comparative literature, linguopoetics, artistic text.*

Kirish

Temuriylar davri Markaziy Osiyo tarixida siyosiy, madaniy va ilmiy taraqqiyot davri sifatida alohida ahamiyat kasb etadi. Bu davrda nafaqat davlat boshqaruvi, balki ilm-fan, adabiyot va madaniyat ham yuksak darajada rivojlangan. Temuriylar sulolasiga mansub ayollar, xususan malika va malikalar davlat va madaniy hayotda muhim rol o‘ynagan. Ularning faoliyati va shaxsiyati ko‘plab tarixiy va badiiy asarlarda aks etgan. Adabiyotda tarixiy shaxslar obrazini yaratishda til vositalari muhim rol o‘ynaydi. Mualliflar qahramon xarakterini ochishda epitetlar, metaforalar, tasviriy ifodalar hamda madaniy konseptlardan keng foydalanadilar. Temuriy malikalari obrazi ham ingliz va o‘zbek adabiyotida turli lingvistik vositalar orqali ifodalanadi. Mazkur tadqiqot Temuriy malikalari obrazining ingliz va o‘zbek adabiyotida tasvirlanishidagi lingvistik mezonlarni aniqlash va qiyosiy tahlil qilishga qaratilgan. Bu esa tarixiy shaxs obrazining adabiy diskursda qanday shakllanishini chuqurroq anglash imkonini beradi.

Adabiyotlar tahlili va metodologiya

Temuriylar davri tarixiy shaxslari, jumladan Temuriy malikalari haqida ko‘plab ilmiy va badiiy asarlar yaratilgan. O‘zbek adabiyotida bu mavzu asosan tarixiy romanlar, ilmiy tadqiqotlar va badiiy asarlar orqali yoritilgan. Ingliz adabiyotida esa Temuriylar davri haqida tarixiy tadqiqotlar, tarjima asarlar va tarixiy-biografik manbalar mavjud.

Mazkur tadqiqotda quyidagi metodlardan foydalanildi:

- *Qiyosiy tahlil metodi*– ingliz va o‘zbek adabiyotidagi malika obrazlarini solishtirish uchun.
- *Lingvopoetik tahlil* – badiiy matnlarda qo‘llangan stilistik vositalarni aniqlash uchun.
- *Diskurs tahlili* – tarixiy shaxs obrazining matnda qanday ideologik va madaniy ma’noda ifodalanganini aniqlash uchun.

Tadqiqot obyekti sifatida Temuriy malikalari tasvirlangan badiiy va ilmiy matnlar tanlandi. Ushbu matnlarda ishlatilgan leksik birliklar, epitetlar va metaforalar lingvistik nuqtai nazardan tahlil qilindi.

Tadqiqot natijalari va muhokamasi

Tadqiqot natijalari shuni ko‘rsatdiki, Temuriy malikalari obrazi ingliz va o‘zbek adabiyotida turli lingvistik vositalar orqali tasvirlanadi. O‘zbek adabiyotida malika obrazini ifodalashda ko‘proq milliy va madaniy semantikaga ega bo‘lgan epitetlar qo‘llanadi. Masalan, “donishmand malika”, “oqila ayol”, “xalqparvar malika” kabi birikmalar orqali obrazning ijtimoiy va axloqiy fazilatlari ko‘rsatiladi. Ingliz adabiyotida esa tasvir ko‘proq tarixiy-realistik xarakterga ega bo‘lib, “noble queen”, “wise princess”, “influential royal woman” kabi iboralar qo‘llanadi. Bu iboralar malikaning siyosiy va ijtimoiy rolini ta’kidlashga xizmat qiladi.

Lingvistik jihatdan qaralganda, har ikki adabiyotda ham quyidagi vositalar keng qo‘llanadi:

1. Epitetlar – qahramon xarakterini ochishda.
2. Metaforalar – obrazni badiiy jihatdan boyitishda.
3. Tarixiy leksika – davr ruhini ifodalashda.
4. Madaniy konseptlar – milliy qadriyatlarni ko‘rsatishda.

Shuningdek, o‘zbek adabiyotida malika obrazi ko‘proq “ma’naviy yetakchi va madaniyat homiysi” sifatida tasvirlansa, ingliz manbalarida esa ”siyosiy ta’sirga ega tarixiy shaxs” sifatida talqin qilinadi.

Xulosa

Xulosa qilib aytganda, Temuriy malikalari obrazi ingliz va o‘zbek adabiyotida turli lingvistik vositalar orqali yoritilgan. Tadqiqot natijalariga ko‘ra, har ikki adabiyotda ham malika obrazini tasvirlashda epitetlar, metaforalar va tarixiy leksika muhim rol o‘ynaydi. O‘zbek adabiyotida tasvir milliy-madaniy qadriyatlarga ko‘proq asoslangan bo‘lsa, ingliz adabiyotida tarixiy-realistik va analitik yondashuv ustunlik qiladi. Bu esa turli madaniy muhitlarning adabiy tasvir usullariga ta’sirini ko‘rsatadi.

Mazkur tadqiqot natijalari tarixiy shaxslar obrazining lingvistik va adabiy tahlilini chuqurlashtirishga xizmat qiladi hamda qiyosiy adabiyotshunoslik sohasida muhim ilmiy manba bo‘lib xizmat qilishi mumkin.

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“NAVOIY TILINING GRAMMATIK XUSUSIYATLARI” ASARINING O‘ZBEK TILSHUNOSLIGIDAGI O‘RNI

Sharipov Raufjon Elmurod o‘g‘li

Qo‘qon davlat universiteti

sharipovraufjon80@gmail.com

Annotatsiya. *G‘anijon Abdurahmonov va A. Rustamov tomonidan yaratilgan “Navoiy tilining grammatik xususiyatlari” asari o‘zbek tilshunosligida tarixiy-lingvistik tadqiqotlarning muhim bosqichini tashkil etadi. Asarda Alisher Navoiy asarlari tilining fonetik va grammatik tizimi ilmiy asosda tahlil qilinib, eski o‘zbek adabiy tilining struktura xususiyatlari tiklanadi. Tadqiqot natijalari o‘zbek tilining tarixiy taraqqiyotini aniqlashda muhim ilmiy manba sifatida ahamiyat kasb etadi.*

Kalit so‘zlar: *Navoiy tili, tarixiy grammatika, fonetika, morfologiya, fonema, eski o‘zbek tili, lingvistik tizim, til taraqqiyoti.*

Abstract. *The work “Grammatical Features of the Navoi Language” by Ganijon Abdurakhmonov and A. Rustamov constitutes an important stage of historical and linguistic research in Uzbek linguistics. The work analyzes the phonetic and grammatical system of the language of Alisher Navoi’s works on a scientific basis and restores the structural features of the old Uzbek literary language. The results of the research are important as an important scientific source in determining the historical development of the Uzbek language.*

Keywords: *Navoi language, historical grammar, phonetics, morphology, phoneme, old Uzbek language, linguistic system, language development.*

Kirish. O‘zbek tilshunosligida tarixiy grammatika masalalari til taraqqiyotining ichki qonuniyatlarini ochib berishda muhim o‘rin egallaydi. Bu jarayonda Alisher Navoiy asarlari tili asosiy lingvistik manba sifatida xizmat qiladi. Navoiy asarlari XV asr adabiy tilining fonetik, morfologik va sintaktik xususiyatlarini o‘zida mujassam etgan bo‘lib, ular orqali eski o‘zbek adabiy tilining tizimli tuzilishini tiklash mumkin[23]. Navoiy tilini o‘rganish bo‘yicha dastlabki tadqiqotlarda asosan badiiy-estetik jihatlar ustuvor bo‘lgan. Biroq tilning ichki mexanizmlarini — fonemalar tizimi, grammatik shakllar, affikslar funksiyasini ilmiy asosda o‘rganish ehtiyoji mavjud edi. Shu jihatdan G‘anijon Abdurahmonov va A. Rustamovning mazkur asari o‘zbek tilshunosligida yangi bosqichni boshlab berdi.

Asosiy qism. G‘anijon Abdurahmonovning “Navoiy tilining grammatik xususiyatlari” asari o‘zbek tilshunosligida tarixiy-lingvistik yo‘nalishning shakllanishi va rivojlanishida muhim ilmiy bosqichlardan biri hisoblanadi. Ushbu tadqiqotning ilmiy ahamiyati shundaki, unda Alisher Navoiy asarlari tili ilk bor izchil lingvistik tizim sifatida kompleks ravishda o‘rganiladi. Mazkur asarning yuzaga kelishi, avvalo, Navoiy tilining ilmiy tavsifi yetarli darajada ishlab chiqilmaganligi bilan izohlanadi. Ilgari olib borilgan tadqiqotlarda Navoiy asarlari ko‘proq badiiy-estetik nuqtai nazardan baholangan bo‘lib, tilning ichki strukturasini tashkil etuvchi fonetik va grammatik birliklar tizimli ravishda tahlil qilinmagan. Abdurahmonov esa bu muammoni hal etish maqsadida tilni lingvistik birliklar — fonema, morfema va grammatik kategoriyalar darajasida o‘rganadi. Tadqiqotning metodologik asosini tarixiy-lingvistik yondashuv tashkil etadi. Muallif til hodisalarini sinxron holatda emas, balki diaxron rivojlanish jarayonida tahlil qiladi. Bu esa fonetik va grammatik shakllarning kelib chiqishi, evolyutsiyasi hamda funksional yuklamasini aniqlash imkonini beradi. Ayniqsa, eski o‘zbek adabiy tilining rekonstruksiyasi jarayonida bunday yondashuv muhim ilmiy natijalarga olib

[23] Abdurahmonov G‘., Rustamov A. Navoiy tilining grammatik xususiyatlari. – Toshkent: Fan, 1984.

keladi. Asarning muhim jihatlaridan biri — manbashunoslik asosining puxtaligidir. G‘anijon Abdurahmonov Navoiy asarlari tilini o‘rganishda nashr etilgan matnlar bilan cheklanib qolmay, balki bevosita qo‘lyozma manbalarga murojaat qiladi. Qo‘lyozma variantlar tilning fonetik xususiyatlarini, xususan, unlilarning cho‘ziqligi, undoshlarning variantlari hamda grafika bilan bog‘liq o‘ziga xosliklarni aniqroq aks ettiradi. Shu sababli tadqiqot natijalari yuqori darajada ilmiy ishonchlilikka ega bo‘ladi.

Fonetik tahlil asarning markaziy qismlaridan birini tashkil etadi. Unda Navoiy tilining vokal tizimi ilmiy asosda tiklanib, 9 ta unli fonema mavjudligi aniqlanadi: i, i:, e, a, ä, o, ö, u, ü. Ushbu tasnif turkiy tillarga xos singarmonizm qonuniyati bilan bog‘liq holda izohlanadi. Unlilarning old qator va orqa qator, tor va keng, lablangan va lablanmagan turlarga ajratilishi ularning fonologik tizimdagi o‘rnini aniqlashga xizmat qiladi. Ayniqsa, cho‘ziq unlilarning mavjudligi va ularning semantik differensiasiyadagi roli muhim ilmiy xulosa sifatida keltiriladi. Undoshlar tizimi tahlilida esa jarangli va jarangsiz undoshlarning o‘zaro munosabati, fonetik variantlarning mavjudligi, assimilyatsiya va dissimilyatsiya hodisalari ilmiy asosda izohlanadi. Shuningdek, arab va fors tillari ta’siri natijasida kirib kelgan fonetik elementlar ham alohida qayd etilib, Navoiy tilining kontakt til sifatidagi xususiyatlari ochib beriladi.

Morfologik tahlil doirasida so‘z turkumlari va ularning grammatik kategoriyalari izchil o‘rganiladi. Xususan, otlarda egalik va kelishik kategoriyalari, fe’llarda zamon, mayl va nisbat shakllari, shuningdek, so‘z yasovchi affikslarning funksional xususiyatlari tahlil qilinadi. Bu orqali eski o‘zbek tilining grammatik modeli ilmiy asosda tiklanadi. Asarning nazariy jihatdan eng muhim yangiliklaridan biri — grammatik birliklarning qayta talqin qilinishidir. An’anaviy tilshunoslikda “urg‘usiz affiks” sifatida qaralgan ayrim birliklar muallif tomonidan enklitika va proklitika sifatida izohlanadi. Bu yondashuv grammatik birliklarning sintaktik va prosodik xususiyatlarini chuqurroq anglash imkonini beradi hamda ularning mustaqil funksional birlik sifatidagi maqomini belgilaydi. Shuningdek, tadqiqotda fonetika va grammatikaning o‘zaro bog‘liqligi masalasi alohida ilmiy asosda

yoritiladi. Muallif fonetik o‘zgarishlarning grammatik shakllarga ta’sirini ko‘rsatib, tilni o‘zaro aloqador elementlardan tashkil topgan murakkab tizim sifatida talqin qiladi. Bu esa strukturaviy tilshunoslik tamoyillariga mos keluvchi yondashuv hisoblanadi. Navoiy tilining lingvistik tahlili hozirgi o‘zbek adabiy tilining shakllanish bosqichlarini aniqlashda ham muhim ahamiyat kasb etadi. Tadqiqot natijalari zamonaviy o‘zbek tilidagi ko‘plab fonetik va grammatik hodisalar tarixiy ildizlarga ega ekanini ko‘rsatadi. Bu esa til taraqqiyotining uzviyligi va davomiyligini ilmiy jihatdan asoslaydi. Umuman olganda, “Navoiy tilining grammatik xususiyatlari” asari o‘zbek tilshunosligida tarixiy grammatika, fonetika va morfologiya sohalarining rivojlanishiga sezilarli hissa qo‘shgan fundamental tadqiqotdir. Unda qo‘llangan metodologik yondashuv, manbashunoslik prinsiplari va nazariy xulosalar keyingi ilmiy izlanishlar uchun mustahkam asos vazifasini bajaradi.

Xulosa. G‘anijon Abdurahmonov va A. Rustamov tomonidan yaratilgan “Navoiy tilining grammatik xususiyatlari” asari o‘zbek tilshunosligida tarixiy-lingvistik tadqiqotlarning shakllanishi va rivojlanishida muhim ilmiy bosqichni tashkil etadi. Ushbu tadqiqot orqali Alisher Navoiy asarlari tili ilk bor izchil va kompleks lingvistik tizim sifatida tahlil qilinib, eski o‘zbek adabiy tilining fonetik va grammatik modeli ilmiy asosda qayta tiklandi. Asarning ilmiy ahamiyati, avvalo, unda til hodisalarining oddiy tavsifi bilan cheklanilmay, balki ularning ichki qonuniyatlari, tarixiy taraqqiyoti va funksional xususiyatlari chuqur tahlil qilinganida namoyon bo‘ladi. Xususan, fonemalar tizimining aniqlashtirilishi, unlilar tasnifining ilmiy asosda berilishi, grammatik kategoriyalarning izchil tavsifi o‘zbek tilshunosligida muhim nazariy natijalar sifatida baholanadi.

Mazkur tadqiqotning yana bir muhim jihati — unda qo‘lyozma manbalarga tayangan holda tilning real lingvistik holatini tiklashga erishilganidir. Bu esa o‘zbek tilshunosligida manbashunoslikka asoslangan ilmiy yondashuvning mustahkamlanishiga xizmat qildi. Shu bilan birga, tarixiy-lingvistik metodning izchil qo‘llanilishi til hodisalarini diaxron nuqtai nazardan tahlil qilish imkonini berib, keyingi tadqiqotlar uchun samarali metodologik asos yaratdi. Asarda ilgari

surilgan nazariy qarashlar, xususan, grammatik birliklarning qayta talqin qilinishi (enklitika va proklitika masalasi) o‘zbek tilshunosligida mavjud qarashlarni boyitib, yangi ilmiy yo‘nalishlarning shakllanishiga turtki berdi. Bu esa til tizimini yanada chuqurroq va mukammalroq anglash imkonini yaratdi. Shuningdek, tadqiqot natijalari hozirgi o‘zbek adabiy tilining shakllanish jarayonini ilmiy asosda tushuntirishga xizmat qiladi. Navoiy tilida kuzatilgan fonetik va grammatik hodisalarning zamonaviy til bilan uzviy bog‘liqligi til taraqqiyotining izchil va qonuniy jarayon ekanini tasdiqlaydi. Umuman olganda, “Navoiy tilining grammatik xususiyatlari” asari o‘zbek tilshunosligida fundamental ilmiy manba sifatida alohida ahamiyat kasb etadi. Unda ilgari surilgan ilmiy xulosalar va metodologik yondashuvlar nafaqat o‘z davri uchun, balki bugungi zamonaviy tilshunoslik — xususan, tarixiy grammatika, kompyuter lingvistikasi va korpus tadqiqotlari uchun ham muhim nazariy asos bo‘lib xizmat qiladi.

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CENTRAL ASIA–JAPAN STRATEGIC DIALOGUE: OUTCOMES OF THE C5+JAPAN MECHANISM AND THE NEW INTEGRATION AGENDA

Toshboyeva Durdona

Tashkent State University of Oriental Studies

toshboyevadurdona@gmail.com

Annotation. *The article analyzes the evolution and current development of the C5+Japan dialogue format, focusing on its strategic importance for Central Asia and Japan. Based on Japanese, foreign, and Central Asian scholarly sources, as well as official materials of MOFA, JICA, and the Ministries of Foreign Affairs of regional states, the study examines the institutional foundations, economic cooperation mechanisms, transport connectivity initiatives, green energy projects, and human capital development programs within the C5+Japan framework. The research demonstrates that Japan's non-coercive, technology-oriented and institution-building approach has strengthened regional resilience, supported modernization processes, and contributed to multi-vector diplomacy in Central Asia. The article evaluates the practical outcomes of the format and discusses the expected agenda of the upcoming C5+Japan Summit scheduled for December 2025 in Tokyo. Findings show that the platform is becoming an important long-term strategic institution promoting stability, connectivity, and sustainable development in the region.*

Keywords: *Central Asia, Japan, C5+Japan Dialogue, foreign policy, regional cooperation, transport connectivity, green energy, JICA, modernization, multi-vector diplomacy.*

Annotatsiya. *Maqolada C5+Japan muloqot formatining shakllanishi va bugungi rivojlanishi, uning Markaziy Osiyo hamda Yaponiya uchun strategik ahamiyati tahlil qilinadi. Tadqiqot yapon, xorijiy va mahalliy ilmiy manbalar,*

shuningdek MOFA, JICA va mintaqa Tashqi ishlar vazirliklarining rasmiy hujjatlariga asoslanadi. C5+Japan doirasida institutsional hamkorlik tamoyillari, iqtisodiy sheriklik mexanizmlari, transport-logistika bog‘liqligi, yashil energetika tashabbuslari va inson kapitalini rivojlantirish dasturlari yoritiladi. Tadqiqot natijalari Yaponiyaning majburlovga asoslanmagan, texnologiya va institutlarni rivojlantirishga qaratilgan yondashuvi mintaqaviy barqarorlikni mustahkamlashga, modernizatsiya jarayonlariga ko‘maklashishga va ko‘pvektorli diplomatiyaning rivojlanishiga sezilarli ta’sir ko‘rsatganini ko‘rsatadi. Maqolada 2025-yil dekabr oyida Tokioda bo‘lib o‘tishi rejalashtirilgan C5+Japan sammitining kutilayotgan kun tartibi ham tahlil qilinadi. Xulosalarda ushbu platforma mintaqada barqarorlik, o‘zaro bog‘liqlik va barqaror rivojlanishni ta’minlaydigan muhim strategik institutga aylanib borayotgani asoslanadi.

Kalit so‘zlar: *Markaziy Osiyo, Yaponiya, C5+Japan, tashqi siyosat, mintaqaviy hamkorlik, transport bog‘liqligi, yashil energetika, JICA, modernizatsiya, ko‘pvektorli diplomatiya.*

Аннотация. *В статье проводится комплексный анализ формирования и современного развития формата сотрудничества C5+Japan, а также его стратегической значимости для Центральной Азии и Японии. Исследование основано на японских, зарубежных и региональных источниках, а также на официальных материалах МИД Японии, JICA и внешнеполитических ведомств стран Центральной Азии. Рассматриваются институциональные основы диалога, механизмы экономического взаимодействия, инициативы по транспортной связности, проекты в сфере «зелёной» энергетики и программы развития человеческого капитала. Результаты показывают, что неконфронтационный, технологически ориентированный и институциональный подход Японии способствует укреплению региональной устойчивости, поддерживает процессы модернизации и усиливает многовекторную дипломатию в регионе. Также обсуждается предполагаемая повестка предстоящего саммита C5+Japan, намеченного на декабрь 2025 года в Токио. В заключении обосновывается, что данный*

формат постепенно превращается в важный долгосрочный стратегический институт, направленный на укрепление стабильности, связности и устойчивого развития региона.

Ключевые слова: *Центральная Азия, Япония, C5+Japan, внешняя политика, региональное сотрудничество, транспортная связность, зелёная энергетика, JICA, модернизация, многовекторная дипломатия.*

INTRODUCTION

Central Asia has emerged as one of the key strategic hubs in the geopolitical dynamics of the 21st century. The region's transcontinental transport corridors, energy potential, ongoing economic transformation processes, and its growing role in global supply chains have transformed it into a space where the interests of major powers intersect. At the same time, the states of the region pursue a multi-vector foreign policy, seeking to develop a balanced and pragmatic model of cooperation without dependence on any single geopolitical bloc.

In such a context, the **C5+Japan dialogue mechanism** proposed by Japan has taken shape as a diplomatic format grounded not in competition, but in sustainable partnership. When the Japanese Ministry of Foreign Affairs introduced this mechanism in 2004, its core principles included respect for regional sovereignty, support for economic modernization, promotion of high-quality infrastructure, and the concept of human security. As stated in the official concept paper, "Japan fully respects the right of Central Asian states to choose their own independent paths and seeks to establish a partnership mechanism that contributes to regional stability" (MOFA, Central Asia + Japan Dialogue Concept Paper, 2004).

This approach defines Japan's role not as a geopolitical competitor, but as a reliable and long-term development partner for the region. The Diplomatic Bluebook 2023 further clarifies Japan's position: "Japan supports sustainable development, connectivity, human security, and the transition to a market economy in Central Asia" (MOFA, 2023). This perspective aligns closely with the reform agendas and modernization priorities of Central Asian countries. In particular, as emphasized in

Uzbekistan's foreign policy concept, "strengthening economic integration and transport-logistics connectivity in Central Asia" (Ministry of Foreign Affairs of Uzbekistan, 2023) directly corresponds with Japan's strategic approach.

A distinctive feature of the C5+Japan platform is that, unlike other external initiatives, it is not based on debt-driven infrastructure models, but rather on a "soft power" approach that emphasizes human capital development, technological assistance, institutional capacity building, and sustainable economic growth. As noted in the JICA Annual Report 2022, "our strategy in Central Asia relies not on large-scale debt projects, but on technical assistance, capacity building, and sustainable development programs" (JICA, 2022). As a result, C5+Japan has contributed significantly to areas such as high-quality infrastructure, digital transformation, water and energy security, social services, education, and environmental governance in the region.

Foreign scholars increasingly interpret Japan's regional policy as an alternative model to geopolitical competition. RAND analyst Jeffrey Hornung argues that "Japan does not compete with China in Central Asia, but instead offers a development path free from geopolitical pressure" (Hornung, 2021). Similarly, Japanese scholar Hiroaki Iwashita characterizes the C5+Japan framework as "Eurasian engagement without coercion" (Iwashita, 2020). This approach reflects Japan's respect for the independent choices of Central Asian states and its support for maintaining a balanced foreign policy.

Local scholars also view the C5+Japan mechanism as a significant factor in regional development. A. Dadaboev emphasizes that "Japan is one of the few countries in Central Asia that offers not only economic cooperation but also a development model" (Dadaboev, 2019). Meanwhile, B. Kayumov notes that Japanese investments in Uzbekistan are increasingly directed toward high-tech sectors, closely aligning with the country's modernization priorities (Kayumov, 2020).

The upcoming C5+Japan summit, scheduled to be held in Tokyo in December 2025, is expected to mark a new strategic phase of this format. According to Nikkei

Asia, “Japan aims to transform the C5 framework into a comprehensive cooperation platform integrating transport, energy, and digital connectivity” (Nikkei Asia, 2024). This creates opportunities for introducing new mechanisms that will support the long-term development of the region.

Thus, the C5+Japan dialogue mechanism has evolved as a diplomatic platform based on sustainable partnership, closely linked to the foreign policy diversification, economic modernization needs, and regional integration processes of Central Asian states. Consequently, a scholarly analysis of this mechanism requires identifying its conceptual foundations, evaluating methodological approaches, interpreting practical outcomes, and assessing the strategic significance of the 2025 Tokyo summit.

METHODOLOGY AND LITERATURE REVIEW

The choice of research methodology for analyzing the C5+Japan dialogue mechanism is determined by the multi-layered nature of the subject. This platform, while functioning as a diplomatic format, simultaneously encompasses multiple dimensions, including economic integration, political dialogue, regional security, infrastructure policy, digital transformation, and human capital development.

Accordingly, this study employs a combined methodological approach drawing on international relations theories, regional integration theories, constructivist analysis, institutionalism, economic diplomacy, and comparative methods. The rationale for this methodological framework lies in demonstrating that the C5+Japan format can be interpreted differently from various theoretical perspectives, thereby allowing for a comprehensive understanding of its complex nature.

From an institutionalist perspective, the mechanism can be understood as a cooperative institution that fosters stable interdependence among states, based not on coercion but on assistance and mutual trust. Official documents of the Japanese Ministry of Foreign Affairs characterize the C5+Japan framework as an “inclusive regional institution” (MOFA, 2023).

The constructivist approach is applied to explain Japan’s diplomatic identity in Central Asia, including symbolic engagement, historical memory, soft power

elements, and its intention to establish friendly, non-ideological relations with the region. In this regard, Japanese scholar Hiroaki Iwashita emphasizes that Japan's policy is characterized not by geopolitical competition, but by "cultural empathy and technological assistance" (Iwashita, 2020).

The theory of economic diplomacy plays a particularly important role in analyzing the development of the C5+Japan dialogue. According to JICA reports, official analyses of Japan's economic and trade institutions, and expert assessments by the RAND Corporation, Japan has deliberately moved away from "debt diplomacy" and instead promotes a model emphasizing technological expertise, high-quality infrastructure, human capital development, and environmental governance (JICA, 2022; Hornung, 2021). Evaluating this approach through the lens of economic diplomacy allows for a clearer understanding of Japan's long-term strategic objectives in the region.

The literature review serves to identify how the C5+Japan mechanism is interpreted within both international and local academic communities. Among foreign sources, institutions such as RAND, Nikkei Asia, ECFR, and Carnegie generally assess Japan's C5 diplomacy as a multidimensional model characterized by the absence of geopolitical pressure and a strong focus on economic modernization. For instance, a Nikkei Asia analysis notes that "the C5+Japan format is one of Tokyo's most stable Asian initiatives, strengthening structured cooperation in the region" (Nikkei Asia, 2024).

Local scholarship also provides important insights. Dadaboev highlights that Japan's engagement in Uzbekistan is closely linked to the country's economic modernization agenda, noting that "Japanese technology and management experience constitute important factors in Uzbekistan's reform process" (Dadaboev, 2019). Kayumov, in turn, connects Japan's regional policy with Uzbekistan's foreign policy diversification, arguing that "cooperation with Japan accelerates Uzbekistan's integration into Asian markets" (Kayumov, 2020). Additionally, official statements by the Ministry of Foreign Affairs of Uzbekistan recognize the

C5+Japan format as a diplomatic platform that has entered a stage of institutionalized and sustainable dialogue.

Another important aspect of the literature is that Japanese experts tend to interpret the C5+Japan mechanism as a "flexible and politically neutral diplomatic model." Masaru Tanaka argues that "Japan's strategy in Central Asia is not aimed at intensifying geopolitical competition, but at supporting regional integration through soft power" (Tanaka, 2021). A similar perspective is reflected in ECFR reports, which emphasize that Japan's infrastructure policy differs from that of other major powers by being based on voluntarism rather than coercion (ECFR, 2023).

Overall, the methodological and literature analysis demonstrates that the C5+Japan platform cannot be adequately understood solely as a form of economic cooperation or political dialogue. Rather, it should be conceptualized as a comprehensive diplomatic model grounded in stability, trust, technological innovation, and institutional capacity-building. On this basis, the following section of the article examines the practical outcomes and developmental dynamics of the C5+Japan framework.

RESULTS

The findings demonstrate that the C5+Japan dialogue mechanism has generated significant transformations in the diplomatic, economic, and institutional development processes of Central Asia. The platform has contributed to strengthening the multi-vector foreign policy orientation of regional states, diversifying strategic partnerships, enhancing transport and logistics connectivity, and promoting investment in human capital development.

Since its establishment in 2004, nearly twenty ministerial meetings, sectoral dialogues, technical assistance programs, JICA projects, and economic cooperation initiatives have been implemented, collectively transforming the C5+Japan format into a functional mechanism of regional cooperation. As noted in the Diplomatic Bluebook 2023, "cooperation with Central Asia constitutes an important pillar of regional stability and economic growth for Japan, and programs within this framework continue to expand in effectiveness" (MOFA, 2023).

One of the most visible outcomes is the development of transport and logistics systems. In particular, cooperation on the Trans-Caspian Corridor (Middle Corridor) has intensified in recent years. In the context of shifting Eurasian transport dynamics, Japan's engagement in the region has also expanded its access to European markets. As highlighted by Nikkei Asia, "the sustainable development of the Trans-Caspian Corridor enhances Central Asia's economic potential while creating new supply routes for Tokyo" (Nikkei Asia, 2024). This trend aligns closely with the foreign economic priorities of Uzbekistan, Kazakhstan, and Türkiye. According to Uzbekistan's Ministry of Foreign Affairs, "the country's transport diplomacy is multi-directional, and Japan's support plays a key role in strengthening regional connectivity" (MFA Uzbekistan, 2023).

Another major area of achievement is technical assistance and human capital development. The JICA Annual Report 2022 documents more than 150 technical cooperation projects implemented in Central Asia, covering sectors such as healthcare, environmental management, water resource governance, digital transformation, and industrial modernization. As stated in the report, "our technical cooperation programs in Central Asia focus on training skilled personnel, improving public administration efficiency, and strengthening environmental sustainability" (JICA, 2022). This approach corresponds closely with the long-term development strategies of the region, particularly Uzbekistan's "New Uzbekistan" reform agenda.

According to local experts, another key outcome of the C5+Japan format is the strengthening of mutual trust among regional states and the consolidation of institutional cooperation. Dadaboev argues that "the C5+Japan format has created an alternative model of external cooperation for Central Asian states and serves as a factor accelerating regional integration processes" (Dadaboev, 2019). Similarly, Kayumov notes that Japan's engagement in Uzbekistan has facilitated the transfer of advanced technologies, improvements in energy efficiency, and progress in environmental governance (Kayumov, 2020). These developments have enhanced the region's capacity for economic transformation.

The C5+Japan framework has also produced important outcomes as a platform for political dialogue. Foreign experts emphasize that the mechanism has contributed to reducing geopolitical pressures in Central Asia and preserving the sovereign decision-making autonomy of regional states. Hornung characterizes Japan's role as that of "an actor that strengthens stability rather than intensifying competition in Central Asia" (Hornung, 2021). This approach has supported the development of collective dialogue and balanced responses to regional security challenges.

Environmental sustainability and green energy have also emerged as key areas of cooperation within the C5+Japan framework. Under Japan's guidance, pilot projects have been implemented in Uzbekistan and Kazakhstan to improve energy efficiency, waste management systems, and the adoption of renewable energy technologies. As Tanaka notes, "Japan is increasingly positioning itself as a key partner in diversifying energy security in Central Asia" (Tanaka, 2021).

Looking ahead, the upcoming C5+Japan summit scheduled for December 2025 in Tokyo is expected to build upon these achievements and usher in a new phase of cooperation. Anticipated outcomes include further expansion of transport and logistics projects, joint initiatives in green energy, enhanced digital integration, reforms in social services, and new educational programs. According to Nikkei Asia, "the Tokyo summit will elevate the C5 framework to a more institutionalized level of sustainable cooperation" (Nikkei Asia, 2024).

In summary, the C5+Japan format has delivered tangible results in promoting economic modernization, political stability, transport connectivity, human capital development, and environmental sustainability in Central Asia. These achievements provide a solid foundation for the 2025 summit to initiate a new stage in the region's long-term development.

DISCUSSION

A deeper analysis of the findings suggests that the C5+Japan dialogue has evolved beyond a simple framework of strategic partnership into a significant institutional mechanism of regional diplomacy in Central Asia. This section aims to interpret the underlying dynamics of this cooperation, identify the key factors behind

its effectiveness, and assess emerging opportunities and challenges in the context of global transformations.

First, the C5+Japan platform has developed as a diplomatic mechanism that mitigates, rather than intensifies, geopolitical competition in the region. In contrast to initiatives such as China's Belt and Road Initiative, Russia's Eurasian Economic Union, the European Union's Global Gateway, and the United States' C5+US format, Japan has proposed a distinct model characterized by neutrality and infrastructure-oriented cooperation. As Hornung argues, "Japan's policy in Central Asia is not aimed at geopolitical competition, but at strengthening stability and trust" (Hornung, 2021). This reflects Japan's broader strategy of **strategic pragmatism**, prioritizing long-term stability over short-term geopolitical gains.

Second, the effectiveness of the C5+Japan format is closely linked to its alignment with domestic reform agendas in Central Asian states. As countries such as Uzbekistan and Kazakhstan prioritize economic liberalization, transport diversification, energy reform, and digital transformation, Japan provides targeted support through technical assistance, capacity-building, and high-quality infrastructure projects. As noted in JICA reports, this approach "aims to expand sustainable development opportunities without increasing debt burdens" (JICA, 2022). This distinguishes Japan's economic diplomacy from that of other external actors and enhances its long-term credibility in the region.

Third, from a constructivist perspective, Japan's role in Central Asia is shaped by its self-identification as a non-coercive and development-oriented actor. As Iwashita emphasizes, Japan engages the region through "cultural affinity and technological modernization," which strengthens diplomatic trust (Iwashita, 2020). This has significantly enhanced Japan's soft power, manifested through educational exchange programs, healthcare cooperation, engineering capacity-building, and digital governance training initiatives.

Local scholarship further supports this interpretation. Dadaboev highlights that Japan's engagement contributes directly to Uzbekistan's modernization process, particularly through the transfer of technological competencies (Dadaboev, 2019).

Kayumov similarly argues that Japan's economic model facilitates market-oriented reforms in Central Asia (Kayumov, 2020). These perspectives indicate that the C5+Japan mechanism is not externally imposed but is organically aligned with regional development trajectories.

Another important dimension is the platform's contribution to institutional stability. As emphasized in MOFA reports, Japan seeks to "establish a permanent dialogue platform and elevate cooperation to an institutional level" (MOFA, 2023). This suggests that the C5+Japan framework may evolve into a more formalized and structured mechanism following the 2025 Tokyo summit.

However, several limitations must be critically acknowledged. First, differences in national priorities among Central Asian states may hinder deeper regional coordination. Second, asymmetries in relations with major external actors may affect the balance of cooperation. Third, structural constraints—such as the high costs of transport infrastructure, technological requirements for green energy, and bureaucratic barriers—may slow the implementation of projects.

Despite these challenges, as noted by Nikkei Asia, "Japan remains one of the few actors capable of ensuring continuity in cooperation with Central Asian states through a balanced model" (Nikkei Asia, 2024). This highlights the resilience and adaptability of the C5+Japan framework.

Overall, the discussion demonstrates that the success of the C5+Japan format lies in its combination of diplomatic neutrality, economic pragmatism, technical assistance, and institutional development. These features position it as one of the most effective multilateral cooperation mechanisms in the region.

CONCLUSION

The C5+Japan dialogue mechanism has evolved into one of the most stable, long-standing, and functional diplomatic formats in Central Asia. Over the past two decades, it has developed in parallel with the region's socio-economic transformation, contributing significantly to regional integration, transport connectivity, environmental sustainability, human capital development, and modernization processes.

One of the key factors behind its success is Japan's non-competitive approach to the region. Rather than engaging in geopolitical rivalry, Japan emphasizes respect for sovereignty and mutually beneficial cooperation. As stated in the Diplomatic Bluebook, "Japan supports the independence, stability, and prosperity of Central Asia and seeks to enhance regional connectivity" (MOFA, 2023). This principle underpins all initiatives within the C5+Japan framework.

A second important factor is the compatibility of Japan's economic diplomacy and technical assistance model with regional development needs. As highlighted in JICA documents, "Japan brings not debt, but technology, knowledge, and institutional development to Central Asia" (JICA, 2022). This provides a sustainable alternative in a context where concerns about debt dependency are increasingly prominent.

Third, the C5+Japan platform has strengthened a culture of dialogue and cooperation among Central Asian states. As Tanaka notes, "the C5+Japan framework has activated the region's potential for deeper interconnectivity and expanded diplomatic trust" (Tanaka, 2021). This contributes not only to Japan–Central Asia relations but also to intra-regional integration.

Fourth, local perspectives confirm the growing importance of Japan's role in regional development. Dadaboev identifies Japan's technological contributions as an integral component of Uzbekistan's long-term modernization strategy (Dadaboev, 2019), while Kayumov emphasizes its role in supporting foreign policy diversification (Kayumov, 2020).

Finally, the institutional sustainability of the platform represents a critical strength. Japan's intention to transform the C5 format into a permanent mechanism of regional cooperation is clearly articulated in official policy documents (MOFA, 2023). The upcoming Tokyo summit in December 2025 is expected to mark a new stage, introducing initiatives in transport connectivity, digital integration, green energy, and human capital development. As noted by Nikkei Asia, this process may transform the C5 framework into "one of the most stable multilateral platforms in Asia" (Nikkei Asia, 2024).

In conclusion, the C5+Japan dialogue mechanism has become a key instrument for promoting economic modernization, diplomatic stability, and institutional development in Central Asia. Japan's model of neutral and sustainable cooperation aligns closely with the long-term interests of the region and contributes to maintaining strategic balance. The anticipated outcomes of the 2025 Tokyo summit are likely to further deepen Japan–Central Asia relations and provide a solid foundation for sustainable regional development.

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SEMANTIC AND FUNCTIONAL CHARACTERISTICS OF THE CATEGORY OF POLITENESS IN FRENCH

Tursunov Javokhir Asliddin ugli

Uzbekistan State World Languages University

E-mail: javoxirtursunoff@gmail.com

Annotation (FR): *The article analyzes the linguistic category of politeness in French through its semantic and functional aspects. The author examines the linguistic means that convey politeness — lexical, grammatical, and pragmatic — and their role in constructing harmonious intercultural communication.*

Keywords: *politeness, pragmatics, semantics, communication, discursive strategy, cultural norm, linguistic interaction.*

Аннотация (RU): *В статье рассматриваются семантические и функциональные особенности категории вежливости во французском языке. Анализируются лексические, грамматические и прагматические средства выражения вежливости в межкультурной коммуникации.*

Ключевые слова: *вежливость, прагматика, семантика, коммуникация, дискурсивная стратегия, культурная норма, лингвистическое взаимодействие.*

Politeness, as a linguistic, pragmatic, and cultural phenomenon, occupies a central place in the organization of human communication. It does not merely constitute a set of fixed formulas or social conventions, but represents a complex system of interactional regulation. In French, politeness goes far beyond the normative framework of etiquette to become a fully-fledged linguistic category, articulating communicative intentions, social representations, hierarchical relations, and cultural values specific to Francophone society.

The present study aims to deepen the analysis of the semantic and functional characteristics of politeness in contemporary Francophone discourse. It seeks to demonstrate that politeness cannot be reduced to a simple stylistic or lexical phenomenon, but rather constitutes a structuring mechanism of meaning in interaction. In other words, it actively participates in the construction of interpersonal relationships and in the negotiation of discursive identities.

From a methodological perspective, this research adopts an interdisciplinary approach mobilizing pragmatics, semantics, sociolinguistics, and discourse analysis.

Such a perspective makes it possible to examine politeness both as an interactional strategy and as a system of values codified in language. The main objective is to identify the linguistic means — lexical, morphosyntactic, prosodic, and discursive — through which different forms of politeness are expressed, whether explicit or implicit, depending on the communicative context.

The notion of politeness has been widely developed within modern pragmatic theories, notably by Penelope Brown and Stephen Levinson. According to their model, based on the concept of "face" borrowed from interactional sociology, politeness is a strategy aimed at preserving the positive face (the desire to be appreciated) and the negative face (the desire for autonomy) of the interlocutor. In French, this theory finds particularly relevant application, as verbal interactions are strongly structured by considerations of social distance and mutual respect.

Other scholars, such as Catherine Kerbrat-Orecchioni and Robin Lakoff, have emphasized that linguistic choices reflect an implicit hierarchy of social values: relational harmony, respect, and recognition of the other's status. Kerbrat-Orecchioni particularly insists on the interactional and contextual dimension of politeness, which is constructed within the exchange itself. Lakoff, for her part, highlights the pragmatic rules governing conversation, such as "do not impose" and "give options to the interlocutor."

In French, politeness manifests itself at several linguistic levels. On the lexical level, it relies on a set of codified formulas: "please," "thank you," "excuse me," "you're welcome," etc. Far from being mere automatisms, these expressions convey complex socio-affective nuances. They express recognition of a service, acceptance of responsibility, or the intention to maintain a cordial atmosphere. Their absence or inappropriate use may cause a rupture in interactional balance.

On the morphosyntactic level, French politeness makes use of specific verbal forms. The use of the present conditional ("I would like," "Could you") constitutes a mitigation strategy that reduces the illocutionary force of a request. Similarly, the

use of the subjunctive in certain expressions of modesty or deference contributes to the expression of respectful distance. These mechanisms illustrate how grammatical structure supports the interactional function of politeness.

The French pronominal system represents another fundamental marker. The opposition between “tu” and “vous” is not merely a grammatical distinction but reflects a relational semantics deeply rooted in culture. “Vous” generally signals social distance, formality, or respect, whereas “tu” expresses proximity, solidarity, or belonging to the same group. The shift from one to the other may constitute a strong symbolic act marking the evolution of a relationship. Thus, pronominal choice actively participates in the negotiation of meaning and social positioning between interlocutors.

The pragmatic dimension of politeness is particularly evident in speech acts such as requests, invitations, apologies, or refusals. For example, a direct refusal may be perceived as abrupt; therefore, it is often formulated indirectly: “I’m not sure I’ll be able to come” instead of “I will not come.” This strategy of indirectness protects the interlocutor’s face and preserves interactional harmony. Mitigation, euphemization, and reformulation thus constitute central processes of discursive politeness.

It should also be emphasized that linguistic politeness is not universal. It depends on specific cultural norms and interactional models characteristic of each society. In French culture, a particular balance is established between frankness and diplomacy. Communication values argumentative clarity while maintaining symbolic forms of deference. This productive tension between expressiveness and restraint shapes contemporary discursive practices.

Semantic and functional analysis shows that French politeness constitutes a complex semiotic system reflecting power relations, social distance, and collective values. It functions as a mechanism of social regulation, helping to avoid open conflicts and maintain group cohesion. It also contributes to identity construction,

since mastering the codes of politeness means integrating the cultural norms of the linguistic community.

From a didactic perspective, understanding the mechanisms of politeness is essential for teaching French as a foreign language. Learners must not only acquire grammatical competence but also develop pragmatic and intercultural sensitivity. An error in politeness may lead to more serious misunderstandings than a simple morphological mistake. Thus, teaching politeness directly contributes to the development of overall communicative competence.

Finally, this study opens comparative perspectives with other Romance or Oriental languages. A contrastive analysis would make it possible to highlight the typological and cultural specificities of French politeness, particularly in comparison with systems where social hierarchy is linguistically marked in different ways. Such an approach would enrich the understanding of intercultural interactions in a globalized world.

In conclusion, politeness in French inseparably combines semantic dimensions (values of respect, distance, benevolence), pragmatic dimensions (face preservation, mitigation, indirectness), and sociocultural dimensions (collective norms, hierarchy, identity). It is not limited to a set of formal rules but embodies a linguistic phenomenon deeply rooted in social practices. Its study allows for a better understanding of the close relationship between language, culture, and human interaction, and remains essential both for linguistic research and for language pedagogy.

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BIOETHICAL ANALYSIS OF PLASTIC SURGERY IN THE CONTEXT OF CHRISTIANITY

Umirzakova Nargiza Akmalovna

Tashkent State Medical University

n.a.umirzakova@gmail.com

Abstract. *This article examines Christianity's attitude toward plastic surgery, analyzing theological views, the positions of various faiths, and the ethical aspects of intervention in the human body. The conditions under which surgical modification of appearance may be permissible, as well as the situations in which it is condemned, are identified.*

Keywords: *Christianity, plastic surgery, ethics, religion, human body, cosmetology, faith, religious principles.*

Аннотация. *В статье рассматривается отношение христианства к пластической хирургии, анализируются богословские взгляды, позиции различных конфессий и этические аспекты вмешательства в человеческое тело. Выявлены условия, при которых хирургическое изменение внешности может быть допустимым, а также ситуации, в которых это осуждается.*

Ключевые слова: *христианство, пластическая хирургия, этика, религия, тело человека, косметология, вера, религиозные принципы.*

INTRODUCTION. Plastic surgery is becoming one of the most pressing topics of our time. With advances in medicine and cosmetology, people have gained the ability to alter their appearance, correct birth defects, and combat age-related changes. However, for Christian believers, the question remains: to what extent are such interventions compatible with religious principles? Christianity has always placed great emphasis on spiritual beauty and inner harmony, which casts doubt on the need for artificial bodily modification.

The topic is relevant because modern society actively cultivates a cult of appearance and youth. At the same time, social media, the media, and the advertising industry contribute to the rise in plastic surgery, especially among young people. At the same time, religious values and moral norms remain important guideposts. Examining Christianity's attitude toward plastic surgery allows for a deeper understanding of the intersection of traditional spiritual views and modern medical options.

Main part. When studying this issue, it is necessary to consider the Christian teaching on the body. Christianity views the body as the temple of the Holy Spirit (1 Cor. 6:19–20). This means respect for the body and the inadmissibility of its purposeless modification. God created man "in His own image and likeness" (Genesis 1:27), so an excessive pursuit of the ideal of appearance can be perceived as dissatisfaction with God's creation. The Christian clergy's attitude toward plastic surgery is not unambiguous and depends on the purpose of the procedure, the individual's motivation, and the individual's religious tradition (Orthodox, Catholic, or Protestant). Overall, the approach is moral, theological, and bioethical in nature, rather than strictly prohibitive.

The study found that plastic surgery is permissible if it is restorative (reconstructive). Christian ethics identifies situations in which surgical intervention may be considered justified:

- ✓ Recovery from accidents, burns, and injuries;
- ✓ Correction of congenital defects (cleft lip, facial deformities);

- ✓ Surgeries necessary for health and quality of life;
- ✓ Psychological indications, if the defect causes significant suffering and discomfort.
- ✓ Correction necessary for mental and social well-being.

In such cases, surgery is viewed as a form of healing consistent with Christian charity and as a means of helping the individual.

However, cosmetic surgery and aesthetic procedures aimed solely at improving appearance (lip augmentation, facelifts, and nose reshaping without medical indications) are viewed with mixed feelings. Many Christian clergy believe that excessive pursuit of beauty is associated with pride and vanity, which are mortal sins and should be condemned.

In our study, we examined the positions of various faiths, each with its own distinct approaches. For example, Orthodoxy encourages accepting one's appearance as a gift from God and avoiding excessive cosmetic surgery. Catholicism, meanwhile, allows for intervention for medical or psychological reasons. Protestantism, on the other hand, takes a more liberal approach, emphasizing individual freedom but still condemning vanity-based surgeries.

It should be noted that Christian ethics examines the spiritual and moral aspects of plastic surgery and addresses issues of a person's inner state. If surgery is aimed at eliminating suffering and helping to restore a full life, it is perceived positively. However, if a person strives to achieve an artificial appearance for the sake of self-admiration, this can lead to spiritual emptiness and dependence on external evaluations.

Conclusion. Christianity does not explicitly prohibit plastic surgery. The attitude depends on the purpose of the procedure. If the surgery serves to restore health, treat defects, or improve psychological well-being, it may be acceptable. However, surgeries performed for the sake of fashion, vanity, and altering a person's divine image are condemned as a manifestation of pride and dissatisfaction with God's creation. It is important to understand that true beauty in Christianity is defined not by appearance, but by spiritual fullness and virtue.

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MILLIY QADRIYATLAR TA'SIRIDA O'SMIRLARNING IQTISODIY ONG VA XULQ-ATVORINING ETNOPSIXOLOGIK SHAKLLANISHI

Xolmuratova Mahbuba Maxmudovna

Nizomiy nomidagi O'zbekiston milliy pedagogika universiteti,

Annotatsiya.*Ushbu maqolada o'smirlarning iqtisodiy muhitga moslashuvi jarayonida milliy qadriyatlarning psixologik ahamiyati ochib beriladi. Tadqiqot davomida o'smirlarning pul, mehnat va moddiy mas'uliyat haqidagi tasavvurlari asosan oilaviy tarbiya hamda ijtimoiy muhit ta'sirida shakllanishi asoslab beriladi.*

Psixodinamik va ijtimoiy-psixologik yondashuvlar doirasida o'smirlarning moliyaviy xulq-atvori milliy madaniyatga xos bo'lgan halollik, mehnatsevarlik, tejamkorlik va mas'uliyat hissi bilan bevosita bog'liqligi tahlil qilinadi.

Kalit so'zlar: *o'smirlik davri, iqtisodiy moslashuv, milliy madaniyat, etnopsixologik omillar, oilaviy tarbiya, ijtimoiy ta'sirlar, moliyaviy xulq, iqtisodiy ong, ijtimoiy talablar, psixologik barqarorlik.*

Abstract.*This article examines the psychological significance of national values in the process of adolescents' adaptation to the economic environment. The study substantiates that adolescents' perceptions of money, labor, and material responsibility are primarily shaped under the influence of family upbringing and the broader social environment. Within the framework of psychodynamic and socio-psychological approaches, the analysis reveals a direct relationship between adolescents' financial behavior and culturally embedded values such as honesty, diligence, thriftiness, and responsibility.*

Keywords: *adolescence, economic adaptation, national values, ethnopsychological factors, family upbringing, social influence, financial behavior, economic consciousness, social norms, psychological stability.*

Аннотация.*В статье рассматривается психологическое значение национальных ценностей в процессе адаптации подростков к экономической среде. В ходе исследования обосновывается, что представления подростков о деньгах, труде и материальной ответственности формируются преимущественно под влиянием семейного воспитания и социальной среды.*

В рамках психодинамического и социально-психологического подходов выявляется взаимосвязь финансового поведения подростков с такими культурно обусловленными ценностями, как честность, трудолюбие, бережливость и ответственность.

Ключевые слова: *подростковый возраст, экономическая адаптация, национальные ценности, этнопсихологические факторы, семейное воспитание, социальное влияние, финансовое поведение, экономическое сознание, социальные нормы, психологическая устойчивость.*

Kirish. O‘smirlik davri shaxsning ijtimoiy, psixologik va iqtisodiy xulqini shakllantirishdagi eng muhim bosqichlardan biri hisoblanadi. Bu davrda individ o‘z shaxsiy identifikatsiyasini aniqlash, mustaqil qarorlar qabul qilish va jamiyatga moslashish jarayonlaridan o‘tadi. Shu bilan birga, o‘smirlarning moliyaviy qarashlari va pulga bo‘lgan munosabati ham barqarorlikka erishadi.

Moliyaviy ongning shakllanishi faqat iqtisodiy bilim bilan cheklanmaydi; u oilaviy tarbiya, ijtimoiy tajribalar va milliy qadriyatlar bilan bevosita bog‘liqdir.

Tadqiqotlar shuni ko‘rsatadiki, milliy qadriyatlar — mehnatsevarlik, tejash, halollik va shaxsiy mas’uliyat — o‘smirlarning iqtisodiy xulqini belgilashda markaziy ahamiyatga ega. Shu sababli, o‘smirlarning iqtisodiy ijtimoiylashuvini o‘rganish milliy psixologik va sotsiopsixologik kontekstni hisobga olgan holda amalga oshirilishi muhimdir.

Oila o‘smirlarning ijtimoiylashuvida birinchi va eng yaqin ta’sir muhitini tashkil qiladi. Oilaviy munosabatlar, ota-ona tarbiya uslubi, moliyaviy amaliyotlarni namoyon etish va mas’uliyatni o‘rgatish kabi omillar o‘smirlarning pulga bo‘lgan munosabatini shakllantirishda strategik rol o‘ynaydi. Mehnatsevar oilalarda o‘sayotgan o‘smirlar tejash, moliyaviy rejalashtirish va halollik hamda mas’uliyat kabi qadriyatlarni o‘zlashtiradi.

Bundan tashqari, ijtimoiy muhit — maktab, do‘stlar guruhi va keng madaniy kontekst — o‘smirlarning moliyaviy xatti-harakatlariga bilvosita, ammo sezilarli ta’sir ko‘rsatadi. Ijtimoiy solishtirish, do‘stlar bilan moliyaviy tajribalarni muhokama qilish va media orqali iqtisodiy qadriyatlarni qabul qilish kabi jarayonlar o‘smirlarning iqtisodiy ongini boyitadi.

Etnopsixologik yondashuv nuqtai nazaridan, milliy qadriyatlar shaxsning psixologik va ijtimoiy xatti-harakatlariga chuqur ta’sir qiladi. Har bir millat o‘ziga xos iqtisodiy qadriyatlar tizimiga ega bo‘lib, ularning shakllanishida tarixiy tajriba, madaniy an’analar va oilaviy model muhim rol o‘ynaydi.

Shu sababli, o‘smirlarning moliyaviy qarashlarini shakllantirish jarayoni nafaqat individual va oilaviy omillarga, balki milliy madaniyatning etnopsixologik mexanizmlariga ham bog‘liqdir.

Psixodinamik yondashuv bo‘yicha, o‘smirlarning moliyaviy xulqi shaxsiy tajriba, ichki motivatsiya va oilaviy psixologik muhit orqali shakllanadi. Shu bilan birga, sotsiopsixologik tadqiqotlar ijtimoiy norma va madaniy qadriyatlarning o‘smirlarning iqtisodiy qarashlariga bevosita ta’sir ko‘rsatishi mumkinligini ko‘rsatadi. Bu ikki yondashuv birlashganda, o‘smirlarning iqtisodiy ijtimoiylashuvini yanada to‘liq tushunishga imkon beradi.

Shu munosabat bilan, maqola o‘smirlarning iqtisodiy ijtimoiylashuvi jarayonida milliy qadriyatlarning etnopsixologik mexanizmlari hamda ularning oila va ijtimoiy muhit bilan o‘zaro ta’sirini o‘rganishga qaratilgan.

Asosiy qism. O‘smirlik davri shaxsning iqtisodiy ijtimoiylashuvi uchun strategik ahamiyatga ega bo‘lib, bu bosqichda individ psixologik, oilaviy va

madaniy omillar ta’sirida moliyaviy qarorlar qabul qilishni o‘rganadi, pul bilan ongli munosabatni shakllantiradi hamda tejash va sarflash odatlarini rivojlantiradi.

Bu jarayon faqat iqtisodiy bilim yoki texnik ko‘nikmalar bilan chegaralanmaydi; u oilaviy tarbiya, milliy qadriyatlar va ijtimoiy muhit bilan uzviy bog‘liqdir [1].

Shu nuqtai nazardan, o‘smirlar moliyaviy xulqini shakllantirishda nafaqat o‘z shaxsiy tajribasiga, balki oila va atrofidagi jamiyatning me’yor va qoidalariga ham tayanuvchan bo‘ladilar.

Masalan, *Economic Socialization: The Economic Beliefs and Behaviours of Young People* (ed. P. Lunt & A. Furnham, 1996) kitobida yoshlarning iqtisodiy dunyoni anglashida ijtimoiy sinf, oilaviy model va madaniy me’yorlarning muhim rol o‘ynashi ta’kidlanadi [2].

O‘smirlik davri shaxsning iqtisodiy ijtimoiylashuvi jarayonida markaziy bosqich sifatida qaraladi, chunki aynan shu davrda individ nafaqat shaxsiy ehtiyoj va istaklarini anglab, balki ularni jamiyat va oilaviy qadriyatlar kontekstida moslashtirishni o‘rganadi.

Moliyaviy qaror qabul qilish jarayoni shu bosqichda shakllanadi, bu esa pulni boshqarish, tejash va sarflash odatlarini rivojlantirish bilan chambarchas bog‘liqdir. Shu jarayonning o‘ziga xosligi shundaki, moliyaviy ong faqat iqtisodiy bilim va texnik ko‘nikmalar bilan chegaralanmaydi; u oilaviy tarbiya, milliy qadriyatlar, shuningdek, kengroq ijtimoiy muhitning murakkab ta’sirlarini qamrab oladi.

Shu nuqtai nazardan, o‘smirlar moliyaviy xulqini shakllantirishda o‘z shaxsiy tajribasi bilan bir qatorda, oilaviy odatlar, jamiyatning qadriyat me’yorlari va do‘stlar guruhi normativlariga ham tayanadi. Natijada iqtisodiy ijtimoiylashuv — bu shaxsning moliyaviy xatti-harakatlarini shakllantirishda psixologik, ijtimoiy va madaniy komponentlarni birlashtirgan murakkab va ko‘p qirrali jarayon sifatida namoyon bo‘ladi.

Oilaviy muhit, ayniqsa, o‘smirlarning moliyaviy ongini shakllantirishda birinchi va eng bevosita ta’sir etuvchi omil hisoblanadi. Norvegiyada o‘tkazilgan tadqiqotlar shuni ko‘rsatdiki, ota-ona tarbiya uslubi — issiqlik va javobgarlik

ko‘rsatish, xulqni kuzatish, psixologik nazorat va avtonomiya berish kabi faktorlar — o‘smirlarning tejashga moyilligi, kelajakni rejalashtirish va hozirgi vaqtni boshqarish qobiliyatiga bevosita ta’sir ko‘rsatadi [3].

Oiladagi moliyaviy odatlar, masalan, kapitalni taqsimlash, mablag‘larni tejash, oilaviy budjetni birgalikda muhokama qilish va yoshga mos pul berish orqali tejashga rag‘batlantirish, o‘smirlarning moliyaviy xulqini shakllantirishda asosiy determinant sifatida namoyon bo‘ladi. Bu tajribalar nafaqat moliyaviy ko‘nikmalarni rivojlantiradi, balki yoshlarning iqtisodiy qarashlarini psixologik jihatdan mustahkamlaydi, ularni kelajakni rejalashtirishga, moliyaviy mas’uliyatni qabul qilishga va resurslarni ongli boshqarishga o‘rgatadi.

Gollandiyada o‘tkazilgan tadqiqot shuni ko‘rsatdiki, tejashga rag‘bat berilgan va budjetni boshqarish bo‘yicha amaliy maslahatlar olgan o‘smirlar moliyaviy resurslarni nazorat qilish, tejashni afzal ko‘rish va kelajakka yo‘naltirilgan qarashlarni shakllantirishda aniq ustunlikka ega bo‘lgan [4].

Shu nuqtai nazardan, oilada yaratilgan real moliyaviy tajribalar o‘smirlarning iqtisodiy ijtimoiylashuvi jarayonidagi eng samarali mexanizmlardan biri sifatida qaraladi va ularning moliyaviy ongini shakllantirishda strategik ahamiyat kasb etadi.

Shu bilan birga, ijtimoiy muhit — maktab, do‘stlar guruhi, media vositalari va keng madaniy kontekst — o‘smirlarning moliyaviy xatti-harakatlariga bilvosita, ammo sezilarli ta’sir ko‘rsatadi. Ushbu muhit yoshlarni moliyaviy qarorlar qabul qilish jarayonida kuzatish, solishtirish va o‘rganish imkoniyati bilan ta’minlaydi.

Masalan, Janubiy Koreyada o‘smirlar orasida o‘tkazilgan tadqiqotda, media orqali moliyaviy ma’lumot olgan va bank hisobi mavjud bo‘lgan yoshlarning moliyaviy savodxonlik darajasi yuqori bo‘lganligi aniqlangan [5].

Shu bilan birga, boshqa tadqiqotlarda oila a’zolari, do‘stlar va media orqali namoyon bo‘lgan moddiyatparvarlik normativlari yoshlarning moddiyatga bo‘lgan qarashlari va moliyaviy xatti-harakatlariga sezilarli ta’sir ko‘rsatgani qayd etilgan [6].

Bu shuni ko‘rsatadiki, ijtimoiy model va muhit nafaqat kuzatuvchi vazifasini bajaradi, balki o‘smirlarning moliyaviy ongini shakllantirish, qaror qabul qilish va resurslarni boshqarish ko‘nikmalarini rivojlantirishda strategik ahamiyatga ega.

Milliy va madaniy qadriyatlar kontekstida, etnopsixologik mexanizmlar orqali iqtisodiy ijtimoiylashuv yanada chuqurroq bo‘ladi. Tarixiy an’analar, milliy me’yorlar va oilaviy iqtisodiy mentalitet o‘smirlarning moliyaviy qarashlariga bevosita ta’sir qiladi.

Masalan, Xitoy Gonkongidagi tadqiqot shuni ko‘rsatdiki, ota-onalar tomonidan moliyaviy normativlar va model xulqni o‘rgatish yoshlarning moliyaviy xatti-harakatlari va qarashlariga bevosita ta’sir qilgan [7].

Shu tarzda, milliy qadriyatlarni inobatga olgan oilaviy va ijtimoiy ijtimoiylashuv tizimlari o‘smirlarning iqtisodiy ongini shakllantirishda muhim rol o‘ynaydi.

Psixodinamik yondashuv esa yoshlarning ichki motivatsiyasi, ichki nazorat (lokus of control) va oilaviy suhbatlar orqali rivojlanadigan iqtisodiy o‘z-o‘ziga ishonch (economic self-efficacy) moliyaviy xulqqa ta’sir qilishini ko‘rsatadi [8]. Tadqiqot natijalari shuni ko‘rsatadiki, oilada moliya va ish masalalari haqida ochiq muloqot qilgan bolalar kelajakda moliyaviy mustaqillikka erishish va ongli qarorlar qabul qilishda yuqori natijalarga ega bo‘ladi.

Shunday qilib, o‘smirlarning iqtisodiy ijtimoiylashuvi jarayonida milliy qadriyatlar, oilaviy tarbiya va ijtimoiy muhitning o‘zaro ta’siri asosiy mexanizm sifatida namoyon bo‘ladi. Ushbu jarayonni chuqur tushunish pedagogik va psixologik amaliyotlarda yoshlarning moliyaviy madaniyatini rivojlantirishga yo‘naltirilgan strategiyalarni ishlab chiqish imkonini beradi.

Masalan, maktab, oila va jamiyat darajasida uyg‘unlashtirilgan, milliy qadriyatlar bilan integrallashgan moliyaviy ta’lim dasturlari — tejash, mehnatsevarlik, halollik — yoshlarni iqtisodiy jihatdan ongli harakat qilishga undashi mumkin.

O‘smirlarning iqtisodiy ijtimoiylashuvi jarayonini tahlil qilganda, ularning moliyaviy qarashlari va xatti-harakatlari bir nechta o‘zaro bog‘liq omillarning murakkab ta’siri ostida shakllanishi aniqlanadi.

Tadqiqotlar ko‘rsatadiki, oiladagi moliyaviy odatlar — tejashga rag‘batlantirish, oilaviy budjetni birgalikda muhokama qilish va yoshga mos pul berish — o‘smirlarning moliyaviy xulqini belgilashda bevosita va sezilarli rol o‘ynaydi. Shu bilan birga, ota-onaning kommunikatsiya uslubi, xususan, ochiq muloqot, hamkorlik va shaxsiy mas’uliyatni rivojlantirishga qaratilgan yondashuv, o‘smirlarning qaror qabul qilish, resurslarni boshqarish va moliyaviy mustaqillikka intilish ko‘nikmalarini mustahkamlaydi.

Ijtimoiy muhit ham o‘smirlarning moliyaviy xatti-harakatlariga sezilarli ta’sir ko‘rsatadi, garchi u bilvosita xarakterga ega bo‘lsa-da. Bu muhitga maktab, do‘stlar guruhi, media va keng madaniy kontekst kiradi. Ushbu ijtimoiy elementlar yoshlarni moliyaviy qarorlar qabul qilish jarayonida kuzatish, solishtirish va o‘rganish imkoniyati bilan ta’minlaydi.

Masalan, Janubiy Koreyada o‘smirlar bilan o‘tkazilgan tadqiqot natijalari shuni ko‘rsatdiki, media orqali moliyaviy ma’lumot olgan va bank hisobiga ega bo‘lgan yoshlarning moliyaviy savodxonlik darajasi yuqori bo‘lgan, bu esa ularning kelajakdagi moliyaviy qarorlarini ongli, mas’uliyatli va rejalashtirilgan tarzda qabul qilish imkonini yaratadi. Shu bilan birga, do‘stlar guruhi va ijtimoiy norma ta’siri yoshlarning tejash va sarflash qarorlariga sezilarli darajada ta’sir qiladi: o‘smirlar ko‘pincha atrofdagi namunalarga moslashadi va o‘z moliyaviy xatti-harakatlarini shu ijtimoiy kontekstga muvofiqlashtiradi.

Milliy qadriyatlar va etnopsixologik mexanizmlar esa iqtisodiy ijtimoiylashuv jarayonida yanada chuqurroq rol o‘ynaydi. Tarixiy va madaniy kontekst, oilaviy iqtisodiy mentalitet bilan uzviy bog‘liq holda, yoshlarning moliyaviy qarashlarini shakllantiradi.

O‘zbek madaniyatida mehnatsevarlik, tejash va oila barqarorligini ta’minlash qadriyatlari avloddan-avlodga uzatiladi, bu esa o‘smirlarning moliyaviy ongini rivojlantirishda muhim mexanizm sifatida xizmat qiladi. Shu nuqtai nazardan, milliy

qadriyatlar va oilaviy amaliyotlarning uyg‘unligi o‘smirlarning moliyaviy mustaqilligini rivojlantirishda strategik ahamiyatga ega.

Psixodinamik yondashuv bo‘yicha, o‘smirlarning moliyaviy xulqi ularning ichki motivatsiyasi, ichki nazorati (lokus of control) va oilaviy suhbatlar orqali shakllanadi. Tadqiqotlar shuni ko‘rsatdiki, ochiq muloqot va iqtisodiy masalalarni birgalikda muhokama qilish yoshlarning moliyaviy qarorlarini ongli, mas’uliyatli va kelajakni rejalashtirishga yo‘naltirilgan qiladi.

Shu bilan birga, sotsiopsixologik yondashuv ijtimoiy norma va do‘stlar ta’sirini ajratib ko‘rsatadi: yoshlar doimiy ravishda atrofdagi modellarni kuzatadi, o‘z xulqini solishtiradi va shu asosda iqtisodiy qarorlarini qabul qiladi.

Natijalar shuni ko‘rsatadiki, o‘smirlarning moliyaviy qarashlari va xatti-harakatlari bir nechta uzviy bog‘langan omillar — oilaviy model, ijtimoiy muhit va milliy qadriyatlar — orqali shakllanadi.

Bu topilmalarni pedagogik va psixologik amaliyotga tatbiq etish imkoniyati ham mavjud. Ya’ni, o‘smirlarning iqtisodiy ijtimoiylashuvini rivojlantirish uchun oilaviy tarbiya, milliy qadriyatlarni hisobga olgan maktab dasturlari va ijtimoiy modelning uyg‘unligi asosiy strategik yo‘nalish sifatida qabul qilinishi lozim.

Masalan, maktab, oila va jamiyat darajasida uyg‘unlashtirilgan, milliy qadriyatlar bilan integrallashgan moliyaviy ta’lim strategiyalari — tejash, mehnatsevarlik, halollik — yoshlarni iqtisodiy jihatdan ongli va mas’uliyatli harakat qilishga undashi mumkin. Shu tarzda, o‘smirlarning moliyaviy ongini rivojlantirishga qaratilgan kompleks yondashuv, ularning iqtisodiy ijtimoiylashuvi jarayonini yanada samarali qiladi.

O‘smirlarning iqtisodiy ijtimoiylashuvi murakkab, ko‘p qirrali va dinamik jarayon sifatida qaraladi. Ushbu jarayon shaxsning moliyaviy qarashlari, xatti-harakatlari, resurslarni boshqarish ko‘nikmalari va iqtisodiy ongini shakllantirishda markaziy ahamiyatga ega. Tadqiqot natijalari shuni ko‘rsatdiki, oiladagi moliyaviy odatlar — tejashga rag‘batlantirish, oilaviy budjetni birgalikda muhokama qilish, yoshga mos pul berish va kapitalni to‘g‘ri taqsimlash — o‘smirlarning moliyaviy xulqini belgilashda bevosita va barqaror ta’sir ko‘rsatadi.

Shu bilan birga, ota-onaning kommunikatsiya uslubi va oilaviy model, ya’ni ochiq muloqot, hamkorlik va shaxsiy mas’uliyatni rivojlantirishga qaratilgan yondashuv, yoshlarning moliyaviy qarorlarini ongli qabul qilish, tejash va kelajakni rejalashtirish ko‘nikmalarini mustahkamlaydi, shuningdek, ularning iqtisodiy mustaqilligini rivojlantirishga xizmat qiladi.

Ijtimoiy muhit ham o‘smirlarning moliyaviy xatti-harakatlariga sezilarli, garchi bilvosita bo‘lgan ta’sir ko‘rsatadi. Ushbu muhitga maktab, do‘stlar guruhi, media va keng madaniy kontekst kiradi. Yoshlar ko‘pincha atrofdagi modellarni kuzatadi, o‘z xulqini solishtiradi va shu asosda moliyaviy qarorlarini o‘rganilgan ijtimoiy me’yorlarga moslashtiradi.

Media va ijtimoiy norma orqali namoyon bo‘lgan moddiyatparvarlik, moliyaviy me’yorlar va qadriyatlar yoshlarning moddiyatga bo‘lgan munosabatini shakllantiradi, shuningdek, moliyaviy savodxonlik va ongli qaror qabul qilish qobiliyatini rivojlantiradi. Shu jihatdan, ijtimoiy muhit va atrofdagi namuna o‘smirlarning iqtisodiy xatti-harakatlarini ijtimoiy kontekstga moslashtirishda strategik ahamiyat kasb etadi.

Milliy qadriyatlar va etnopsixologik mexanizmlar o‘smirlarning iqtisodiy ijtimoiylashuvi jarayonida yanada chuqurroq va barqaror rol o‘ynaydi. Tarixiy an’analar, madaniy me’yorlar va oilaviy iqtisodiy mentalitet yoshlarning moliyaviy qarashlarini shakllantirishda uzviy bog‘liq bo‘lgan elementlar hisoblanadi.

Masalan, o‘zbek madaniyatida mehnatsevarlik, tejash va oila barqarorligini ta’minlash qadriyatlari avloddan-avlodga uzatiladi. Bu qadriyatlar o‘smirlarning moliyaviy ongini shakllantirishda va kelajakni rejalashtirish, resurslarni ongli boshqarish hamda moliyaviy mas’uliyatni qabul qilish kabi ko‘nikmalarini rivojlantirishda asosiy mexanizm sifatida xizmat qiladi.

Shu nuqtai nazardan, milliy qadriyatlar va oilaviy amaliyotlarning uyg‘unligi o‘smirlarning moliyaviy mustaqilligini rivojlantirishda strategik ahamiyatga ega ekanligi aniqlanadi.

Psixodinamik yondashuvlar yoshlarning moliyaviy xulqini yanada chuqurroq tushunishga imkon beradi. Ichki motivatsiya, ichki nazorat (lokus of control) va

oilaviy suhbatlar yoshlarning moliyaviy qarorlarini ongli va mas’uliyatli qilishda muhim rol o‘ynaydi. Shu bilan birga, sotsiopsixologik yondashuv ijtimoiy norma va do‘stlar ta’sirini ajratib ko‘rsatadi: o‘smirlar atrofdagi modellarni kuzatadi, o‘z xulqini solishtiradi va shu asosda iqtisodiy qarorlarini qabul qiladi.

Natijada, o‘smirlarning moliyaviy qarashlari va xatti-harakatlari bir nechta uzviy bog‘langan omillar — oilaviy model, ijtimoiy muhit va milliy qadriyatlar — orqali shakllanadi.

Shunday qilib, o‘smirlarning iqtisodiy ijtimoiylashuvi — bu oila, ijtimoiy muhit va milliy qadriyatlar o‘rtasidagi uyg‘un ta’sir mexanizmi orqali amalga oshadigan murakkab va ko‘p qirrali jarayon. Bu jarayonni chuqur tushunish nafaqat psixologik tadqiqotlar, balki pedagogik va amaliy strategiyalarni ishlab chiqish uchun ham katta ahamiyatga ega.

Shu nuqtai nazardan, yoshlarning moliyaviy ongini rivojlantirish maqsadida oilaviy tarbiya, milliy qadriyatlarni hisobga olgan maktab dasturlari va ijtimoiy modelning uyg‘unligi asosiy strategik yo‘nalish sifatida ko‘rilishi lozim. Bunday kompleks yondashuv o‘smirlarning moliyaviy xulqini ongli, mas’uliyatli va milliy qadriyatlar bilan uyg‘unlashtirilgan shaklda rivojlantirishga imkon beradi.

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O‘ZBEKISTONDA MEHNAT HUQUQINING BUZILISHI: HOLAT VA ISTIQBOL

Yo‘ldosheva Odinaxon Dilmurodjon qizi

Buxoro davlat pedagogika instituti

odinakhandilmurodjonqizi@gmail.com

Annotatsiya:*Mazkur maqolada O‘zbekistonda mehnat huquqining buzilishi holatlari, ularning kelib chiqish omillari va huquqiy oqibatlari har tomonlama tahlil etiladi. Noqonuniy ishdan bo‘shatish, ish haqini o‘z vaqtida to‘lamaslik, majburiy va yashirin mehnat, mehnat shartnomasiz faoliyat yuritish kabi muammolar*

amaldagi milliy qonunchilik va xalqaro mehnat standartlari asosida yoritiladi. Davlat nazorati, mehnat inspeksiyasi hamda sud amaliyotining roli ochib beriladi. Shuningdek, mehnat munosabatlarini liberallashtirish, raqamli nazorat tizimlarini joriy etish, ijtimoiy sheriklikni rivojlantirish va xodimlarning huquqiy madaniyatini oshirish orqali mehnat huquqlarini ishonchli himoya qilish istiqbollari ilmiy-nazariy va amaliy jihatdan asoslab beriladi.

Kalit so'zlar: *Mehnat huquqi, mehnat qonunchiligi,mehnat huquqining buzilishi,xodimlar huquqlari,ish beruvchi majburiyatlari mehnat shartnomasi noqonuniy ishdan bo'shatish ish haqi kechiktirilishi majburiy mehnat bolalar mehnati.*

Abstract: *This article provides a comprehensive analysis of labor rights violations in Uzbekistan, their underlying causes, and legal consequences. Issues such as unlawful dismissal, delayed wage payments, forced and informal labor, and employment without formal contracts are examined based on current national legislation and international labor standards. The role of state supervision, labor inspections, and judicial practice is highlighted. The study also substantiates the prospects for strengthening labor rights protection through the liberalization of labor relations, implementation of digital monitoring systems, development of social partnership, and enhancement of employees' legal awareness.*

Keywords:*Labour law (Employment law), labour legislation, violation of labour rights, employees' rights, employer's obligations, employment contract, unlawful dismissal, wage delay (delayed payment of wages), forced labour, child labour*

Kirish:

Bozor iqtisodiyoti sharoitida mehnat munosabatlarini huquqiy jihatdan tartibga solish jamiyat barqarorligini ta'minlashning muhim omillaridan biri hisoblanadi. Mehnat huquqi fuqarolarning mehnat qilish, erkin kasb tanlash va munosib mehnat sharoitlariga ega bo'lish huquqlarini kafolatlaydi. Shu bois mehnat qonunchiligiga

rioya etilishi nafaqat xodimlar, balki ish beruvchilar va umuman jamiyat manfaatlari uchun ham muhim ahamiyat kasb etadi.So‘nggi yillarda O‘zbekistonda mehnat sohasini isloh qilish, xodimlar huquqlarini mustahkamlash hamda xalqaro standartlarga moslashish borasida keng ko‘lamli o‘zgarishlar amalga oshirilmoqda. Xususan, yangi tahrirdagi O‘zbekiston Respublikasi Mehnat kodeksi qabul qilinishi mehnat munosabatlarini yanada aniq va tizimli tartibga solishga xizmat qilmoqda. Shunga qaramay, amaliyotda mehnat huquqining buzilishi bilan bog‘liq holatlar — noqonuniy ishdan bo‘shatish, ish haqi kechiktirilishi, mehnat shartnomalarini rasmiylashtirmaslik, majburiy mehnat va bolalar mehnati kabi muammolar uchrab turibdi.Mehnat huquqining buzilishi xodimlarning ijtimoiy himoyasiga, daromad barqarorligiga hamda jamiyatdagi ijtimoiy adolat tamoyillariga salbiy ta’sir ko‘rsatadi. Shu bois mazkur mavzu dolzarb hisoblanib, mehnat qonunchiligiga rioya etilishini ta’minlash, nazorat mexanizmlarini kuchaytirish va huquqiy madaniyatni oshirish masalalarini o‘rganishni taqozo etadi.O‘zbekistonda mehnat huquqining buzilishi holatini tahlil qilish, uning asosiy sabablari va oqibatlarini yoritish hamda kelgusidagi rivojlanish istiqbollarini aniqlashdan iborat.

Asosiy qism

O‘zbekiston hududida mehnat munosabatlari va ularni tartibga soluvchi huquqiy, ijtimoiy va iqtisodiy tizimdir. Tadqiqot doirasida xodimlar va ish beruvchilar o‘rtasidagi mehnat munosabatlari, mehnat shartnomalari, ish haqi to‘lovlari, ish sharoitlari, ijtimoiy himoya mexanizmlari va kasaba uyushmalari faoliyati o‘rganiladi. Shu bilan birga, mehnat huquqining buzilishi bilan bog‘liq holatlar — masalan, noqonuniy ishdan bo‘shatish, ish haqi kechiktirilishi, majburiy mehnat, bolalar mehnati, diskriminatsiya va boshqa huquqbuzarliklar ham tadqiqot obyekti sifatida ko‘rib chiqiladi.Bundan tashqari, tadqiqot obyekti sifatida O‘zbekistonda mehnat qonunchiligini amalga oshirish jarayonidagi nazorat va monitoring tizimlari, sud va boshqa huquqni muhofaza qilish organlari faoliyati, xalqaro mehnat standartlariga moslashish, ijtimoiy himoya va xodimlar huquqlarini ta’minlash mexanizmlari ham qamrab olinadi. Shunday qilib, tadqiqot obyekti

mehnat munosabatlarining huquqiy asoslari, amaliy holatlari va ularning jamiyatdagi ijtimoiy-iqtisodiy ahamiyatini kompleks tarzda o‘rganishga qaratilgan.

Ish haqi bilan bog‘liq muammolar: Eng ko‘p uchraydigan holatlardan biri — ish haqining o‘z vaqtida to‘lanmasligi yoki to‘liq berilmasligidir. Ayrim hollarda ish beruvchilar tomonidan xodim bilan tuzilgan mehnat shartnomasida ko‘rsatilgan miqdordan kam haq to‘lanadi yoki maosh kechiktiriladi. Bu holat xodimning moddiy ta’minotiga bevosita ta’sir ko‘rsatadi va ijtimoiy tengsizlikni kuchaytiradi.

Mehnat shartnomasini rasmiylashtirmaslik:Amaliyotda ayrim ish beruvchilar xodimlarni rasmiy mehnat shartnomasisiz ishga jalb etadi. Natijada xodim mehnat daftarchasi yuritilmaydi, ijtimoiy sug‘urta badallari to‘lanmaydi va kelgusida pensiya ta’minotida muammolar yuzaga keladi. Bu esa yashirin iqtisodiyotning kengayishiga ham sabab bo‘ladi.

Noqonuniy ishdan bo‘shatish

Mehnat qonunchiligida ishdan bo‘shatishning aniq asoslari belgilangan bo‘lsa-da, ayrim hollarda ish beruvchilar xodimni asossiz ravishda ishdan bo‘shatishadi. Sud amaliyotida noqonuniy ishdan bo‘shatish bilan bog‘liq nizolar mavjudligi bu muammoning dolzarbligini tasdiqlaydi.

Mehnat sharoitlari va xavfsizlik

Ishlab chiqarish korxonalarida mehnat muhofazasi qoidalariga to‘liq rioya etilmasligi jarohatlanish va kasb kasalliklariga olib kelishi mumkin. Xavfsiz mehnat sharoitlarini yaratish ish beruvchining asosiy majburiyatlaridan biri hisoblanadi.

Muammolarning ijtimoiy-iqtisodiy oqibatlari

Mehnat huquqlarining buzilishi nafaqat alohida xodim, balki butun jamiyat uchun salbiy oqibatlarga olib keladi. Birinchidan, xodimlarning ishga bo‘lgan ishonchi va motivatsiyasi pasayadi. Ikkinchidan, norasmiy bandlik ortadi. Uchinchidan, mehnat migratsiyasi kuchayishi mumkin.

Shuningdek, mehnat nizolarining ko‘payishi sud tizimiga qo‘shimcha yuklama beradi. Bu esa iqtisodiy samaradorlikka salbiy ta’sir ko‘rsatadi.

Istiqbol va takliflar

Kelgusida mehnat huquqlarini yanada samarali himoya qilish uchun quyidagi choralar muhim ahamiyat kasb etadi:

- Mehnat inspeksiyasi faoliyatini kuchaytirish va nazorat mexanizmlarini takomillashtirish;
- Raqamli mehnat shartnomalari tizimini keng joriy etish;
- Ish beruvchilarning javobgarligini oshirish;
- Xodimlarning huquqiy savodxonligini oshirish bo‘yicha targ‘ibot ishlarini kuchaytirish;
- Norasmiy bandlikka qarshi tizimli kurashish.

Mehnat munosabatlarini shaffof va adolatli tashkil etish orqali ijtimoiy barqarorlikni mustahkamlash mumkin.

Ilmiy yangiligi

Mazkur maqolada mehnat huquqlarining buzilishi masalasi zamonaviy huquqiy islohotlar kontekstida kompleks tahlil qilindi. Qonunchilik normalari va amaliyot o‘rtasidagi tafovutlar ochib berildi hamda muammoni bartaraf etishning aniq mexanizmlari taklif etildi.

Xulosa

Xulosa qilib aytganda, O‘zbekistonda mehnat huquqlarining buzilishi dolzarb ijtimoiy-huquqiy muammo bo‘lib qolmoqda. Qonunchilik bazasi takomillashgan bo‘lsa-da, uning amaliy ijrosini ta’minlash muhim vazifa hisoblanadi. Davlat organlari, ish beruvchilar va xodimlar o‘rtasida huquqiy madaniyatni oshirish hamda

samarali nazorat tizimini yo‘lga qo‘yish orqali mehnat huquqlarining ishonchli himoyasiga erishish mumkin.

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THE INTEGRATION OF INCLUSIVE INSTITUTIONS AND SOCIAL SCIENCES IN SOCIETAL DEVELOPMENT

Zokirov Mirzo

TSUE

email: zokirov0796@gmail.com

Abstract. *This article explores the role of inclusive institutions and the integration of social sciences in shaping sustainable societal development. It argues that inclusive political and economic institutions create equal opportunities, encourage innovation, and support long-term growth. At the same time, social sciences provide theoretical and methodological tools to understand social*

processes, human behavior, and governance systems. The study emphasizes that the interaction between institutional structures and social knowledge is crucial for addressing modern global challenges. By analyzing contemporary development models, the paper highlights that the integration of inclusive institutions and social sciences contributes to building stable, just, and progressive societies.

Keywords: *Inclusive institutions, social sciences, societal development, institutional integration, governance, economic growth, social progress, innovation, sustainability, public policy*

Introduction

In the contemporary world, the issue of societal development has become one of the most significant and widely discussed topics within both academic research and practical policy-making. The rapid transformation of global economic, political, and social systems has intensified the need to understand the fundamental factors that determine why some societies achieve sustainable progress while others experience stagnation or decline. In this context, the integration of inclusive institutions and social sciences emerges as a crucial framework for analyzing and promoting long-term development.

Societal development should not be reduced solely to economic growth indicators such as gross domestic product or industrial expansion. It is, rather, a multidimensional process that includes political stability, social justice, equality of opportunities, and the realization of human capabilities. From this perspective, development requires not only material resources but also effective institutional arrangements and a deep understanding of social processes. As Daron Acemoglu and James A. Robinson argue, “inclusive economic institutions… allow and encourage participation by the great mass of people in economic activities” [1;74], which ultimately fosters innovation and sustainable growth.

Inclusive institutions play a central role in shaping the trajectory of societal development. These institutions are characterized by the protection of property rights, the rule of law, equal access to economic opportunities, and political inclusiveness. They create an environment in which individuals are motivated to invest, innovate, and contribute to the broader social and economic system. In contrast, extractive institutions concentrate power and resources in the hands of a narrow elite, limiting participation and hindering development. Therefore, the nature of institutions directly influences whether a society progresses or regresses.

At the same time, social sciences provide the conceptual and analytical tools necessary to understand how institutions function and how societies evolve. Disciplines such as sociology, political science, economics, and philosophy examine the relationships between individuals, groups, and structures, offering insights into human behavior, social norms, and governance mechanisms. Through these perspectives, social sciences help explain why certain institutional arrangements succeed while others fail. As Douglass C. North emphasizes, “institutions are the rules of the game in a society” [3;3], highlighting their foundational role in shaping social and economic interactions.

The integration of inclusive institutions and social sciences is particularly important in addressing modern global challenges. Issues such as inequality, governance inefficiency, social fragmentation, and economic instability cannot be effectively resolved through purely technical or economic approaches. Instead, they require a comprehensive understanding of institutional structures and human behavior.

Furthermore, the relevance of this integration becomes even more evident in the context of developing countries undergoing transformation. In such societies, reforms aimed at improving governance, strengthening the rule of law, and expanding economic opportunities must be grounded in both institutional change and social understanding. Without considering the social dimensions of

development, institutional reforms may remain ineffective or produce unintended consequences.

Main Body

The relationship between inclusive institutions and social sciences plays a decisive role in understanding and ensuring sustainable societal development. While inclusive institutions provide the structural framework for economic and political participation, social sciences offer the analytical tools to interpret how these structures function within real societies. Their integration creates a comprehensive approach that explains not only how development occurs, but also why it succeeds in some contexts and fails in others.

At the core of inclusive institutions lies the principle of equal opportunity. These institutions ensure that individuals, regardless of their social background, have access to education, economic resources, and political participation. This inclusiveness stimulates innovation, increases productivity, and strengthens social cohesion. When individuals feel that their efforts are protected and rewarded, they are more likely to invest in long-term activities such as education, entrepreneurship, and technological advancement. In this sense, inclusive institutions act as a catalyst for both economic growth and social progress.

From a social science perspective, this process can be explained through the interaction between structure and agency. Institutions represent the structural dimension of society, while individuals and social groups embody agency. Social sciences analyze how these two dimensions influence each other. For example, sociology examines how social norms and values affect participation in institutions, while political science explores how power relations shape institutional design. Economics, on the other hand, focuses on how incentives created by institutions influence human behavior. This interdisciplinary approach allows for a deeper understanding of development processes.

One of the key mechanisms through which inclusive institutions contribute to development is the protection of property rights and the rule of law. These elements

create a predictable environment in which individuals and businesses can operate without fear of arbitrary interference. As noted by Daron Acemoglu and James A. Robinson, “secure property rights are central for economic prosperity” [2;75]. This stability encourages investment and long-term planning, which are essential for sustainable growth.

However, institutions alone are not sufficient to guarantee development. Their effectiveness depends on the broader social context in which they operate. This is where the role of social sciences becomes particularly important. Social sciences help to identify cultural, historical, and social factors that influence how institutions are implemented and perceived. For instance, trust within society significantly affects the functioning of institutions. High levels of social trust facilitate cooperation and reduce transaction costs, while low levels of trust can undermine even well-designed institutions.

Moreover, inclusive institutions promote political participation, which is a key factor in ensuring accountability and responsiveness in governance. When citizens have the ability to influence decision-making processes, governments are more likely to adopt policies that reflect the needs and interests of the broader population. This participatory dimension strengthens democracy and contributes to long-term stability. As Amartya Sen emphasizes, “development requires the removal of major sources of unfreedom” [4;3], highlighting the importance of freedom and participation in development processes.

Another important aspect of the integration between inclusive institutions and social sciences is the role of education. Education not only enhances individual capabilities but also fosters critical thinking, civic responsibility, and social awareness. Through education, individuals become more capable of participating in economic and political life, which in turn strengthens inclusive institutions. Social sciences contribute to this process by developing educational frameworks that promote analytical skills and a deeper understanding of societal issues.

In addition, globalization and technological advancement have created new challenges and opportunities for societal development. Inclusive institutions must adapt to these changes in order to remain effective. Social sciences play a crucial role in analyzing the impact of globalization, digitalization, and cultural transformation on institutional structures. They provide insights into how societies can navigate these changes while maintaining social cohesion and promoting inclusive growth.

The integration of inclusive institutions and social sciences is also essential for addressing issues such as inequality and social exclusion. Inclusive institutions aim to reduce disparities by ensuring equal access to opportunities, while social sciences analyze the root causes of inequality and propose strategies for social inclusion. This combined approach enables more effective policy-making and contributes to the creation of more equitable societies.

Conclusion

In conclusion, the integration of inclusive institutions and social sciences plays a fundamental role in ensuring sustainable and balanced societal development. The analysis demonstrates that development is not merely an economic process, but a complex system shaped by political structures, social relationships, and human behavior. Inclusive institutions, by providing equal opportunities, protecting rights, and encouraging participation, create the necessary conditions for innovation, stability, and long-term growth. At the same time, social sciences contribute by offering theoretical and analytical tools that help to understand how these institutions function within different social contexts.

The study highlights that the effectiveness of inclusive institutions largely depends on their interaction with social factors such as culture, trust, education, and collective values. Without considering these aspects, even well-designed institutional reforms may fail to achieve their intended outcomes. Therefore, the integration of institutional frameworks with insights from social sciences allows for

a more comprehensive understanding of development processes and enables more effective policy-making.

Furthermore, this integrated approach is particularly important in addressing contemporary global challenges, including inequality, governance inefficiency, and social fragmentation. By combining institutional reforms with a deep understanding of social dynamics, societies can create more inclusive, just, and resilient systems.

Overall, the findings confirm that sustainable development can only be achieved when inclusive institutions are supported by strong social foundations. The synergy between institutional structures and social knowledge not only enhances economic performance but also promotes social cohesion and human well-being. Thus, the integration of inclusive institutions and social sciences should be considered a key strategy for building progressive and stable societies in the modern world.

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ФОРМИРОВАНИЯ КУЛЬТУРЫ ДОНОРСТВА В ОБЩЕСТВЕ КАК ЭЛЕМЕНТ ДУХОВНОГО РАЗВИТИЯ

Обидова Муаттарбону Хусанбой кизи

Андижанский государсвенный педогогический институт

Abstract: *The article examines the significance of developing a culture of donation in modern society as an important factor in the spiritual and moral development of both the individual and society. The social, cultural, and moral-ethical aspects of the donor movement are analyzed, as well as the role of educational institutions, government structures, and public organizations in promoting donation. Particular attention is paid to fostering humanism, compassion, and social responsibility through citizens' participation in donor programs. It is emphasized that the development of a culture of donation contributes to strengthening the moral values of society, promoting solidarity, and forming an active civic position.*

Keywords: *blood donation, donation culture, spiritual and moral development, humanism, social responsibility, volunteerism, civic engagement.*

Annotatsiya: *Mazkur maqolada zamonaviy jamiyatda donorlik madaniyatini rivojlantirishning shaxs va jamiyatning ma'naviy-axloqiy taraqqiyotidagi muhim omil sifatidagi ahamiyati yoritilgan. Donorlik harakatining ijtimoiy, madaniy hamda axloqiy jihatlari, shuningdek, donorlikni targ'ib etishda ta'lim muassasalari,*

davlat tuzilmalari va jamoat tashkilotlarining o‘rni tahlil qilingan. Fuqarolarning donorlik dasturlarida ishtiroki orqali insonparvarlik, mehr-shafqat va ijtimoiy mas’uliyatni shakllantirishga alohida e’tibor qaratilgan. Donorlik madaniyatini rivojlantirish jamiyatda axloqiy qadriyatlarni mustahkamlash, birdamlikni kuchaytirish va faol fuqarolik pozitsiyasini shakllantirishga xizmat qilishi ta’kidlangan.

Kalit so‘zlar: *qon donorligi, donorlik madaniyati, ma’naviy-axloqiy rivojlanish, insonparvarlik, ijtimoiy mas’uliyat, volontyorlik, fuqarolik faolligi.*

Аннотация: *в статье рассматривается значение формирования культуры донорства в современном обществе как важного элемента духовно-нравственного развития личности и социума. Анализируются социальные, культурные и моральные аспекты донорского движения, а также роль образовательных учреждений, государства и общественных организаций в популяризации донорства. Особое внимание уделяется воспитанию гуманизма, милосердия и социальной ответственности через участие в донорских программах. Делается вывод о том, что развитие культуры донорства способствует укреплению нравственных ценностей общества и формированию активной гражданской позиции.*

Ключевые слова: *донорство крови, культура донорства, духовное развитие, гуманизм, социальная ответственность, добровольчество, общество.*

Современное общество сталкивается с множеством социальных и гуманитарных проблем, решение которых требует не только научно-технического прогресса, но и высокого уровня духовно-нравственного развития людей. Одним из ярких проявлений гуманизма и социальной ответственности является донорство крови. Донорство представляет собой добровольную помощь людям, нуждающимся в переливании крови или её компонентов, и играет важную роль в системе здравоохранения. Каждый год миллионы людей во всем мире нуждаются в переливании крови в результате

травм, операций, тяжёлых заболеваний и различных медицинских процедур. Однако обеспечение медицинских учреждений необходимым количеством донорской крови остаётся одной из актуальных проблем многих стран. В связи с этим особое значение приобретает формирование устойчивой культуры донорства в обществе. Культура донорства предполагает не только наличие системы медицинского обеспечения, но и формирование у граждан осознанного отношения к донорству как к важной социальной миссии. Она основывается на принципах гуманизма, взаимопомощи и добровольности. Развитие культуры донорства способствует укреплению нравственных ценностей общества, формированию чувства ответственности за жизнь и здоровье других людей. Цель данной статьи — рассмотреть особенности формирования культуры донорства в обществе и определить ее роль в духовном развитии личности и общества. Донорство крови является одним из наиболее значимых проявлений социальной солидарности и взаимопомощи. Оно основывается на добровольном желании человека оказать помощь другим людям, не ожидая материального вознаграждения. Такой акт помощи отражает высокий уровень морального сознания личности и свидетельствует о развитии гуманистических ценностей в обществе. В современном мире донорство рассматривается не только как медицинская процедура, но и как важный социальный институт. Донорское движение объединяет людей разных возрастов, профессий и социальных групп, стремящихся внести вклад в спасение человеческих жизней. Одной из ключевых особенностей донорства является его добровольный характер. Добровольные доноры, сдающие кровь на регулярной основе, обеспечивают стабильность системы здравоохранения и позволяют медицинским учреждениям своевременно оказывать помощь пациентам. По данным Всемирной организации здравоохранения, именно добровольные доноры являются наиболее безопасным и надежным источником донорской крови. Кроме того, донорство играет важную роль в формировании социальной ответственности граждан. Люди, участвующие в донорских программах, проявляют активную гражданскую позицию и

демонстрируют готовность помогать обществу. Формирование культуры донорства тесно связано с духовно-нравственным развитием личности. Донорство предполагает проявление таких моральных качеств, как милосердие, сострадание, альтруизм и готовность помогать другим людям. Духовное развитие человека проявляется в его отношении к окружающим, в способности проявлять заботу и поддержку тем, кто находится в трудной жизненной ситуации. Донорство является ярким примером бескорыстной помощи, когда человек добровольно делится частью себя ради спасения жизни другого человека. Важную роль в формировании духовных ценностей играет воспитание. Семья, образовательные учреждения и общественные организации оказывают значительное влияние на формирование у молодежи гуманистических взглядов и социальной ответственности. Таким образом, развитие культуры донорства способствует укреплению духовных основ общества и формированию атмосферы взаимной поддержки и доверия. Формирование культуры донорства невозможно без активного участия образовательных учреждений, государственных структур и общественных организаций. Именно эти институты играют ключевую роль в распространении информации о значении донорства и формировании позитивного отношения к донорскому движению. Образовательные учреждения, такие как школы и университеты, могут способствовать популяризации донорства путем проведения лекций, семинаров и социальных акций. Вовлечение студентов в донорские программы позволяет не только повысить уровень осведомленности молодежи, но и сформировать у них чувство социальной ответственности. Средства массовой информации также играют важную роль в формировании общественного мнения. Социальная реклама, информационные кампании и публикации в СМИ помогают привлечь внимание общества к проблеме нехватки донорской крови и мотивируют людей становиться донорами. Кроме того, государственные программы и инициативы способствуют развитию донорского движения. Создание благоприятных условий для доноров, организация мобильных

пунктов сдачи крови и проведение национальных донорских акций позволяют значительно увеличить количество добровольных доноров. Уровень развития донорского движения часто рассматривается как показатель социальной зрелости общества. В странах с высоким уровнем донорской активности население проявляет большую степень социальной ответственности и готовности помогать другим людям. Донорское движение способствует укреплению общественной солидарности и формированию культуры взаимопомощи. Люди начинают осознавать свою роль в обществе и понимать, что их участие может спасти чью-то жизнь. Особенно важную роль в развитии донорства играет молодежь. Молодые люди являются наиболее активной частью общества и способны распространять идеи гуманизма и добровольчества среди своих сверстников. Развитие донорской культуры также способствует укреплению доверия между гражданами и государством. Когда люди видят, что их участие действительно помогает спасать жизни, они становятся более вовлеченными в общественную жизнь и проявляют большую гражданскую активность.

Заключение

Таким образом, формирование культуры донорства является важным элементом духовного развития общества. Донорство способствует развитию гуманизма, милосердия и социальной ответственности, а также укрепляет нравственные ценности и культуру взаимопомощи.

Развитие донорского движения требует совместных усилий государства, образовательных учреждений, общественных организаций и средств массовой информации. Только при активной поддержке всех социальных институтов возможно сформировать устойчивую культуру донорства и обеспечить медицинские учреждения необходимым количеством донорской крови.

Вовлечение молодежи в донорские программы, проведение информационных кампаний и развитие добровольческого движения являются

важными шагами на пути к формированию гуманного и социально ответственного общества.

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ПСИХОЛОГИЧЕСКИЕ И ДУХОВНЫЕ АСПЕКТЫ ДОНОРСТВА ОРГАНОВ

Обидова Муаттарбону Хусанбой кизи

Андижанский государсвенный педогогический институт

Abstract: *The article examines the psychological and spiritual aspects of organ donation as an important social and humanitarian phenomenon of modern society. It analyzes the moral and ethical foundations of organ donation, the psychological factors influencing an individual's decision to become a donor, as well as the role of spiritual values in shaping a positive attitude toward donation. Particular attention is given to the influence of family, society, and cultural traditions on the development of a culture of donation. The article concludes that the development of spiritual and moral values contributes to an increase in the number of voluntary donors and strengthens the humanistic principles of society.*

Keywords: *organ donation, transplantation, psychological factors, spiritual values, humanism, altruism, social responsibility.*

Annotatsiya: *Mazkur maqolada zamonaviy jamiyatda muhim ijtimoiy-gumanitar hodisa sifatida organ donorligining psixologik va ma'naviy jihatlari yoritilgan. Organ donorligining axloqiy-me'yoriy asoslari, shaxsning donor bo'lish qaroriga ta'sir etuvchi psixologik omillar hamda donorlikka ijobiy munosabatni shakllantirishda ma'naviy qadriyatlarning roli tahlil qilingan. Shuningdek, donorlik madaniyatini rivojlantirishda oila, jamiyat va madaniy an'analarning ta'siriga alohida e'tibor qaratilgan. Maqola xulosasida ma'naviy-axloqiy qadriyatlarning rivojlanishi ixtiyoriy donorlar sonining ortishiga xizmat qilishi hamda jamiyatda insonparvarlik tamoyillarini mustahkamlashi ta'kidlangan.*

Kalit so'zlar: *organ donorligi, transplantatsiya, psixologik omillar, ma'naviy qadriyatlar, insonparvarlik, altruizm, ijtimoiy mas'uliyat.*

Аннотация: *В статье рассматриваются психологические и духовные аспекты донорства органов как важного социального и гуманитарного явления современного общества. Анализируются морально-нравственные основы донорства, психологические факторы, влияющие на решение человека стать донором, а также роль духовных ценностей в формировании положительного отношения к донорству. Особое внимание уделяется влиянию семьи, общества и культурных традиций на формирование*

донорской культуры. Делается вывод о том, что развитие духовно-нравственных ценностей способствует увеличению числа добровольных доноров и укреплению гуманистических принципов общества.

Ключевые слова: *донорство органов, трансплантация, психологические факторы, духовные ценности, гуманизм, альтруизм, социальная ответственность.*

Современная медицина достигла значительных успехов в области трансплантологии. Пересадка органов стала эффективным способом спасения жизни пациентов, страдающих тяжелыми заболеваниями сердца, печени, почек и других жизненно важных органов. Однако развитие трансплантологии невозможно без наличия донорских органов, что делает проблему донорства одной из наиболее актуальных в сфере здравоохранения. Донорство органов представляет собой сложное социальное и медицинское явление, которое включает не только биологические и медицинские аспекты, но и глубокие психологические и духовные факторы. Решение человека стать донором органов связано с его мировоззрением, нравственными ценностями и отношением к жизни и смерти. Во многих странах проблема нехватки донорских органов остается крайне актуальной. Несмотря на развитие медицинских технологий, количество пациентов, ожидающих трансплантацию, значительно превышает количество доступных донорских органов. В этой связи особое значение приобретает формирование положительного отношения общества к донорству. Психологические и духовные аспекты играют ключевую роль в формировании готовности человека стать донором. Уровень гуманизма, альтруизма и социальной ответственности влияет на принятие решения о донорстве. Поэтому изучение данных аспектов является важным для развития донорского движения и повышения эффективности трансплантационных программ. Цель данной статьи — рассмотреть психологические и духовные аспекты донорства

органов и определить их значение в формировании культуры донорства в обществе.

Решение стать донором органов является сложным психологическим процессом, который зависит от множества факторов. К ним относятся личностные установки, жизненный опыт, уровень информированности о донорстве, а также влияние социальных и культурных норм. Одним из основных психологических факторов является уровень эмпатии. Люди, обладающие высоким уровнем сопереживания, чаще проявляют готовность помочь другим людям, даже если это связано с определенными личными жертвами. Донорство органов часто рассматривается как акт высшего альтруизма, направленный на спасение жизни другого человека. Также важную роль играет уровень доверия к системе здравоохранения. Если люди уверены в прозрачности и справедливости медицинской системы, они с большей вероятностью соглашаются стать донорами. Напротив, недостаток информации или недоверие к медицинским учреждениям может снижать готовность общества участвовать в донорских программах. Еще одним важным фактором является страх. Многие люди испытывают психологический дискомфорт при обсуждении темы смерти или медицинских процедур. Этот страх может стать препятствием для принятия решения о донорстве. Поэтому важной задачей является проведение информационных и просветительских мероприятий, направленных на снижение тревожности и формирование объективного представления о донорстве органов. Кроме того, на отношение к донорству значительное влияние оказывает мнение семьи и близкого окружения. Поддержка родственников и друзей может стать важным фактором, способствующим принятию положительного решения. Донорство органов имеет глубокое духовное и нравственное значение. Оно основано на таких ценностях, как милосердие, сострадание, взаимопомощь и уважение к человеческой жизни. Во многих культурах и религиозных традициях помощь другим людям считается одной из высших моральных обязанностей.

Донорство органов может рассматриваться как проявление высшей формы гуманизма, поскольку оно направлено на спасение жизни другого человека. С духовной точки зрения донорство символизирует продолжение жизни и передачу жизненной энергии. Человек, принимающий решение стать донором, проявляет готовность помочь другим даже после своей смерти, что отражает высокий уровень нравственного сознания. Многие религиозные организации поддерживают донорство органов, рассматривая его как акт милосердия и благотворительности. Подобное отношение способствует формированию положительного общественного мнения и снижению психологических барьеров, связанных с донорством. Развитие духовных ценностей играет важную роль в формировании культуры донорства. Чем выше уровень нравственного сознания общества, тем больше людей готовы участвовать в донорских программах и помогать другим людям. Формирование положительного отношения к донорству органов требует активного участия различных социальных институтов. Важную роль в этом процессе играют образовательные учреждения, средства массовой информации и государственные программы. Образовательные учреждения могут способствовать формированию культуры донорства путем проведения лекций, семинаров и научно-популярных мероприятий. Информирование молодежи о значении донорства помогает формировать у них чувство социальной ответственности и гуманизма. Средства массовой информации также играют важную роль в популяризации донорства. Социальная реклама, документальные фильмы и информационные кампании помогают повышать уровень осведомленности населения и разрушать существующие мифы о трансплантации органов. Кроме того, государственные программы и законодательные инициативы способствуют развитию донорского движения. Создание прозрачной и эффективной системы трансплантации органов повышает доверие населения и стимулирует участие граждан в донорских программах. Особое значение имеет развитие добровольчества и общественных организаций, занимающихся популяризацией донорства. Такие

организации проводят различные акции, направленные на привлечение внимания общества к проблеме нехватки донорских органов. Донорство органов имеет большое социальное значение, поскольку оно позволяет спасать жизни людей и улучшать качество их жизни. Каждый донор может помочь нескольким пациентам, нуждающимся в трансплантации. Кроме медицинского значения, донорство способствует развитию социальной солидарности и взаимопомощи. Оно формирует в обществе атмосферу доверия и гуманизма, укрепляет нравственные ценности и способствует развитию культуры добровольчества. Развитие донорского движения также оказывает положительное влияние на общественное сознание. Люди начинают осознавать свою ответственность перед обществом и понимать важность взаимной поддержки. В некоторых случаях проблемы, возникающие после имплантации зубов, могут быть связаны не только с медицинскими осложнениями, но и с недобросовестными действиями отдельных специалистов. Если врач действует непрофессионально или вводит пациента в заблуждение относительно необходимости процедуры, это может привести не только к физическим, но и к серьёзным психологическим последствиям.

Некоторые пациенты сталкиваются с ситуациями, когда им рекомендуют имплантацию без достаточных медицинских показаний или не предоставляют полной информации о возможных рисках и альтернативных методах лечения. В результате после процедуры могут возникнуть осложнения, такие как боль, воспаление, неправильная установка импланта или необходимость повторной операции. Подобные ситуации могут вызвать у пациента чувство обмана, разочарование и потерю доверия к медицинским специалистам. Психологическая травма в таких случаях проявляется в виде повышенной тревожности, страха перед дальнейшим лечением, стресса и даже отказа от обращения за медицинской помощью в будущем. Особенно остро такие переживания могут восприниматься молодыми пациентами, для которых внешний вид и здоровье зубов имеют большое значение для самооценки и

социальной уверенности. Кроме того, длительное лечение и необходимость исправления ошибок могут вызывать эмоциональное истощение и чувство беспомощности. Пациенты могут испытывать стыд, гнев или разочарование, особенно если процедура оказалась дорогостоящей и не принесла ожидаемого результата. Поэтому крайне важно, чтобы медицинские специалисты соблюдали профессиональную этику, предоставляли пациентам полную и достоверную информацию о процедуре и её возможных последствиях. Повышение прозрачности медицинских услуг, развитие профессионального контроля и информирование пациентов о своих правах могут способствовать снижению подобных ситуаций и защите психологического благополучия пациентов.

Заключение

Психологические и духовные аспекты донорства органов играют ключевую роль в формировании культуры донорства в современном обществе. Решение человека стать донором связано с его мировоззрением, нравственными ценностями и уровнем социальной ответственности. Развитие донорского движения требует комплексного подхода, включающего просветительскую деятельность, развитие системы здравоохранения и поддержку со стороны государства и общественных организаций. Формирование положительного отношения к донорству способствует укреплению гуманистических ценностей общества, развитию культуры взаимопомощи и повышению уровня духовно-нравственного сознания людей. Таким образом, развитие культуры донорства органов является важным фактором гуманизации общества и одним из показателей его духовной зрелости.

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ЛИНГВОКУЛЬТУРНЫЙ АНАЛИЗ КОНЦЕПТА «МАТЬ» В ПОСЛОВИЧНОМ ФОНДЕ РУССКОГО И УЗБЕКСКОГО ЯЗЫКОВ

Хакбердиева С.Ф.

Мавлонкулова Ш.Ш.

СамГУ

Аннотация: *Рассматривается лингвокультурный анализ концепта «мать» в русских и узбекских пословицах. На основе сопоставительного*

анализа выявляются универсальные и национально-специфические особенности отражения материнского образа в двух лингвокультурах. Особое внимание уделяется семантическим полям, раскрывающим такие ценностные аспекты, как забота, самопожертвование, любовь, мудрость и моральный авторитет матери. Проанализированы их семантические структуры, эмоциональная и культурная ёмкость, а также общественные роли, которые они отражают.

Ключевые слова: *концепт, пословицы, лингвокультурный анализ, национально-культурные ценности, паремии, мать, семья, мудрость.*

Abstract: *This article examines the linguacultural analysis of the concept of «mother» in Russian and Uzbek proverbs. A comparative analysis reveals universal and nationally specific ways in which the maternal image is reflected in the two linguacultures. Particular attention is paid to semantic fields that reveal such value aspects as care, self-sacrifice, love, wisdom, and the moral authority of a mother. Their semantic structures, emotional and cultural connotations, and the social roles they reflect are analyzed.*

Keywords: *concept, proverbs, linguocultural analysis, national and cultural values, paremias, mother, family, wisdom.*

В современной лингвистике особое внимание уделяется исследованию языковой картины мира, отражающей культурные, духовные и ценностные ориентиры народа. Одним из наиболее продуктивных направлений таких исследований является лингвокультурология, изучающая взаимосвязь языка, культуры и национального мировосприятия. Особое внимание уделяется изучению важных культурных смыслов. Они вбирают в себя историю и социальный опыт людей, отражаясь в разных словах и выражениях.

Пословицы и поговорки представляют собой особый пласт национального языка, в котором формируются нравственные нормы, жизненный опыт и культурные традиции народа. Они отражают устойчивые представления общества о роли матери в семье и обществе, передают идеалы

материнства, а также формируют систему ценностных ориентиров, передаваемых из поколения в поколение.

В русской и узбекской лингвокультурах образ матери занимает особое место в системе семейных ценностей. Несмотря на общность базовых представлений о материнстве, каждая культура обладает собственными национально-культурными особенностями осмысления данного концепта. Эти особенности проявляются в языковых средствах, метафорических образах и аксиологических характеристиках, закреплённых в паремийном фонде исследуемых языков.

Образ матери традиционно ассоциируется с такими категориями, как любовь, забота, самоотверженность, воспитание и продолжение рода. В языковом сознании народа данный концепт обладает высокой аксиологической значимостью и широко репрезентируется в различных формах народного творчества, прежде всего в пословицах и поговорках.

Исследуемый концепт связан с рядом ассоциаций, значений и ролей в различных культурах и обществах. Вот некоторые аспекты, которые включает в себя концепт «мать» и отражают её основную роль: Биологическая роль: мать в первую очередь ассоциируется с женщиной, которая рожает, воспитывает и растит своих детей. Биологическая связь с ребенком является одним из основных аспектов материнства; Эмоциональная связь: мать-ребенок – это уникальная эмоциональная связь, основанная на любви, заботе и защите. Мать обычно ассоциируется с чувствами нежности, тепла и безусловной поддержки, заботы и защиты; Забота и воспитание: материнская роль включает в себя заботу, воспитание и обучение детей. Мать играет важную роль в формировании личности и характера своих детей; Символическое значение: мать часто воспринимается как символ жизни, плодородия и продолжения рода. Во многих культурах мать уважается и почитается как символ женственности, материнства, заботы и уюта; Социокультурные ожидания: в разных культурах могут существовать

различные социокультурные ожидания от матерей, включая их основную роль в семье, обществе и экономике [1, с.114].

Таким образом, концепт «мать» представляет собой сложное и многогранное понятие, которое включает в себя биологические, эмоциональные, социальные и культурные аспекты.

Русский и узбекский языки имеют свои уникальные особенности в выражении концепта «мать», которые могут отражать культурные, исторические и социальные аспекты обществ, использующих эти языки.

Языковая объективизация концепта «мать» в русском и узбекском языках может проявляться через различные лингвистические признаки, такие как употребление слов и выражений, морфологические особенности, фразеологические обороты, крылатые выражения, пословицы и поговорки и т.д. Например:

Употребление слов и фраз:

Слово «мать» в русском и узбекском языках несет за собой множество значений. Однако, в общем плане, понятие «мать» в русском языке и «она» в узбекском языке относится к женщине, которая родила, воспитала, вырастила и заботилась о своих детях. За этим основным смыслом, это понятие включает в себя также эмоциональные, социальные и культурные аспекты.

В русском языке также существуют фразы и выражения, относящиеся к материнству, например: «*материнская любовь*», «*мать-героиня*», *мать-кормилица*», «*благословенна мати*» и т.д. В узбекском языке также существуют подобные фразы, например: «*она мехри*», «*она дуоси*», «*она – олам фахридир*», «*она билан бола – гул билан лола*», «*она-дарахт, бола-мева*», но они могут иметь свои специфические особенности [4, с. 52].

Приведем еще несколько примеров крылатых выражений: «*Мать-кормилица*», «*Благословенна мати*», «*Мать-героиня,* «*Мать-природа*».

Теперь приведем примеры несколько аналогичных крылатых выражений на узбекском языке: «*Она-ибрат*», «*Оналик овози*», «*Она азиз ва мукаддас*», «*Оналик муънавар*». Все эти фразы и крылатые выражения отражают

различные аспекты материнства и главной роли матери в жизни каждого человека и в обществе [5, с.23].

Фразеологизмы и пословицы:

В русском языке существуют множество фразеологизмов, связанных с важностью и святостью материнства, например: «*Впитать с молоком матери*», «*Мать лучше всякого друга*», «*Материнская молитва со дна моря выносит*», «*При солнышке – тепло, при матери – добро*», «*Мать лучше всякого друга*», «*Птица рада весне, а дитя – матери*» [3, с.48].

В узбекском языке также могут быть свои устойчивые выражения, отражающие отношение к материнству. Например: «*Она дуосин ол*», «*Жаннат, оналар оёғи остида*», «*Онанинг кўнгли болада, боланинг кўнгли далада*», «*Бола – лой, она – кулол*», «*Онанга бошингни хам қил, Отангга гапингни кам қил*», «*Онаниг алласи дунёни тебратар*», «*Боланинг қўли шилинса, онаниг кўнгли шилинади*», «*Она билан бола – гул билан лола*», «*Онангни қуёш билсанг, отангни ой бил*» [4, с.52].

Таким образом, концепт «мать» относится к универсальным концептам в обоих языках, в которых наиболее полно отражаются этноментальные особенности лингвокультурного сообщества. Русская и узбекская культура, как и любая национальная культура, самобытны, что обусловливает наличие в ней собственных представлений об этом феномене, а также средств его выражения и оценки. Концепт, как и поле, образует множество когнитивных признаков, значений, имеющих хотя бы один общий когнитивный признак.

Таким образом, в результате проведенного нами исследования было установлено, что концепт «мать/она» как один из значимых универсальных концептов культуры вызывает в сознании носителей языков разные ассоциации. Анализ концепта по выявлению ядра показал, что образ матери в русском и узбекском языках предстает как пересечение системы ценностей народа и соотносится в первую очередь с жизнью, любовью, заботой и счастьем. Мать в языковом сознании этносов, это самый близкий и родной человек, источник любви и поддержки семьи. Изучение когнитивной

структуры концепта «мать» позволил выявить и некоторые этноспецифичные различия: в русском языке образ матери соотносится с домом, родиной, защитой, поддержкой; в узбекском языке мать является близкой подобно самой душе, олицетворяет родник, источник жизни; а общие черты в обоих языках – мать символ женского начала, семьи, плодородия, семейного очага, поддержки и любви.

Во всех лингвокультурах материнство коннотируется положительно. Мать – это источник тепла, комфорта, защиты, заботы, доброты, любви. В изучении концепта определяются такие признаки, как свойство матери порождать жизнь, оставлять генетический след в детях, жизненно необходимая духовная, физическая и материальная связь матери с ребенком, божественное начало материнской миссии на земле, мать как хранительница семейных традиций. Значения лексемы «мать» раскрываются в определении материнства как состояния женщины-матери; свойственного матери сознания родственной связи с детьми; поведения женщины, направленного на продолжение рода, включающего в себя биологический (вынашивание, рождение, вскармливание ребенка) и социальный (воспитание) аспекты. Концепт «мать» характеризуется соединением различных моделей материнства, включающих: рождение, генетическое отношение, воспитание, брак и генеалогию.

В целом, изучение концепта «мать» является важным для понимания семейных и социокультурных динамик, а также для формирования глубокого и комплексного взгляда на роль женщины в обществе и ее вклад в развитие человеческой цивилизации.

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PEDAGOGY AND MODERN EDUCATIONAL TECHNOLOGIES

OPPORTUNITIES FOR DEVELOPING CHILDREN'S SPEECH THROUGH AUDIOVISUAL MEDIA

Abduvosiyeva Mahmuda Xamidullo qizi
Tashkent Branch of the A.I. Herzen Russian State Pedagogical University
Email: abduvosiyeva96@mail.ru

Abstract: The rapid development of digital technologies has significantly transformed educational practices, particularly in early childhood learning environments. Audiovisual media have become an important pedagogical tool for supporting children's cognitive and linguistic development. The present study examines the potential of audiovisual resources in enhancing children's speech development and communicative competence. The research analyzes how visual and auditory stimuli contribute to vocabulary expansion, pronunciation improvement, and the development of narrative skills among young learners. Using qualitative and analytical research methods, the study reviews existing pedagogical approaches and evaluates the effectiveness of audiovisual tools in educational contexts. The findings indicate that well-structured audiovisual materials can positively influence children's speech abilities by stimulating attention, facilitating comprehension, and encouraging active participation in communication processes. However, the study also emphasizes the need for pedagogical guidance and age-appropriate content to ensure meaningful language acquisition. The results highlight that the integration of audiovisual technologies into educational environments can create interactive learning experiences that significantly enhance children's speech development.

Keywords: *audiovisual media, speech development, early childhood education, digital learning, language acquisition*

INTRODUCTION

Speech development plays a crucial role in children's overall cognitive and social growth. Language is not only a communication tool but also a fundamental mechanism through which children interpret the world, express emotions, and interact with others. In early childhood education, the development of coherent speech, vocabulary richness, and pronunciation accuracy forms the foundation for successful learning in later stages of education. With the advancement of digital technologies, educational environments have undergone significant transformation. Traditional teaching methods are increasingly complemented by multimedia tools that combine visual and auditory information. Audiovisual media, including educational videos, animated stories, interactive presentations, and digital storytelling platforms, have become widely used in modern pedagogical practice. These tools create dynamic learning environments that can stimulate children's curiosity and motivation to communicate. Researchers emphasize that children learn language more effectively when information is presented through multiple sensory channels. Visual images combined with sound help children establish stronger cognitive connections between words and meanings. Audiovisual content also supports contextual learning, allowing children to observe real-life situations, gestures, and emotional expressions that accompany spoken language. Despite the growing popularity of audiovisual resources in education, questions remain regarding their pedagogical effectiveness and appropriate use. Excessive or unstructured exposure to digital media may lead to passive learning and reduced interaction. Therefore, it is important to analyze how audiovisual technologies can be integrated into educational activities in ways that actively support children's speech development.

The purpose of this study is to examine the opportunities and pedagogical potential of audiovisual media in developing children's speech. The research focuses on identifying how audiovisual materials influence vocabulary acquisition, pronunciation, communicative competence, and narrative abilities among young learners.

LITERATURE REVIEW

The role of multimedia technologies in language development has been widely discussed in educational research. Scholars argue that audiovisual tools can significantly improve language learning outcomes by combining images, sound, and text into a single learning environment. According to cognitive multimedia learning theory, individuals process visual and auditory information through separate channels, which allows learners to build more complex mental representations of knowledge. Studies in early childhood education indicate that children respond particularly well to visual narratives and animated storytelling. Educational cartoons and interactive videos help children associate words with actions, objects, and emotions, which strengthens vocabulary retention. Moreover, audiovisual content often models natural speech patterns, pronunciation, and conversational structures that children can imitate. Several researchers have also highlighted the motivational benefits of audiovisual learning. Digital stories, songs, and animated characters capture children's attention and encourage them to participate in verbal communication. When children observe dialogues between characters, they learn conversational strategies such as asking questions, expressing opinions, and describing events. However, scholars also caution against the uncontrolled use of digital media in early education. Passive consumption of media content may limit children's opportunities for active speech practice. For this reason, educators recommend integrating audiovisual materials into interactive classroom activities, such as discussions, role-playing, and storytelling exercises.

The existing literature suggests that audiovisual media can be highly beneficial for speech development when used as part of a structured pedagogical framework. Teachers play a key role in guiding children's interpretation of audiovisual content and encouraging them to express their thoughts verbally.

METHODOLOGY

The research employs a qualitative analytical approach to examine the role of audiovisual media in children's speech development. The study is based on a review

and synthesis of existing pedagogical literature, as well as the analysis of educational practices involving multimedia tools in early childhood education. Several educational resources, including animated learning materials, digital storytelling platforms, and audiovisual language activities, were examined in order to identify their pedagogical features and potential benefits for speech development. Particular attention was given to learning environments where audiovisual media were used to stimulate children's verbal interaction and communication skills.

The analysis focuses on three key aspects of speech development:

1. Vocabulary acquisition
2. Pronunciation and phonetic awareness
3. Narrative and communicative competence

By examining how audiovisual stimuli influence these aspects of language development, the study aims to identify the pedagogical conditions under which multimedia tools can be most effective.

RESULTS

The analysis reveals several important opportunities provided by audiovisual media in supporting children's speech development.

First, audiovisual materials significantly enhance vocabulary learning. Visual representations of objects, actions, and situations help children understand the meanings of new words more easily. When children hear words while simultaneously observing corresponding images, they are able to establish stronger semantic associations. This multimodal learning process contributes to faster vocabulary expansion and better retention of new lexical items.

Second, audiovisual media support pronunciation development. Exposure to spoken language through videos, songs, and animated dialogues allows children to hear correct pronunciation patterns and intonation. Repetition of phrases from audiovisual content encourages imitation and improves phonetic accuracy.

Third, audiovisual storytelling promotes narrative competence. When children watch short stories or animated scenes, they learn to follow sequences of events and understand cause-and-effect relationships. After viewing such content, children can be encouraged to retell the story, describe characters, or express their opinions about the events. These activities help develop coherent speech and logical thinking. Another significant result is the increase in children's motivation to communicate. Audiovisual materials often present information in an engaging and emotionally rich format. Characters, music, and visual effects capture children's attention and create a positive emotional atmosphere that encourages participation in speech activities.

DISCUSSION

The findings of this study support the idea that audiovisual media can play an important role in language development when used appropriately in educational contexts. The combination of visual and auditory stimuli allows children to process linguistic information more effectively and engage actively in learning activities. However, the educational effectiveness of audiovisual tools largely depends on the pedagogical strategies employed by teachers. Simply presenting children with digital content is not sufficient to promote speech development. Teachers must design interactive tasks that encourage children to discuss, interpret, and respond to the audiovisual material. For example, after watching an educational video, children can participate in group discussions, answer comprehension questions, or create their own stories based on the characters they observed. Such activities transform passive viewing into active language practice. Another important consideration is the selection of age-appropriate content. Audiovisual materials should correspond to children's cognitive abilities and linguistic level. Content that is too complex may lead to confusion, while overly simple materials may not stimulate language development.

Therefore, the integration of audiovisual media into early education requires careful planning and methodological support. When implemented within a

structured learning environment, audiovisual technologies can significantly enhance children's speech abilities and communication skills.

CONCLUSION

Audiovisual media represent a powerful educational resource for supporting children's speech development. The combination of visual images and auditory information creates rich learning environments that facilitate vocabulary acquisition, pronunciation improvement, and narrative skills. The study demonstrates that audiovisual tools can stimulate children's motivation to communicate and help them better understand linguistic structures through contextualized learning experiences. At the same time, the effective use of audiovisual media requires pedagogical guidance and interactive teaching strategies.

Future research may focus on empirical studies that examine the long-term impact of audiovisual learning on children's language development. As digital technologies continue to evolve, educators have new opportunities to design innovative learning environments that support children's communicative competence and overall cognitive growth.

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GAMIFICATION AS A TOOL FOR INCREASING STUDENTS MOTIVATION

Alimova Gulnoza Yuldashalievna
Uzbekistan State World Languages University
flowercharmy860210@gmail.com
Zaripov Feruz Husan ugli
Uzbekistan State World Languages University
feruzbek-master@mail.ru

Abstract. This study explores the role of gamification as an innovative pedagogical approach to enhancing student motivation in educational settings. Gamification involves the integration of game elements such as

points, badges, leaderboards, and rewards into the learning process to create a more engaging and interactive environment. The research examines how gamified learning strategies influence students' intrinsic and extrinsic motivation, participation, and overall academic performance. Findings from recent studies indicate that gamification can significantly improve learner engagement, promote active participation, and foster a positive attitude toward learning. However, its effectiveness depends on proper implementation and alignment with educational objectives.

Keywords: *Gamification, Student Motivation, Educational Technology, Engagement, Learning Strategies, Digital Learning, Active Learning*

Introduction

In recent years, the rapid development of educational technologies has led to the emergence of innovative teaching approaches aimed at improving student engagement and motivation. One of the most prominent strategies is gamification, which refers to the application of game-design elements in non-game contexts, particularly in education. By incorporating features such as points, badges, levels, and leaderboards, gamification transforms traditional learning environments into more interactive and stimulating experiences. Student motivation is widely recognized as a crucial factor influencing academic success and learning outcomes. However, many educational systems continue to face challenges related to low student engagement, lack of interest, and passive learning behaviors. Traditional teaching methods often fail to capture learners' attention, especially in digitally oriented environments where students are accustomed to interactive and dynamic content.

Gamification has been proposed as a solution to these challenges by making learning more enjoyable and meaningful. It encourages active participation, fosters competition and collaboration, and provides immediate feedback, which can enhance both intrinsic and extrinsic motivation. Furthermore, gamified learning environments support personalized learning experiences, allowing students to

progress at their own pace while maintaining a sense of achievement. Despite its growing popularity, the effectiveness of gamification in education remains a subject of ongoing research. While some studies report significant improvements in student motivation and performance, others highlight potential limitations, such as overreliance on external rewards and the risk of reducing learning to superficial engagement. Therefore, it is essential to critically examine the role of gamification in education and evaluate its impact on student motivation.

Main Body

Theoretical Foundations of Gamification in Education

Gamification has gained considerable attention as an innovative pedagogical approach aimed at enhancing student motivation and engagement in educational contexts. The concept is generally defined as the application of game design elements, such as points, badges, leaderboards, and challenges, in non-game environments (Deterding et al., 2011). Within education, gamification is grounded in several motivational theories, particularly Self-Determination Theory (SDT), which emphasizes the importance of autonomy, competence, and relatedness in fostering intrinsic motivation (Deci & Ryan, 2000). Gamified learning environments are designed to support these psychological needs by allowing students to make choices, experience progress, and interact with peers in collaborative or competitive settings.

From a pedagogical perspective, gamification aligns closely with constructivist learning theories, which emphasize active participation and learner-centered approaches. By incorporating interactive tasks and immediate feedback, gamification encourages students to engage in meaningful learning experiences rather than passive knowledge reception. According to Hamari et al. (2014), gamification has the potential to positively influence user activity, engagement, and motivation, particularly when it is carefully aligned with learning objectives.

Gamification and Student Motivation

Student motivation is widely recognized as a key determinant of academic success, influencing learners' persistence, effort, and overall performance. In traditional educational settings, maintaining high levels of motivation remains a challenge, especially among digitally oriented learners who are accustomed to interactive technologies. Gamification addresses this issue by introducing elements of play and competition into the learning process. Research indicates that gamified systems can significantly enhance both intrinsic and extrinsic motivation. Intrinsic motivation refers to engagement driven by internal satisfaction, while extrinsic motivation is influenced by external rewards (Ryan & Deci, 2000). Gamification effectively combines both types by offering rewards such as points and badges while also creating enjoyable and immersive learning experiences. For example, a study by Sailer et al. (2017) found that gamified learning environments increased students' intrinsic motivation by providing clear goals, immediate feedback, and a sense of achievement. Furthermore, gamification fosters a sense of progression and accomplishment, which can motivate students to continue learning. Leaderboards and achievement systems create a competitive environment that encourages learners to improve their performance. However, competition must be carefully managed to avoid negative effects, such as anxiety or decreased motivation among lower-performing students (Hanus & Fox, 2015).

Impact of Gamification on Student Engagement

Engagement is another critical factor influenced by gamification. It encompasses behavioral, emotional, and cognitive dimensions of learning. Gamified environments often increase behavioral engagement by encouraging active participation in tasks and activities. Emotional engagement is enhanced through enjoyment and interest, while cognitive engagement is supported by problem-solving and critical thinking activities embedded in game-like scenarios. Recent studies have demonstrated that gamification can significantly improve student engagement in both online and face-to-face learning environments. For instance, Huang and Hew (2018) found that gamified elements such as progress bars and

reward systems increased students' participation and sustained their interest in learning tasks. Similarly, Zainuddin et al. (2020) reported that gamification positively influenced student engagement in higher education by promoting interaction and collaboration.

In addition, gamification supports personalized learning experiences by adapting tasks to individual learner needs. Adaptive gamified systems can provide customized challenges and feedback, enabling students to progress at their own pace. This flexibility enhances engagement by ensuring that learning activities are neither too easy nor too difficult, thereby maintaining an optimal level of challenge.

Gamification and Learning Outcomes

Beyond motivation and engagement, gamification has also been linked to improvements in academic performance and learning outcomes. By encouraging repeated practice and providing immediate feedback, gamified systems help reinforce knowledge and develop skills more effectively. According to Buckley and Doyle (2017), gamification can lead to improved academic achievement when it is integrated with clear instructional objectives and meaningful learning tasks. Moreover, gamification promotes the development of higher-order thinking skills, such as problem-solving, decision-making, and critical thinking. Game-based tasks often require learners to analyze information, make strategic choices, and apply knowledge in realistic contexts. These skills are essential for success in modern education and the workforce. However, the effectiveness of gamification depends largely on its design and implementation. Poorly designed gamified systems that focus solely on rewards may lead to superficial learning and reduce intrinsic motivation over time (Hanus & Fox, 2015). Therefore, it is important to balance game elements with pedagogical principles to ensure meaningful learning experiences.

Challenges and Limitations of Gamification

Despite its numerous benefits, gamification also presents several challenges that must be considered. One major concern is the potential overreliance on extrinsic

rewards, which may undermine intrinsic motivation if not carefully managed. When students focus primarily on earning points or badges, they may lose interest in the learning process itself. Another challenge is the variability in student preferences and learning styles. Not all learners respond positively to gamified environments, and some may find competitive elements stressful or demotivating. Additionally, the effectiveness of gamification may vary depending on factors such as age, subject area, and cultural context (Toda et al., 2019). Technical and practical limitations also exist. Implementing gamification requires access to digital tools, teacher training, and time for designing appropriate activities. Without adequate support, educators may struggle to integrate gamification effectively into their teaching practices.

Recent Trends and Future Directions

Recent research has explored the integration of gamification with emerging technologies such as artificial intelligence (AI), virtual reality (VR), and adaptive learning systems. These technologies enhance the effectiveness of gamification by providing more personalized and immersive learning experiences. For example, AI-driven gamified platforms can analyze student performance and adjust tasks in real time, offering tailored feedback and challenges (Zawacki-Richter et al., 2019). Furthermore, the COVID-19 pandemic accelerated the adoption of digital learning technologies, highlighting the importance of engaging online learning environments. Gamification has become a key strategy for maintaining student motivation in remote and hybrid learning contexts. Future research should focus on long-term effects of gamification, its impact across different educational contexts, and the development of evidence-based design principles. Understanding how to optimize gamification for diverse learners will be crucial for its continued success in modern education.

Conclusion

In conclusion, gamification represents a powerful and innovative pedagogical approach that has the potential to significantly enhance student motivation and engagement in educational settings. By integrating game design elements such as

points, badges, leaderboards, and interactive challenges into the learning process, educators can create more dynamic and stimulating learning environments that encourage active participation and sustained interest. The findings discussed in this study suggest that gamification can positively influence both intrinsic and extrinsic motivation, foster learner autonomy, and promote meaningful engagement with educational content. However, the effectiveness of gamification largely depends on its thoughtful design and alignment with pedagogical objectives. While gamified systems can provide immediate feedback, personalized learning experiences, and opportunities for collaboration, an excessive reliance on external rewards may lead to superficial learning and diminish intrinsic motivation over time. Therefore, it is essential to strike a balance between motivational elements and educational value to ensure that learning remains the primary focus. Furthermore, the integration of gamification into education requires adequate teacher training, technological infrastructure, and consideration of individual learner differences. Not all students respond equally to gamified approaches, and factors such as cultural context, learning preferences, and subject matter must be taken into account.

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MAHMUDXO‘JA BEHBUDIYNING ”PADARKUSH ” ASARI: DRAMATIK OBRAZLAR ORQALI TARBIYA

Almuratova Gulbaxor Mansur qizi

JDPU

Annotatsiya: *Mazkur maqola Behbudiyning “Padarkush” dramasidagi tarbiya va ma’rifat masalalarini tahlil qiladi. Asardagi dramatik obrazlar orqali nodonlik, jaholat va tarbiyasizlikning oqibatlari ko‘rsatiladi hamda ijtimoiy va axloqiy xulosalar chiqariladi.*

Kalit so‘zlar: *Padarkush, Behbudiy, drama, tarbiya, ma’rifat, nodonlik, axloq*

Аннотация: *В данной статье анализируются вопросы воспитания и просвещения в драме Mahmudxo‘ja Behbudiy «Padarkush». Через драматические образы произведения показаны последствия невежества, тьмы и отсутствия воспитания, а также сделаны социальные и нравственные выводы.*

Ключевые слова: *Padarkush, Behbudiy, драма, воспитание, просвещение, невежество, нравственность.*

Annotation: *This article analyzes the issues of education and enlightenment in the drama Padarkush by Mahmudxo‘ja Behbudiy. Through the dramatic characters of the work, the consequences of ignorance, backwardness, and lack of proper upbringing are revealed, and social as well as moral conclusions are drawn.*

Keywords: *Padarkush, Behbudiy, drama, education, enlightenment, ignorance, morality.*

”Dunyoda turmoq uchun dunyoviy fan va ilm lozimdur,
zamona ilmi va fanidan bebahra millat boshqalarga poymol bo‘lur.”
Mahmudxo‘ja Behbudiy

XX asr bo‘sag‘asida Turkiston ijtimoiy-siyosiy hayotida millat taqdiri uchun qayg‘uruvchi ma’rifatparvar ziyolilar maydonga chiqdi. Ana shunday tarixiy sharoitda xalqni butunlay yo‘q bo‘lib ketish, Vatanni esa mustamlaka zulmi ostida qolib ketish xavfidan asrab qolish, avlodlarni erk, ozodlik va mustaqillik ruhida tarbiyalash vazifasi jadidlar nomi bilan tarixga kirgan fidoyi ziyolilar zimmasiga tushdi. Shu ma’rifatparvarlar safida Mahmudxo‘ja Behbudiy alohida o‘rin egallaydi. U millat taraqqiyoti yo‘lida xizmat qilgan eng yetuk jadid namoyandalaridan biri bo‘lib, ma’rifat orqali jamiyatni yangilash g‘oyasini ilgari surdi. Behbudiy o‘sha davr sharoitida millatni taraqqiyot sari yetaklash uchun faqat maktab ochishning o‘zi yetarli emasligini chuqur anglagan edi. Uning fikricha, xalq zamon va dunyo voqealaridan xabardor bo‘lishi, millat va Vatan taqdiri, jamiyat hayotidagi muammolar haqida muntazam ravishda ogoh bo‘lib borishi zarur edi. Shuning uchun ham u millat hayotini aks ettiruvchi, uning yutuq va kamchiliklarini ko‘rsatib bera oladigan ma’naviy “oyna” zarurligini ta’kidlagan.

Ana shu ehtiyoj va zarurat Behbudiyni matbuot va teatr sohasiga yuzlanishga undadi. Natijada uning mashhur “Padarkush” dramasi dunyoga keldi. Ushbu asar 1911-yilda yozilgan bo‘lib, o‘zbek dramaturgiyasining ilk namunalaridan biri sifatida e’tirof etiladi.

“Padarkush” asari jaholat va nodonlikning fojeali oqibatlarini badiiy ifoda etadi. Asarda o‘qimagan, tarbiya ko‘rmagan yoshlarning yomon yo‘lga kirib ketishi va bu holat nafaqat o‘zlari, balki ota-ona va jamiyat uchun ham qanday fojialarga olib kelishi tasvirlangan. Asar syujetida boyning Toshmurod ismli o‘g‘li tasvirlangan. Boy o‘g‘lini o‘qitishga e’tibor bermaydi, atrofdagilarning nasihatlariga ham quloq solmaydi. Natijada Toshmurod tarbiya va ma’rifatdan yiroq holda ko‘cha bezorilari ta’siriga tushib qoladi. Maishatga berilib ketgan yigit bir kuni sheriklari bilan o‘z uyiga bostirib kiradi. Ularni sezib qolgan otasi esa shu jarayonda o‘ldiriladi va uyidagi pul talon-taroj qilinadi. Asarning g‘oyaviy mazmuni shundan iboratki, jaholat va nodonlik nafaqat bir insonning, balki butun bir oilaning fojeasiga sabab bo‘lishi mumkin. Behbudiy bu orqali jamiyatni o‘ylantiruvchi muhim savolni

o‘rtaga tashlaydi: agar butun millat shu ahvolga tushsa, uning taqdiri qanday bo‘ladi?

Shu o‘rinda aytish kerakki, o‘sha davrda yaratilgan boshqa dramalar Behbudiyning «Padarkush»i kabi muvaffaqiyatli chiqmagan. Asar dialoglaridagi ayrim detallar muallif fikrini ifodalashda kalit vazifasini bajaradi. Bir lahzada hamma narsasidan mahrum bo‘lgan, eri o‘ldirilgan ayol shunday baqirib, dod soladi: «He juvonmarg Toshmurod! Qon qus! Koshki chechakda ketsayding! Voy, padarkush!” Aynan shu daqiqada Domulla Boyning xotiniga tanbeh beradi: «Bu badbaxtlik va musibatga sabab jaholat va nodonlikdir, bema’nilik va tarbiyasizlikdir. Uyingizni nodonlik buzdi…”[1,49] drama nafaqat ijtimoiy fojiani tasvirlaydi, balki har bir insonning tarbiya va axloqiy mas’uliyatini yorituvchi vosita sifatida xizmat qiladi. Bugungi kunda ham ushbu asar yosh avlodni axloqiy qadriyatlar, o‘zlikni anglash va jamiyat oldidagi mas’uliyatga o‘rgatishda dolzarb ahamiyatga ega. Shu tariqa dramaturg ma’rifat, ta’lim va tarbiyaning millat ravnaqi uchun naqadar muhim ekanini chuqur badiiy talqin orqali ko‘rsatib beradi. Muallif Mahmudxo‘ja Behbudiy har bir qahramon orqali jamiyat va shaxsiy hayotdagi tarbiyaviy muammolarni ochib beradi. Bu obrazlar talabalarga nafaqat adabiy tahlil, balki ma’naviy-axloqiy xulosalar chiqarish imkonini beradi.

Boy ota – beparvolik va mas’uliyatsizlik timsoli: Asardagi boy ota qahramoni farzand tarbiyasiga befarq bo‘lishi, ularni ilm va ma’rifatdan uzoqlashtirish orqali jamiyatga zarar yetkazishini ko‘rsatgan. Bu obraz orqali talabalarga ota-onaning tarbiyadagi mas’uliyati va farzandning shakllanishida oilaning roli tushuntirilgan. Ota-ona tarbiyasining yetishmasligi yoshlarni noto‘g‘ri yo‘lga solishi dramatik tarzda namoyon etilgan.

Farzand – noto‘g‘ri tarbiya natijasi: Farzand obrazida tarbiyasiz va ma’rifatsiz o‘sgan yoshning xulq-atvori, qarorlari va hayotdagi muammolari aks etgan. Bu timsol orqali talaba yoshlar tarbiya va ilm olishning ahamiyatini ko‘radi, shuningdek, shaxsiy mas’uliyatni anglashga o‘rganadi.

Ziyoli va ma’rifatparvar obrazlar – ilm va axloq timsoli: Drama qahramonlaridan ziyoli va ma’rifatparvarlar – ilmli o‘qituvchi yoki maslahat

beruvchi shaxslar – yoshlarni to‘g‘ri yo‘lga yo‘naltirish, axloqiy qadriyatlarni singdirish vazifasini bajargan. Shu orqali talabalarga ilm va ma’rifatning hayotdagi rolini amaliy misollar orqali tushuntirish mumkin.

Jamiyat va muhit timsoli: Asardagi jamiyat muhitining o‘zi ham tarbiyaviy ta’sir ko‘rsatadi. Jaholat, befarqlik, noto‘g‘ri odatlar tarbiyaviy muhitning salbiy tomonlarini ochib bergan. Talabalar drama orqali muhit va tarbiyaning o‘zaro bog‘liqligini tushunadi [2,136]. Shu tarzda, “Padarkush” dramasidagi obrazlar orqali tarbiya masalalari bir necha darajada yoritilgan: ota-ona va farzand munosabatlari, ilm va ma’rifat ahamiyati, axloqiy qadriyatlarni shakllantirish va jamiyat ta’siri. Drama talabalarga shaxsiy va jamiyat oldidagi mas’uliyatni anglashi, axloqiy tanlovlar qilish va to‘g‘ri xulq-atvorni egallash uchun namuna sifatida xizmat qiladi.

1.Talabalarda milliy tarbiya tushunchasini shakllantirish: Dramada ota-ona va farzand munosabatlari, tarbiyaning to‘g‘ri yoki noto‘g‘ri bo‘lishi inson hayotiga qanday ta’sir ko‘rsatishi ochib berilgan. Bu jihatlar talabalarda milliy tarbiya, ma’naviy mas’uliyat va axloqiy qadriyatlar haqida chuqur tasavvur hosil qilishga yordam beradi. Shu sababli asarni tahlil qilish jarayonida talabalarga oila, jamiyat va muhitning tarbiyadagi o‘rni haqida tushuntirish mumkin.

2. Ma’rifatparvarlik g‘oyalarini anglash: Asarda jaholat va ma’rifat o‘rtasidagi qarama-qarshilik aniq ko‘rsatilgan. Bu orqali talabalar jadid ma’rifatparvarlarining asosiy g‘oyasi – ilm va ma’rifat orqali jamiyatni rivojlantirish g‘oyasini anglaydilar. Shu jihatdan asarni o‘rganish jadidchilik pedagogikasini tushuntirishda samarali vosita bo‘lib xizmat qiladi.

3. Tanqidiy fikrlash va tahlil ko‘nikmalarini rivojlantirish: Drama voqealari talabalarga turli pedagogik va ijtimoiy masalalarni muhokama qilish imkonini beradi. Masalan, asardagi voqealarni tahlil qilish, qahramonlarning xatti-harakatlarini baholash, ularning qarorlariga munosabat bildirish orqali talabalarda tanqidiy fikrlash, muammoli vaziyatlarni tahlil qilish va xulosa chiqarish ko‘nikmalari rivojlanadi.

4. Ma’naviy-axloqiy tarbiyani kuchaytirish. Asarda tasvirlangan fojiaviy voqealar yoshlarni noto‘g‘ri yo‘ldan qaytarish, ularni mas’uliyatli hayotga undashga xizmat qiladi. Shu sababli drama talabalarda axloqiy qadriyatlar, ota-ona hurmati, jamiyat oldidagi burchni anglash kabi fazilatlarni shakllantirishda muhim ahamiyatga ega.

5. Zamonaviy pedagogik metodlar bilan o‘rganish imkoniyati. Bugungi ta’lim jarayonida ushbu asarni turli interfaol metodlar orqali o‘rganish mumkin. Masalan, “Qarorlar shajarasi”, “Munozara”, “Rol o‘ynash”, “Muammoli vaziyat tahlili” kabi metodlar yordamida talabalar asardagi voqealarni chuqur tahlil qilishlari va tarbiyaviy xulosalar chiqarishlari mumkin.

Padarkush dramasi bugungi ta’lim jarayonida muhim ma’naviy-tarbiyaviy va pedagogik ahamiyatga ega asarlardan biri hisoblanadi. Ushbu asar orqali yosh avlodni milliy qadriyatlar, ma’rifatparvarlik g‘oyalari hamda mas’uliyatli hayot tarziga yo‘naltirish mumkin. Asar muallifi Mahmudxo‘ja Behbudiy jamiyat taraqqiyotida tarbiyaning hal qiluvchi o‘rni borligini badiiy obrazlar orqali ko‘rsatib bergan.

Xulosa sifatida shuni ko‘rsatish kerakki, jadidlar jamiyatni rivojlantirish omili bininchi navbatda ma’rifatga, ta’lim- tarbiyaga bog’liq ekanligini yaxshi anglab yetgan. Shu tufayli ”Padarkush” dramasida yoritilgan hayotiy muommo eng dolzarb masala sifatida kuyunchaklik bilan ko’rsatilgan. “Padarkush” dramasi nafaqat adabiy asar, balki milliy tarbiya va ma’rifat g‘oyalarini targ‘ib qiluvchi muhim pedagogik manba hisoblanadi.

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KIMYO FANINI O'QITISHDA FIZIKA QONUNLARINING SAMARADORLIGI

Aytjanova Urazgul Xasan qizi

Chirchiq Davlat Pedagogika Universiteti

aytjanova.1217@gmail.com

Annotatsiya: *Ushbu maqolada kimyo fanini o'qitishda fizika qonunlarining ahamiyati va samaradorligi tahlil qilinadi. Fizika va kimyo o'rtasidagi o'zaro bog'liqlik, o'quv jarayonida fizika qonunlaridan foydalanish usullari ko'rib chiqiladi.*

Kalit so’zlar: *kimyo, fizika, o'qitish, samaradorlik, ta'lim.*

Аннотация: *В данной статье анализируется значимость и эффективность законов физики при преподавании химии. Рассматриваются взаимосвязь между физикой и химией, а также способы использования физических законов в образовательном процессе.*

Ключевые слова: *Химия, физика, преподавание, эффективность, образование.*

Abstract: *This article analyzes the importance and effectiveness of physics laws in teaching chemistry. The interrelation between physics and chemistry, as well as methods of applying physics laws in the learning process, are examined.*

Keywords: *Chemistry, physics, teaching, effectiveness, education.*

Kirish

Kimyo va fizika fanlari, tabiiy fanlar sohasida, bir-biri bilan chuqur bog'liq bo'lgan ikki muhim yo'nalishdir. Ularning o'zaro aloqasi, ilm-fan va texnologiyaning rivojlanishida muhim rol o'ynaydi. Kimyo, moddalar va ularning o'zaro ta'sirlarini o'rganish bilan shug'ullanadi, fizikada esa moddalar va energiya o'rtasidagi munosabatlar, shuningdek, tabiiy qonuniyatlar tadqiq qilinadi. Ushbu ikki fan o'rtasidagi bog'liqlik, ko'plab ilmiy tadqiqotlar va amaliyotlarda namoyon bo'ladi, masalan, kimyoviy reaksiyalarni fizik qonunlar yordamida tushuntirish yoki fizik hodisalarni kimyoviy jarayonlar orqali aniqlash mumkin. Bu o'zaro bog'liqlik, ilm-fanning kompleks tabiati va ko'p qirrali yondashuvni ta'minlaydi. Maqolaning maqsadi, kimyo va fizika fanlari o'rtasidagi o'zaro bog'liqlikni chuqur o'rganish va bu aloqaning ilmiy va amaliy ahamiyatini belgilashdir. Kimyo va fizika o'rtasidagi munosabatlar, ko'plab ilmiy kashfiyotlar va innovatsiyalarni keltirib chiqargan. Misol uchun, kimyoviy termodinamika, kimyoviy jarayonlarning energetik jihatlarini fizik qonunlar yordamida tahlil qilishni ta'minlaydi. Shuningdek, fizik kimyo fani, kimyoviy jarayonlarni fizik qonunlar orqali tushuntirishga qaratilgan bo'lib, bu borada molekulalararo kuchlar, termodinamik jarayonlar va kimyoviy dinamikalar o'rganiladi. Bunday yondashuvlar, kimyoviy moddalarning xususiyatlarini, ularning o'zaro ta'sirini va reaktsiyalarning mexanikasini chuqur tushunishga imkon beradi. Shu bilan birga, kimyo va fizika fanlari o'rtasidagi bog'liqlik, ilmiy tadqiqotlar va texnologik innovatsiyalarni rivojlantirishda muhim ahamiyatga ega. Kimyoviy materiallar va ularning fizik xususiyatlari o'rtasidagi bog'liqlik, yangi materiallar ishlab chiqarish va ularning qo'llanilishi uchun asos bo'lib xizmat qiladi. Misol uchun, nanomateriallar, kimyo va fizikaning birgalikda ishlashi natijasida yaratilgan yangi materiallardir.

Nanoteknologiyalar, materiallarning fizik va kimyoviy xususiyatlarini o'zgartirish orqali, yangi imkoniyatlar va qo'llanilish sohalarini ochadi. Shunday qilib, kimyo va fizika fanlari o'rtasidagi o'zaro bog'liqlik, ilmiy tadqiqotlar va zamonaviy texnologiyalarni rivojlantirishda muhim omil hisoblanadi. Ushbu maqola, bu bog'liqlikni yanada chuqurroq o'rganish va uning ahamiyatini ta'kidlaydi. O'rganilgan bilimlar, kelajakdagi ilmiy tadqiqotlar va amaliyotlarda yangi yondashuvlar va innovatsiyalarni keltirib chiqarishi mumkin. Natijada, kimyo va fizikaning o'zaro aloqasini chuqur tushunish, ilm-fanning rivojlanishi va insoniyatning turli sohalarida muvaffaqiyatli ishlashiga yordam beradi. Bu esa, o'z navbatida, global muammolarni hal qilishda va barqaror rivojlanishda muhim ahamiyatga ega bo'ladi. Kimyo va fizika fanlari o'rtasidagi o'zaro bog'liqlik, ilm-fan va texnologiyaning rivojlanishida muhim rol o'ynaydi. Kimyo, moddalarning tuzilishi, xususiyatlari va o'zaro ta'sirlarini o'rganish orqali, fizika bilan birgalikda ko'plab ilmiy va amaliy masalalarni hal etishda yordam beradi. Fizika esa, materiyaning asosiy qonunlarini va energiyaning harakatini o'rganish orqali, kimyoviy jarayonlarning asosiy mexanizmlarini tushunishga imkon yaratadi. Shunday qilib, ushbu ikki fan o'rtasidagi o'zaro bog'liqlik, ilmiy tadqiqotlarda yangi kashfiyotlar va texnologik innovatsiyalarni yuzaga keltirishga xizmat qiladi. Maqolaning maqsadi, kimyo va fizika o'rtasidagi bog'liqlikni tahlil qilish va ularning birgalikdagi ta'sirini ko'rsatishdir. Bu o'zaro aloqalarni o'rganish, nafaqat ilmiy nazariyalarni yanada rivojlantirishga, balki amaliyotda qo'llaniladigan yangi echimlarni ishlab chiqishga ham imkon beradi. Bunday yondashuv, o'z navbatida, muammolarni hal qilishda va barqaror rivojlanishga erishishda ilm-fan va texnologiyaning ahamiyatini oshiradi. Shuning uchun, kimyo va fizika fanlari o'rtasidagi integratsiya, zamonaviy ilmiy tadqiqotlar va innovatsiyalar uchun muhim asos bo'lib xizmat qiladi. Kimyo va fizika fanlari o'rtasidagi o'zaro bog'liqlik ilmiy tadqiqotlar va amaliyotda muhim rol o'ynaydi. Ushbu maqolaning maqsadi, ushbu ikki fanning o'zaro ta'sirini, ularning nazariy va amaliy jihatlarini tahlil qilishdir. Kimyo va fizikaning integratsiyasi, yangi texnologiyalar va materiallar yaratishda, shuningdek, tabiiy jarayonlarni tushunishda muhim ahamiyatga ega. Bu yondashuv,

ilm-fanning rivojlanishi va ijtimoiy ehtiyojlarga javob berish borasida katta imkoniyatlar yaratadi.

Fizika qonunlari va kimyo o'rtasidagi bog'liqlik

Fizika qonunlari va kimyo o'rtasidagi bog'liqlik ilm-fanning ikkita asosiy sohasini birlashtiradi, bu esa ko'plab jarayonlarni tushunishda muhim rol o'ynaydi. Fizika, moddiy dunyoning asosiy qonuniyatlarini o'rganadigan fan sifatida, kimyo jarayonlarining asosiy mexanizmlarini tushunishga yordam beradi. Masalan, termodinamika, energiyaning o'tishi va transformatsiyalari haqidagi qonunlarni o'z ichiga oladi va bu kimyoviy reaksiyalarni tushunishda muhim ahamiyatga ega. Termodinamik qonunlar, masalan, energiyaning saqlanishi va entropiya tushunchalari, kimyoviy reaksiyalarning yo'nalishini va tezligini belgilaydi. Reaksiyalarning entropik va entalpik xususiyatlarini o'rganish, kimyoviy muvozanatni va energetik jihatdan qulay shartlarni aniqlashda yordam beradi. Shuningdek, kimyoviy kinetika ham fizika qonunlariga asoslanadi. Kinetika, kimyoviy reaksiyalarning tezligini va mexanizmlarini o'rganadi, bu esa zarralarning to'qnashuvlari va energiya almashinuvi bilan bog'liq. Fizikada zarralarning harakati va ularning energiyasi bilan bog'liq qonunlar kimyoviy kinetikaning asosiy tamoyillarini belgilaydi. Masalan, to'qnashuv nazariyasi, zarralarning harakat energiyasi va to'qnashuv burchaklari bilan bog'liq bo'lib, kimyoviy reaktsiyalarning tezligi va mexanizmini aniqlashda muhim ahamiyatga ega. Bu jarayonlar orqali kimyoviy reaksiyalarni tezlashtirish yoki sekinlashtirish mumkin, bu esa sanoatda va laboratoriya sharoitlarida mahsulotlarni olish jarayonlarini optimallashtirish imkonini beradi.Fizika va kimyoning o'zaro ta'siri, shuningdek, materiallar ilmida ham o'z aksini topadi. Moddalar va ularning xususiyatlari, fizikaning mexanik, elektr va termodinamik qonunlari bilan bog'liqdir. Masalan, materiallarning issiqlik o'tkazuvchanligi va kuchlanishi, ularning kimyoviy xususiyatlarini belgilovchi asosiy omillardir. Kimyoviy reaksiyalar davomida energiya o'zgarishlari, materiallarning fizikaviy xususiyatlariga ta'sir qiladi va bu jarayonlarni boshqarish uchun fizika qonunlaridan foydalanish zarur. Fizika va kimyo o'rtasidagi bog'liqlik,

shuningdek, yangi texnologiyalar va innovatsion materiallar yaratishda ham muhimdir. Nanotexnologiya, masalan, fizikaviy va kimyoviy xususiyatlarni birlashtirish orqali yangi materiallar ishlab chiqarishga imkon beradi. Bu materiallar ko'plab sohalarda, jumladan, elektronika, energetika va tibbiyotda qo'llanilishi mumkin.

Umuman olganda, fizika qonunlari va kimyo o'rtasidagi o'zaro ta'sirlar, ilm-fanning rivojlanishi va yangi bilimlarni kashf etishda muhim rol o'ynaydi. Bu bog'liqlik, shuningdek, tabiatdagi murakkab jarayonlarni tushunishga yordam beradi va insoniyatning turli ehtiyojlariga javob beradigan yangi yechimlar ishlab chiqishga imkon beradi. Shunday qilib, fizika va kimyo o'rtasidagi o'zaro bog'liqlik, ilmiy tadqiqotlar va amaliyotda muhim ahamiyatga ega. Fizika qonunlari va kimyo o'rtasidagi bog'liqlik, ilm-fan va texnologiya rivojida muhim o'rin tutadi. Fizika, asosan, materiyaning harakati va energiya almashinuvi bilan shug'ullansa, kimyo esa moddalararo o'zaro ta'sir va reaksiyalarni o'rganadi. Termodinamikada, masalan, entropiya va energiya saqlanishi qonunlari kimyoviy reaksiyalarning natijalarini tushunishda muhim ahamiyatga ega. Kimyoviy jarayonlar davomida energiya o'zgarishlari kuzatiladi va bu jarayonlar termodinamik qonunlar bilan bog'liqdir. Shuningdek, kinetika, ya'ni kimyoviy reaksiyalar tezligini o'rganish, molekulalararo to'qnashuvlar va energiya almashinuvi jarayonlarini fizika qonunlari asosida tahlil qiladi. Molekulalarning harakatlari va energiya darajalari, kimyoviy reaksiyalarning tezligi va yo'nalishini belgilovchi asosiy omillar hisoblanadi. Bu o'zaro ta'sirlar, ilmiy tadqiqotlar orqali yangi materiallar va texnologiyalarni yaratishda yordam beradi. Shunday qilib, fizika va kimyo o'rtasidagi bog'liqlik nafaqat nazariy, balki amaliy jihatdan ham muhim ahamiyatga ega, chunki u yangi ilmiy yutuqlar va innovatsiyalarni keltirib chiqarishi mumkin. Fizika qonunlari kimyo jarayonlarini chuqur ta'sir qiladi, ayniqsa termodinamika va kinetika sohalarida. Termodinamikada energiya saqlanishi va o'zgarishi kimyoviy reaktsiyalar davomida muhim rol o'ynaydi. Kinetika esa reaktsiya tezligini va mexanizmini o'rganadi, bu esa molekulalararo to'qnashuvlar va energiya almashinuvi bilan bog'liq. Shu tarzda, fizika va kimyo o'rtasidagi o'zaro bog'liqlik yangi nazariyalar va tajribalar orqali

ilmiy bilishimizni kengaytiradi, shuningdek, amaliy qo'llanmalarda inqilobiy o'zgarishlarni keltirib chiqaradi.

O'qitishda fizika qonunlaridan foydalanish

O'qitishda fizika qonunlaridan foydalanish, ayniqsa kimyo fanida, o'quv jarayonini yanada samarali va qiziqarli qilishga yordam beradi. Fizika qonunlari, masalan, energiyaning saqlanishi, harakat qonunlari va issiqlik o'tkazuvchanligi, kimyo reaksiyalarining mexanizmini tushunishda muhim rol o'ynaydi. Kimyo jarayonlarini o'rganish jarayonida fizika asoslarini bilish, o'quvchilarga atomlar va molekulalararo o'zaro ta'sirlarni yanada chuqurroq anglash imkonini beradi. O'qituvchilar fizika qonunlarini kimyo kontekstida qo'llash orqali o'quvchilarga molekulalararo kuchlar, reaksiya mexanizmlari va energetika masalalarini yanada osonroq tushuntirishlari mumkin. Masalan, energiyaning saqlanish qonuni kimyo reaktsiyalarini o'rganishda juda muhimdir. O'quvchilar kimyoviy energetika va reaktsiya mexanizmlarini tushunishlari uchun, energiya almashinuvi va uning saqlanishi haqida ma'lumot berish zarur. Bunday tushunchalar fizika qonunlari bilan bog'liq bo'lib, o'quvchilarga o'zaro bog'liqlikni ko'rsatadi. O'qituvchilar energiya almashinuvi jarayonlarini fizikaviy misollar bilan tushuntirish orqali o'quvchilarning qiziqishini oshirishlari mumkin. Masalan, issiqlik energiyasining kimyoviy reaktsiyalardagi o'rni haqida gapirganda, o'quvchilarga issiqlik o'tkazuvchanligi va energiya ko'chirish jarayonlarini ko'rsatish orqali kimyoviy jarayonlar haqida chuqurroq tushuncha berish mumkin. Bundan tashqari, fizika qonunlari yordamida o'quvchilarga molekulalararo kuchlar va ularning kimyoviy reaksiyalarni qanday ta'sir qilishini o'rgatish juda muhimdir. O'quvchilar uchun kuchlarning ta'siri, masalan, Van der Waals kuchlari, ion kuchlari va kovalent bog'lanishlar haqida ma'lumot berish, ularning kimyo fanidagi tushunchalarini mustahkamlashga yordam beradi. Fizika asosidagi tushunchalar orqali, o'quvchilar molekulalararo o'zaro ta'sirlarni aniqroq ko'rishlari va kimyoviy jarayonlarni yanada yaxshi tushunishlari mumkin. Shuningdek, fizika qonunlari yordamida kimyoviy reaksiyalarni laboratoriya sharoitida o'rganishda ham muhim ahamiyatga ega.

O'qituvchilar kimyo tajribalarida fizikaviy asboblar, masalan, termometrlar, manometrlar va boshqa o'lchov uskunalaridan foydalanish orqali, o'quvchilarga tajriba natijalarini qanday tahlil qilish va tushuntirishni o'rgatishlari mumkin. Bu jarayon o'quvchilarga nazariy bilimlarni amaliy faoliyat bilan bog'lash imkonini beradi, bu esa ularning o'qitish jarayonida faolligini oshiradi. O'qitishda fizika qonunlaridan foydalanish, shuningdek, o'quvchilarning analitik fikrlash qobiliyatini rivojlantirishga yordam beradi. O'quvchilar fizika va kimyo o'rtasidagi o'zaro ta'sirlarni o'rganish orqali, muammolarni hal qilish va yangi g'oyalarni ishlab chiqish qobiliyatlarini oshiradilar. Natijada, fizika qonunlarini kimyo darslarida qo'llash, o'quvchilarning bilim darajasini oshirish va ilmiy tafakkurlarini rivojlantirish uchun samarali usuldir. Bunday yondashuv, kimyo fani o'qituvchilarining o'quv jarayonini yanada qiziqarli va samarali qilish imkoniyatlarini kengaytiradi. O'qitishda fizika qonunlaridan foydalanish, o'quvchilarning kimyo tushunchalarini yaxshilashda muhim rol o'ynaydi. Fizika va kimyo o'rtasidagi o'zaro bog'liqlik, ko'plab kimyoviy jarayonlar va hodisalar fizika qonunlari asosida tushuntirilishi mumkinligini ko'rsatadi. Masalan, gaz qonunlari, issiqlik o'tkazuvchanligi va kimyoviy kinetika kabi mavzular, fizika asoslari bilan bog'liqdir. O'qituvchilar fizika qonunlarini misollar orqali o'quvchilarga tushuntirganlarida, ular kimyoviy reaksiyalar va jarayonlarning mexanizmini yaxshiroq anglashadi. Bu, o'z navbatida, o'quvchilarda ilmiy tafakkur va analitik fikrlash qobiliyatlarini rivojlantiradi. Kimyo darslarida fizika qonunlarini zamonaviy texnologiyalar yordamida ko'rsatish, o'quvchilarning qiziqishini oshiradi va o'z bilimlarini amaliyotda qo'llash imkonini beradi. Shuningdek, fizika qonunlari orqali o'quvchilar kimyoviy jarayonlarning asosiy tamoyillarini aniqroq tushunishlari, ularni sinovlardan o'tkazishlari va o'z bilimlarini mustahkamlashlari mumkin. Shu tariqa, fizika va kimyo o'rtasidagi integratsiya, o'qitish jarayonini yanada samarali va qiziqarli qiladi. O'qitishda fizika qonunlaridan foydalanish, o'quvchilarga kimyo tushunchalarini chuqurroq anglash imkonini beradi. Fizikaning asosiy qonunlari, masalan, energiya saqlanishi va moddaning holatlari, kimyoviy reaksiyalarni tushunishda muhim rol o'ynaydi. O'qituvchilar fizika qonunlarini misol sifatida keltirib, kimyoviy jarayonlarda qo'llanilishi

mumkin bo'lgan amaliyotlarni tashkil etish orqali o'quvchilarning qiziqishini oshirishlari mumkin. Bu yondashuv, o'quvchilarning ilmiy fikrlash qobiliyatlarini rivojlantirib, o'quv jarayonini yanada samarali qiladi.

Amaliy misollar

Kimyo fanida fizika qonunlarini o'qitish jarayonida amaliy misollarni keltirish, o'quvchilarning anglash qobiliyatini oshirishga yordam beradi. Masalan, gazlarning xususiyatlarini o'rganish jarayonida, Boyle qonuni va Charles qonuni kabi fizik qonunlar kimyoviy jarayonlar bilan bog'liq ravishda ko'rsatilishi mumkin. Boyle qonuni, gazning hajmi va bosimi o'rtasidagi munosabatni ifodalaydi, bu esa o'quvchilarga gazlarning siqilishi va kengayishi jarayonlarini tushunishga yordam beradi. Laboratoriya sharoitida o'quvchilar gazlar bilan tajribalar o'tkazish orqali bu qonunlarni amalda ko'rishlari mumkin. Masalan, siqilgan gaz bilan to'ldirilgan shisha idishning bosimini o'lchab, hajm o'zgarishini kuzatish orqali Boyle qonunini amalda tasdiqlash mumkin. Shuningdek, kimyo fanida reaksiya tezligini o'rganish jarayonida fizika qonunlaridan foydalanish muhimdir. O'quvchilar, reaksiya tezligini ta'sir qiluvchi omillarni, masalan, harorat, konsentratsiya va maydonni o'rganish orqali o'z bilimlarini kengaytirishi mumkin. Bu jarayonda Arrhenius qonuni, reaksiya tezligining haroratga bog'liqligini ifodalaydi. Laboratoriyada har xil haroratlarda kimyoviy reaksiyalarni o'tkazish va ularning tezligini o'lchash orqali o'quvchilar bu qonunni amalda qo'llash imkoniyatiga ega bo'lishadi. Ushbu tajriba orqali o'quvchilar haroratning reaksiya tezligiga qanday ta'sir qilishini o'z ko'zlari bilan ko'rishadi, bu esa ularning ilmiy fikrlash qobiliyatini rivojlantiradi. Shuningdek, kimyo va fizika o'rtasidagi bog'liqlikni ko'rsatish uchun, elektroliz jarayonini o'rganish jarayonida Faraday qonunlaridan foydalanish mumkin. O'quvchilar, elektroliz jarayoni davomida elektr oqimining kimyoviy o'zgarishlarga qanday ta'sir qilishini o'rganish orqali, energiya muhofazasi qonunini ham tushunishlari mumkin. Laboratoriya sharoitida elektroliz tajribalarini o'tkazish, masalan, suyuq suvda elektrolit sifatida tuz yoki kislotani qo'shish orqali o'quvchilarga o'zgarishlarni kuzatish imkonini beradi. Ushbu jarayon, o'quvchilarga

energiya o'tkazuvchi va kimyoviy o'zgarishlar o'rtasidagi bog'liqlikni amalda ko'rsatadi. Bundan tashqari, kimyo fanida termodinamik qonunlarini o'qitishda ham amaliy misollar keltirish muhimdir. Termodinamik qonunlar, energiyaning o'tkazilishi va muhofazasi, shuningdek, issiqlik va ish o'rtasidagi munosabatlarni tushunishga yordam beradi. O'quvchilar, issiqlik energiyasining kimyoviy jarayonlardagi roli haqida tajribalar o'tkazish orqali amaliy bilimlar olishlari mumkin. Masalan, ekzotermik va endotermik reaksiyalarni o'rganish jarayonida, o'quvchilar harorat o'zgarishini o'lchab, energiya o'zgarishlarini kuzatishlari mumkin. Bu esa, ularning ilmiy tushunchalarini yanada mustahkamlashga yordam beradi.

Shunday qilib, fizika qonunlari asosida kimyo fanida o'qitish jarayonida amaliy misollar keltirish, o'quvchilarning qiziqishini oshirish va ilmiy fikrlash qobiliyatlarini rivojlantirishda muhim ahamiyatga ega. Laboratoriya ishlarini misol sifatida ko'rish, o'quvchilarga nazariy bilimlarni amaliy tajribalar bilan birlashtirib, ularning o'z-o'zini rivojlantirishiga yordam beradi. Fizika qonunlari asosida kimyo fanida o'qitish jarayonida amaliy misollar keltirish, o'quvchilarning qiziqishini oshirish va ilmiy fikrlash qobiliyatlarini rivojlantirishda muhim ahamiyatga ega. Laboratoriya ishlarini misol sifatida ko'rish, o'quvchilarga nazariy bilimlarni amaliy tajribalar bilan birlashtirib, ularning o'z-o'zini rivojlantirishiga yordam beradi. Masalan, kimyo laboratoriyasida gazlar qonunlari asosida tajribalar o'tkazish o'quvchilarga Boyle qonunini tushunishga yordam beradi. O'quvchilar turli bosimdagi gazlar hajmini o'lchash orqali bu qonunlarning amaliy ko'rinishini ko'rishlari mumkin. Shuningdek, reaksiyalarning kinetikasi va termodinamikasi kabi fizik jarayonlarni o'rganish, kimyoviy reaksiyalarni tezlik bilan bog'lashda muhimdir. O'quvchilar, masalan, reaksiyalarning haroratga bog'liqligini o'rganish maqsadida turli haroratlarda reaktsiyalarni o'tkazishlari mumkin. Bu kabi amaliy misollar, nafaqat nazariy bilimlarni mustahkamlash, balki o'quvchilarning muammolarni hal qilish qobiliyatini ham rivojlantirishga xizmat qiladi. Shunday qilib, fizika va kimyo o'rtasidagi bog'lanish o'quvchilarning fanlarga bo'lgan qiziqishini yanada oshiradi. Fizika qonunlari asosida kimyo fanida o'qitish

jarayonida amaliy misollar muhim ahamiyatga ega. Masalan, gazlar qonunlarini o'rganish jarayonida o'quvchilar gazlarning bosim va harorat o'rtasidagi bog'lanishni laboratoriya sharoitida o'lchash orqali ko'rishlari mumkin. Bu kabi laboratoriya ishlar, tajriba o'tkazish orqali o'quvchilarni nazariy bilimlarni amalda qo'llashga undaydi va ularning fanlarga bo'lgan qiziqishini yanada oshiradi.

O'quvchilarning qiziqishini oshirish

Fizika va kimyo o'rtasidagi bog'liqlikni o'quvchilarga tushuntirish, ularning qiziqishini oshirishda muhim vosita sifatida xizmat qiladi. Ushbu ikki fan ko'plab jihatlarda bir-biriga ta'sir qiladi va o'quvchilarni ilmiy tadqiqotlarga jalb qilishda samarali bo'lishi mumkin. Masalan, kimyo darslarida o'quvchilar kimyoviy reaksiyalarni o'rganish jarayonida fizik qonunlar, masalan, energiya saqlanishi va entropiya tushunchalari bilan tanishadilar. Bunday bog'lanishlar, o'quvchilarga har bir fanning o'zaro aloqasi va murakkabligi haqida chuqurroq tushuncha beradi. O'quvchilarning qiziqishini oshirish uchun, darslarda interaktiv usullarni qo'llash juda muhimdir. Fizik va kimyo fanlarida o'zaro bog'lanishlarni ko'rsatish uchun, o'quvchilarga real hayotdagi misollarni keltirish mumkin. Masalan, kimyoviy reaksiya natijasida hosil bo'ladigan energiya o'zgarishlari, fizik qonunlar orqali tushuntirilishi mumkin. Shunday qilib, o'quvchilar, kimyo va fizika o'rtasidagi bog'liqlikni ko'rib, o'zlarining qiziqishlarini kuchaytirishlari mumkin. Laboratoriya ishlarida o'quvchilar o'zlari tajribalar o'tkazish orqali nazariy bilimlarni amalda sinab ko'rish imkoniyatiga ega bo'lishadi. Bu jarayonda, masalan, kimyoviy moddalar aralashganda hosil bo'ladigan issiqlik o'zgarishlarini o'lchash, o'quvchilarga fizik qonunlar orqali kimyoviy jarayonlarni tushunishga yordam beradi. O'quvchilar, o'zlari o'tkazgan tajribalar natijasida, ilmiy jarayonlarning qanday ishlashini ko'rishlari mumkin. Bu esa, ularning qiziqishini oshirishda muhim rol o'ynaydi.

Shuningdek, o'quvchilarga fizika va kimyo fanlaridagi tarixiy kashfiyotlar haqida ma'lumot berish, ularning qiziqishini yanada oshirishi mumkin. Masalan, Avogadro qonuni yoki termodinamik qonunlarining kashf etilishi, bu fanlar o'rtasidagi

bog'liqlikni yanada yaqqol ko'rsatadi. O'quvchilar, bunday tarixiy kontekstni bilganlarida, ilmiy tadqiqotlar va kashfiyotlar jarayoniga nisbatan qiziqishlari ortadi. O'quvchilarning qiziqishini oshirishda muhim jihatlardan biri, ularni ilmiy fikrlashga undashdir. Fizika va kimyo o'rtasidagi bog'liqlikni ta'kidlash orqali, o'quvchilarga muammolarni hal qilishda analitik fikrlashni rivojlantirish imkoniyatini berish mumkin. Ular, o'zlarini ilmiy tadqiqotchilar sifatida tasavvur qilib, yangi g'oyalarni ishlab chiqishga intiladilar. Bu jarayon, nafaqat qiziqishni oshiradi, balki o'quvchilarning ilmiy bilimlarini ham kengaytiradi. Natijada, fizika va kimyo o'rtasidagi bog'liqlikni ta'kidlash, o'quvchilarning qiziqishini oshirishda samarali strategiya bo'lib, ularni ilmiy jarayonlarga yaqinlashtiradi hamda ularning fikrlash ko'nikmalarini rivojlantirishga yordam beradi. Bu esa, kelajakdagi ilmiy kashfiyotlar uchun mustahkam poydevor yaratadi. Fizika va kimyo o'rtasidagi bog'liqlikni ta'kidlash, o'quvchilarning qiziqishini oshirishda muhim ahamiyatga ega. Ushbu ikki fan o'rtasidagi o'zaro aloqalar, o'quvchilarga tabiiy jarayonlarni va ularning mexanik, kimyoviy asoslarini tushunishga yordam beradi. Misol uchun, kimyoviy reaktsiyalar davomida energiya o'zgarishlari va fizikaning qonunlari qanday amalga oshishini ko'rsatish, o'quvchilarga ilmiy nazariyalarni amaliy misollar bilan bog'lash imkonini beradi. Bu jarayon o'quvchilarning ilmiy fikrlash qobiliyatini rivojlantirishga, shuningdek, muammolarni hal qilishda kreativ yondashuvlarni qo'llashga undaydi. O'quvchilarga turli eksperimentlar o'tkazish, fizik va kimyoviy hodisalarni birgalikda o'rganish orqali, ularning qiziqishini yanada oshirish mumkin. Masalan, kimyoviy moddalar bilan tajribalar o’tkazish jarayonida, fizika qonunlarini qo'llash va ularni kuzatish, o'quvchilarda ko'proq qiziqish uyg'otadi. Shuningdek, turli xil ilmiy loyihalar va tadqiqotlar orqali, o'quvchilarning o'zaro hamkorligi va fikr almashinuvi ta'minlanadi, bu esa o'z navbatida, ularning ilmiy bilimlarini yanada kengaytiradi va mustahkamlaydi. O'quvchilarning qiziqishini oshirish, ularning kelajakdagi ilmiy faoliyatlariga tayyorgarlik ko'rishiga yordam beradi. Fizika va kimyo o'rtasidagi bog'liqlikni ta'kidlash orqali o'quvchilarning qiziqishini oshirish mumkin. Masalan, kimyoviy reaktsiyalarni fizikaviy qonunlar bilan bog'lash, o'quvchilarga nazariy

bilimlarni amaliy misollar orqali tushunishga yordam beradi. O'qituvchilar, tajribalar va interaktiv mashg'ulotlar orqali ushbu ikki fan o'rtasidagi o'zaro ta'sirlarni ko'rsatib, o'quvchilarning qiziqishini yanada kuchaytirishi mumkin. Bu esa, o'z navbatida, o'quvchilarning fanlarga bo'lgan qiziqishini oshirib, ularning ilmiy fikrlash qobiliyatlarini rivojlantiradi.

Xulosa

Maqolaning asosiy fikrlarini umumlashtiradigan bo'lsak, fizika qonunlarining kimyo fanini o'qitishda ahamiyati alohida e'tiborga molikdir. Kimyo va fizika o'rtasidagi o'zaro bog'lanish, o'quvchilarga tabiiy fanlar bo'yicha chuqurroq tushuncha berishga yordam beradi. Fizika qonunlari kimyoviy jarayonlarning asosiy mexanizmlarini tushunishda muhim rol o'ynaydi. Masalan, termodinamik qonunlar kimyoviy reaksiyalarning energetik jihatlarini, kinetik nazariya esa moddalar o'rtasidagi munosabatlarni tushuntirishda qo'llaniladi. O'quvchilar fizikaning asosiy prinsiplari yordamida kimyoviy jarayonlarni yanada aniqroq va ravshanroq anglaydilar. Kimyo fanini o'qitishda fizika qonunlarining qo'llanilishi nafaqat nazariy bilimlarni oshirish, balki amaliy ko'nikmalarni ham rivojlantiradi. O'quvchilar, masalan, gazlar qonuni yoki reaktsiya tezligini o'rganish orqali, real hayotdagi kimyoviy jarayonlarni yaxshiroq tushunadilar. Bunday yondashuv, o'quvchilarga fanlararo integratsiyani ta'minlaydi va ularga turli xil muammolarni hal qilishda yordam beradi. O'zaro bog'lanish, shuningdek, o'quvchilarga ilmiy tadqiqotlarda muhim ahamiyatga ega bo'lgan analitik fikrlash ko'nikmalarini shakllantiradi.

O'quvchilarning muammolarni hal qilish va yangi nazariyalarni rivojlantirishdagi qobiliyatlari, fizika va kimyo o'rtasidagi bog'liqlikni tushunish orqali yanada kuchayadi. Shuningdek, fizika qonunlarini kimyo o'qitish jarayonida qo'llash, o'quvchilarga tajribalar o'tkazish imkoniyatini beradi. Tajribalar orqali olingan natijalar, o'quvchilarga nazariy bilimlarni amaliyotda sinab ko'rish imkoniyatini yaratadi va ularning o'z bilimlarini mustahkamlashga yordam beradi. Bu jarayon, shuningdek, o'quvchilarga ilmiy metodologiyalarga asoslangan tadqiqotlar olib

borishni o'rgatadi, bu esa ularni kelajakda ilmiy karyera uchun tayyorlaydi. Umuman olganda, fizika qonunlarining kimyo fanini o'qitishda ahamiyati nafaqat nazariy bilimlarni shakllantirishda, balki amaliy ko'nikmalarni rivojlantirishda ham muhimdir. O'quvchilar fizika va kimyoning o'zaro aloqasini tushunish orqali, ilmiy fikrlash qobiliyatlarini yanada rivojlantiradilar. Bu esa, o'z navbatida, ularning kelajakdagi ilmiy faoliyatlari uchun mustahkam poydevor yaratadi. Shunday qilib, fizika va kimyo o'rtasidagi integratsiya, o'quvchilarning fanlarga bo'lgan qiziqishini oshirib, ularning ilmiy bilimlarini yanada kengaytirishga xizmat qiladi. Maqolaning asosiy fikrlari shuni ko'rsatadiki, fizika qonunlari kimyo fanini o'qitishda muhim rol o'ynaydi. Kimyo jarayonlarini tushunishda fizik qonunlarni bilish zarurati o'quvchilarga molekulalar va atomlar o'rtasidagi o'zaro ta'sirlarni yaxshiroq anglash imkonini beradi. Fizika, masalan, energiyaning saqlanishi, harakat qonunlari va termodinamik qonunlar orqali kimyoviy reaksiyalarni tushunishga yordam beradi. Bu esa, o'z navbatida, kimyoviy jarayonlarning mexanikasini, tezligini va muvozanatini o'rganishda muhim ahamiyatga ega. O'quvchilarga fizika va kimyo o'rtasidagi o'zaro bog'liqlikni ko'rsatish, ularning ilmiy fikrlash qobiliyatini rivojlantirishga xizmat qiladi. Natijada, bu integratsiya o'quvchilarning ilmiy bilimlarini kengaytiradi va ularni kelajakdagi ilmiy faoliyatlari uchun tayyorlaydi. Shuningdek, fizika va kimyo o'rtasidagi bog'lanish, o'quvchilarga murakkab ilmiy tushunchalarni oddiy va tushunarli shaklda taqdim etishga imkon beradi. Bu jarayon, o'z navbatida, o'quvchilarning fanlarga bo'lgan qiziqishini oshirib, ularning ilmiy sohalarga bo'lgan qiziqishini kuchaytiradi. Shunday qilib, fizika qonunlarining kimyo fanida o'qitilishi, o'quvchilarning bilim darajasini oshirishda muhim ahamiyatga ega.

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CHET TILLARINI O‘RGANISHDA SUNIIY INTELLEKT VA INFORMATSION DASTURLARDAN FOYDALANISH

Azizova Feruza Rejavaliyevna
Jahon iqtisodiyoti va diplomatiya universiteti

Annotatsiya. *Chet tillarini o‘rganish zamonaviy globallashuv sharoitida muhim ijtimoiy va madaniy ahamiyat kasb etmoqda. Ushbu maqolada chet tillarini o‘rganishda sun’iy intellekt va axborot dasturdan foydalanish masalalari keng qamrovli tahlil qilinadi. Tadqiqot davomida sun’iy intellekt texnologiyalarining til o‘rganish jarayoniga ta’siri, raqamli platformalar yordamida individual yondashuvni shakllantirish imkoniyatlari, shuningdek, xalqaro tajribada qo‘llanilayotgan innovatsion yechimlar ilmiy asosda yoritiladi. Maqolada sun’iy intellektning lingvistik ko‘nikmalarni rivojlantirishdagi o‘rni, ta’lim samaradorligini oshirishdagi ahamiyati hamda yuzaga kelayotgan muammolar va ularning yechimlari ko‘rib chiqiladi.*

Annotation. *This article examines the use of artificial intelligence and information programs in foreign language learning. It analyzes the impact of AI technologies on language acquisition, the role of digital platforms in personalized learning, and innovative approaches based on international experience. The study highlights the importance of artificial intelligence in developing linguistic skills,*

improving educational effectiveness, and addressing emerging challenges in modern language education.

Kalit so‘zlar: *Chet tillari, sun’iy intellekt(SI), raqamli ta’lim, axbarot dasturlar, adaptiv o‘qitish, onlayn platformalar, individual yondashuv, globallashuv, xalqaro tajriba, ta’lim texnologiyalari, nutqni tanish, sun’iy muhit, ta’lim samaradorligi, innovatsiya, lingvistik nufuz.*

Keywords: *Foreign languages, artificial intelligence, digital education, information programs, adaptive learning, online platforms, personalized learning, globalization, international experience, educational technologies, speech recognition, virtual environment, educational effectiveness, innovation, linguistic competence.*

Kirish

XXI asr globallashuv, raqamlashtirish va innovatsion texnologiyalar asri sifatida jadal rivojlanib bormoqda. Bugungi kunda SI nafaqat texnik sohalarda, balki ta’lim tizimida, xususan, chet tillarini o‘rganishda ham muhim o‘rin egallamoqda. Zamonaviy axborot dasturlari va intellektual texnologiyalar til o‘rganish jarayonini yanada samarali, interaktiv va individual yondashuvga asoslangan holga keltirmoqda.

O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev ham SIning ahamiyatiga alohida e’tibor qaratib, uning bugungi taraqqiyotdagi o‘rnini yuksak baholamoqda. Xususan, Toshkentda bo‘lib o‘tgan xalqaro SI forumida davlat rahbari buyuk ajdodlarimiz — Muhammad al-Xorazmiy, Abu Rayhon Beruniy va Mirzo Ulug‘beklarning algoritmlar, matematika va mantiq fanlari rivojiga qo‘shgan ulkan hissasini ta’kidlab, aynan shu ilmiy meros bugungi SI taraqqiyotiga poydevor bo‘lib xizmat qilayotganini qayd etdi.

Prezidentning fikricha, raqamli texnologiyalar va SI XXI asrda barqaror taraqqiyotning muhim omiliga aylanib, iqtisodiyot, davlat boshqaruvi va kundalik hayotning barcha jabhalariga chuqur kirib bormoqda. Shu nuqtayi nazardan

qaraganda, SI imkoniyatlaridan ta’lim sohasida, ayniqsa, chet tillarini o‘qitishda samarali foydalanish zamon talabi hisoblanadi.

Mazkur maqolada chet tillarini o‘rganishda SI va axborot dasturlarining ahamiyati, ularning ta’lim jarayonidagi imkoniyatlari rivojlantirishdagi roli tahlil qilinadi.

Shu narsa ravshan bo‘lmoqdaki,an`anaviy chet tilini o‘qitish metodlari ko‘p hollarda umumiy yondashuvga asoslangan bo‘lib, har bir o‘rganuvchining individual ehtiyojlari va qobiliyatlarini to‘liq inobatga olmaydi. SI va informatsion dasturlar esa til o‘rganish jarayonini individuallashtirish, o‘quvchi faoliyatini tahlil qilish va moslashtirilgan ta’lim muhitini yaratish imkonini beradi. Xalqaro tadqiqotlar shuni ko‘rsatadiki, SI asosidagi ta’lim texnologiyalari o‘quvchilarning motivatsiyasi va o‘zlashtirish darajasini sezilarli oshiradi.

Chet tillarini o‘rganishda SI texnologiyalari lingvistik salohiyatni.bilim doirasini rivojlantirish va kengaytirishda muhim rol o‘ynaydi. SI til o‘rganuvchining bilim darajasini tahlil qilib, uning zaif va kuchli tomonlarini aniqlash imkonini beradi. Shu asosda individual mashg‘ulotlar, moslashtirilgan topshiriqlar va tavsiyalar shakllantiriladi.

SI asosidagi tizimlar grammatik xatolarni avtomatik aniqlash, talaffuzni baholash va lug‘at boyligini oshirishga qaratilgan mashqlarni taklif etadi. Nutqni tanish va tabiiy tilni qayta ishlash texnologiyalari yordamida o‘rganuvchilar real vaqt rejimida o‘z nutqini tahlil qilish imkoniyatiga ega bo‘ladi. Bu jarayon og‘zaki nutqni rivojlantirishda muhim ahamiyat kasb etadi.

Xalqaro tajribada Duolingo, Busuu, Rosetta Stone, BBC Learning English kabi platformalar SI imkoniatlaridan samarali foydalanib kelmoqda. Ushbu dasturlar o‘yinlashtirish, multimedia materiallarida va adaptiv o‘qitish modellari orqali til o‘rganishni qiziqarli va samarali qiladi. Tadqiqotlarining ko‘rsatishicha , bunday platformalardan foydalangan o‘rganuvchilarning til o‘zlashtirish sur’ati an’anaviy usullarga nisbatan yuqori bo‘ladi.

Sabablar

Chet tillarini o‘rganishda SI va axborot dasturlardan foydalanishning asosiy sabablariga quyidagilar kiradi:

-globallashuv sharoitida xalqaro muloqot ehtiyojining ortishi;

-raqamli texnologiyalarning ta’lim tizimiga keng joriy etilishi;

-ta’lim jarayonida individual yondashuvga bo‘lgan talabning oshishi;

-masofaviy ta’lim va onlayn o‘rganish imkoniyatlarining kengayishi;

-zamonaviy yoshlarning raqamli muhitga moslashganligi.

Ushbu omillar SI asosidagi ta’lim texnologiyalarining dolzarbligini yanada oshirmoqda.

Oqibatlar

SI va axborot dasturlardan foydalanish bir qator ijobiy natijalarga olib keladi:

-til o‘rganish samaradorligining oshishi;

-o‘rganuvchilarning mustaqil ta’lim ko‘nikmalarining rivojlanishi;

-o‘qituvchi va o‘quvchi o‘rtasidagi muloqotning optimallashuvi;

-o‘quv jarayonining shaffofligi va nazoratning kuchayishi;

-xalqaro til kompetensiyalariga moslashuvning tezlashuvi.

Ammo shuni ham ta`kidlash kerakki, texnologiyalarga haddan tashqari tayanish jonli muloqotning kamayishiga olib kelishi mumkin. Bu holat til o‘rganishda muvozanatli yondashuvni talab etadi.

Yechimlar

Bizning fikirimizcha,SI va axborot dasturlardan samarali foydalanish uchun quyidagi yechimlarni amalga oshirish zarur:

-sun’iy intellektni an’anaviy ta’lim metodlari bilan uyg‘unlashtirish;

-o‘qituvchilarning raqamli va uslubiy nufuzini oshirish;

-ta’lim platformalarining sifatini va kontentini doimiy yangilab borish;

-o‘rganuvchilarda tanqidiy fikrlash va mustaqil o‘rganish ko‘nikmalarini rivojlantirish;

-xalqaro tajriba va ilg‘or amaliyotlarni milliy ta’lim tizimiga moslashtirish.

Xulosa

Yakuniy muloha zalar, chet tillarini o‘rganishda SI va informatsion dasturlardan foydalanish zamonaviy ta’limning muhim yo‘nalishlaridan biridir. Ushbu texnologiyalar ta’lim jarayonini individuallashtirish, samaradorligini oshirish va xalqaro standartlarga moslashtirish imkonini beradi. Sun’iy intellektni oqilona va maqsadli qo‘llash orqali chet tillarini o‘rganish jarayonida yuqori natijalarga erishish mumkin.

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MAKTABGACHA YOSHDAGI BOLALARDA MULOQOT KO'NIKMALARINING PEDAGOGIK VA PISIXOLOGIK AHAMIYATI

Baratov Baxtiyor Qodirovich

Farg'ona davlat universiteti

O‘rinboyeva Hafizaxon

Farg'ona davlat universiteti

E-mail: ***orinboyevahafizahon@gmail.com***

Annotatsiya. *Ushbu maqolada maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarining shakllanishi, uning pedagogik va psixologik ahamiyati hamda bola shaxsining rivojlanishidagi o‘rni yoritiladi. Maktabgacha ta’lim jarayonida bolalarning nutqiy faoliyati, tengdoshlar va kattalar bilan o‘zaro muloqot qilish jarayoni ularning ijtimoiylashuvi, tafakkuri, emotsional holati va shaxsiy fazilatlarining rivojlanishiga muhim ta’sir ko‘rsatadi. Shuningdek, maqolada tarbiyachi va ota-onalarning bolalarda samarali muloqot ko‘nikmalarini shakllantirishdagi pedagogik yondashuvlari ham tahlil qilinadi.*

Kalit so‘zlar: *maktabgacha ta’lim, muloqot ko‘nikmalari, pedagogik ahamiyat, psixologik rivojlanish, bolalar nutqi, ijtimoiylashuv, tarbiyachi, bola shaxsi, kommunikativ kompetensiya, ta’lim-tarbiya.*

Abstract. *This article discusses the formation of communication skills in preschool children and their pedagogical and psychological significance. In the process of preschool education, children's speech activity and interaction with peers and adults play an important role in the development of their socialization, thinking, emotional state, and personal qualities. The article also analyzes the pedagogical approaches of educators and parents in developing effective communication skills in children.*

Keywords: *preschool education, communication skills, pedagogical significance, psychological development, children's speech, socialization, educator, child personality, communicative competence, education and upbringing.*

Аннотация. *В данной статье рассматриваются особенности формирования коммуникативных навыков у детей дошкольного возраста, а также их педагогическое и психологическое значение. В процессе дошкольного образования речевая активность детей и их взаимодействие со сверстниками и взрослыми играют важную роль в развитии социализации, мышления, эмоционального состояния и личностных качеств ребенка. Также в статье анализируются педагогические подходы воспитателей и родителей к формированию эффективных коммуникативных навыков у детей.*

Ключевые слова; *дошкольное образование, коммуникативные навыки, педагогическое значение, психологическое развитие, детская речь, социализация, воспитатель, личность ребенка, коммуникативная компетентность, образование и воспитание.*

KIRISH. Maktabgacha yosh davri bola hayotidagi eng muhim va mas’uliyatli bosqichlardan biri hisoblanadi. Aynan shu davrda bolaning shaxs sifatida shakllanishi, uning tafakkuri, nutqi, hissiyoti hamda ijtimoiy munosabatlari rivojlana boshlaydi. Maktabgacha ta’lim tizimi esa bolalarning har tomonlama barkamol bo‘lib voyaga yetishida muhim rol o‘ynaydi. Ushbu jarayonda ayniqsa muloqot ko‘nikmalarini shakllantirish muhim ahamiyat kasb etadi. Chunki muloqot orqali bola atrof-muhitni anglaydi, o‘z fikrini ifodalaydi, tengdoshlari va kattalar bilan ijtimoiy aloqalarni o‘rnatadi.

Muloqot inson hayotining ajralmas qismi bo‘lib, u shaxslar o‘rtasida axborot almashish, fikr bildirish, his-tuyg‘ularni ifodalash hamda o‘zaro tushunishni ta’minlaydi. Ayniqsa, maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarining rivojlanishi ularning kelajakdagi ta’lim jarayoni va jamiyatdagi faol ishtiroki uchun mustahkam poydevor yaratadi. Bolalar muloqot jarayonida nafaqat nutqiy malakalarni egallaydilar, balki o‘z fikrini to‘g‘ri ifodalash, boshqalarni tinglash, fikr almashish, hamkorlik qilish kabi muhim ijtimoiy ko‘nikmalarni ham o‘rganadilar.

Maktabgacha yoshdagi bolalarda muloqot ko‘nikmalari asosan o‘yin, ta’lim faoliyati va kundalik hayotiy vaziyatlar orqali rivojlanadi. Ayniqsa rolli o‘yinlar, suhbatlar, savol-javoblar va turli interaktiv mashg‘ulotlar bolalarda nutqiy faollikni oshirishga xizmat qiladi. Bu jarayonda tarbiyachining roli juda katta. Tarbiyachi bolalarni faol muloqotga jalb etishi, ularni o‘z fikrini erkin ifodalashga undashi, shuningdek tengdoshlar bilan to‘g‘ri va madaniyatli munosabat o‘rnatishga o‘rgatishi lozim. Shu bilan birga ota-onalar ham bolalarning muloqot madaniyatini shakllantirishda muhim o‘rin tutadi. Oila muhitida bola ko‘proq suhbatlashish, savollarga javob berish, o‘z fikrini bildirish orqali muloqot ko‘nikmalarini mustahkamlaydi.

Psixologik jihatdan qaraganda, muloqot bolalarning hissiy va ijtimoiy rivojlanishiga katta ta’sir ko‘rsatadi. Muloqot jarayonida bola o‘z his-tuyg‘ularini ifodalashni, boshqalarning fikrini tushunishni va ularga hurmat bilan munosabatda bo‘lishni o‘rganadi. Bu esa bolalarda empatiya, ya’ni boshqalarning his-tuyg‘ularini tushunish qobiliyatini rivojlantiradi. Shuningdek muloqot jarayoni bolalarda ishonch, ochiqlik, mustaqillik va faollik kabi shaxsiy sifatlarning shakllanishiga ham yordam beradi.

MUHOKAMA VA NATIJALAR. Maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarini shakllantirish masalasi pedagogika va psixologiya fanlarida muhim o‘rin egallaydi. Tadqiqotlar shuni ko‘rsatadiki, bolaning muloqotga kirishish qobiliyati uning nafaqat nutqiy rivojlanishiga, balki ijtimoiy, hissiy va intellektual taraqqiyotiga ham bevosita ta’sir ko‘rsatadi[24]. Ayniqsa maktabgacha ta’lim muassasalarida tashkil etiladigan ta’lim-tarbiya jarayonlari bolalarning muloqot madaniyatini shakllantirishda muhim ahamiyatga ega.

1-jadval.

Maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarining rivojlanish bosqichlari[25]

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[25] Jean Piaget. *The Language and Thought of the Child*. London: Routledge, 2001.

Yosh bosqichi	Muloqotning asosiy xususiyatlari	Pedagogik ahamiyati
3–4 yosh	Oddiy so‘z va qisqa gaplar orqali muloqot qiladi, savollarga javob beradi	Nutqiy faollikni rivojlantirish va so‘z boyligini oshirish
4–5 yosh	Tengdoshlari bilan faol suhbatlashadi, savollar beradi	Ijtimoiy munosabatlar va hamkorlik ko‘nikmalarini shakllantirish
5–6 yosh	Fikrini aniq ifodalay oladi, suhbatda faol qatnashadi	Mustaqil fikrlash va mantiqiy nutqni rivojlantirish
6–7 yosh	Murakkab gaplar tuzadi, guruhiy muloqotda ishtirok etadi	Maktab ta’limiga tayyorlash va kommunikativ kompetensiyani shakllantirish

Izoh: Ushbu jadval maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarining yoshga qarab qanday rivojlanishini ko‘rsatadi. Har bir bosqichda bolalarning nutqiy faoliyati, muloqot shakli va pedagogik ahamiyati turlicha bo‘lib, tarbiyachi bu xususiyatlarni hisobga olgan holda ta’lim-tarbiya jarayonini tashkil etishi lozim.

Muhokama jarayonida aniqlanishicha, bolalarda muloqot ko‘nikmalarining rivojlanishi bir necha omillarga bog‘liq bo‘ladi. Birinchi navbatda, bolaning oila muhitida qanday tarbiya olayotgani katta ahamiyat kasb etadi. Agar oilada ota-onalar bola bilan ko‘p suhbatlashsa, uning savollariga e’tibor bilan javob bersa va fikr bildirishiga imkon yaratsa, bola o‘z fikrini erkin ifoda etishga o‘rganadi. Bunday muhitda ulg‘ayayotgan bolalarda nutqiy faollik, o‘ziga ishonch va ijtimoiy faollik yuqori bo‘ladi. Aksincha, muloqot kam bo‘lgan oilalarda bolalar tortinchoq, o‘z fikrini ifodalashda qiynaladigan bo‘lib qolishi mumkin.

Shuningdek, maktabgacha ta’lim tashkilotlarida tarbiyachining pedagogik mahorati ham bolalarning muloqot ko‘nikmalarini rivojlantirishda muhim rol o‘ynaydi. Tarbiyachi bolalarni faol muloqotga jalb etishi, turli suhbatlar, o‘yinlar, savol-javoblar va ijodiy mashg‘ulotlar orqali ularning nutqiy faoliyatini

rag‘batlantirishi lozim. Ayniqsa rolli o‘yinlar, ertak aytish, hikoya tuzish, guruhiy mashg‘ulotlar va interaktiv metodlar bolalarda muloqot ko‘nikmalarini rivojlantirishda samarali usullar hisoblanadi. Bunday faoliyat jarayonida bolalar bir-biri bilan fikr almashadi, savollar beradi, javob topishga harakat qiladi va shu orqali ijtimoiy tajriba orttiradi[26].

Psixologik jihatdan olib qaralganda, muloqot ko‘nikmalarining rivojlanishi bolalarda ijobiy hissiy muhitni shakllantiradi. Bola o‘z fikrini erkin ifoda etishga o‘rgangan sari unda o‘ziga bo‘lgan ishonch ortadi, tengdoshlari bilan oson til topisha boshlaydi. Bu esa bolalarning ijtimoiy moslashuvini yengillashtiradi. Shuningdek, muloqot jarayonida bolalar boshqalarni tinglash, ularning fikrini hurmat qilish, navbat kutish kabi muhim ijtimoiy qoidalarni ham o‘rganadilar.

Tadqiqot natijalari shuni ko‘rsatadiki, maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarini rivojlantirishga qaratilgan pedagogik faoliyat ularning nutqiy rivojlanish darajasini sezilarli darajada oshiradi. Muloqotga yo‘naltirilgan mashg‘ulotlar orqali bolalarning so‘z boyligi kengayadi, gap tuzish qobiliyati rivojlanadi va fikrni mantiqiy ifodalash ko‘nikmalari shakllanadi. Shu bilan birga bolalarda ijtimoiy faollik, jamoada ishlash qobiliyati va hamkorlik ko‘nikmalari ham rivojlanadi.

2-jadval.

Maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarini rivojlantirish usullari[27]

Pedagogik usul	Mazmuni	Natijasi
Suhbat metodi	Bolalar bilan erkin suhbat tashkil etish	Nutqiy faollik va fikrni ifodalash qobiliyati rivojlanadi

[26] Jerome Bruner. *Child’s Talk: Learning to Use Language*. Oxford University Press, 1983.
[27] Abdullayeva B. *Bolalar psixologiyasi*. Toshkent: O‘zbekiston, 2018.

Rolli o‘yinlar	Turli ijtimoiy rollarni bajarish orqali muloqot qilish	Ijtimoiy tajriba va hamkorlik ko‘nikmalari shakllanadi
Savol-javob usuli	Bolalarning savollariga javob berish va ularga savollar berish	Tafakkur va nutqiy faollik rivojlanadi
Hikoya tuzish	Rasmlar yoki voqealar asosida hikoya aytish	So‘z boyligi va mantiqiy nutq rivojlanadi

Izoh: Jadvalda maktabgacha ta’lim jarayonida bolalarning muloqot ko‘nikmalarini rivojlantirishda qo‘llaniladigan asosiy pedagogik usullar va ularning natijalari ko‘rsatilgan. Ushbu metodlar bolalarda nutqiy rivojlanish, ijtimoiy moslashuv va kommunikativ kompetensiyani shakllantirishga yordam beradi.

Natijalar shuni ham ko‘rsatadiki, bolalarda muloqot ko‘nikmalarini rivojlantirishda o‘yin faoliyati eng samarali vositalardan biri hisoblanadi. O‘yin jarayonida bolalar erkin harakat qiladi, o‘z his-tuyg‘ularini ifoda etadi va tengdoshlari bilan faol muloqotga kirishadi. Ayniqsa rolli o‘yinlar orqali bolalar turli ijtimoiy rollarni bajarib ko‘radi, bu esa ularning ijtimoiy tajribasini boyitadi.

Umuman olganda, o‘tkazilgan muhokamalar va kuzatuvlar maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarini shakllantirish ularning shaxsiy rivojlanishida muhim ahamiyatga ega ekanligini ko‘rsatadi. Shu sababli maktabgacha ta’lim jarayonida bolalarning nutqiy faoliyatini qo‘llab-quvvatlash, ular uchun qulay muloqot muhiti yaratish va zamonaviy pedagogik metodlardan foydalanish muhim vazifa hisoblanadi.

ADABIYOTLAR SHARHI. Maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarini shakllantirish masalasi pedagogika va psixologiya fanlarida keng o‘rganilgan mavzulardan biridir. Ushbu yo‘nalishda ko‘plab mahalliy va xorijiy olimlar ilmiy tadqiqotlar olib borgan bo‘lib, ularning ilmiy qarashlari bolalarda

kommunikativ kompetensiyalarni rivojlantirishda muhim nazariy va amaliy asos bo‘lib xizmat qiladi[28].

Bolalarning muloqot ko‘nikmalarini rivojlantirish masalasi bo‘yicha muhim ilmiy qarashlarni ilgari surgan olimlardan biri rus psixologi Lev Vygotsky hisoblanadi. Uning fikricha, bolaning rivojlanishi ijtimoiy muhit bilan bevosita bog‘liq bo‘lib, muloqot jarayoni bolaning tafakkuri va nutqining shakllanishida asosiy omil hisoblanadi. Vygotskiy tomonidan ishlab chiqilgan “yaqin rivojlanish zonasi” nazariyasiga ko‘ra, bola kattalar va tengdoshlari bilan hamkorlik jarayonida yangi bilim va ko‘nikmalarni egallaydi. Bu esa muloqotning ta’lim jarayonidagi muhim o‘rnini ko‘rsatadi[29].

Bolaning kognitiv rivojlanishi va muloqot o‘rtasidagi bog‘liqlikni tadqiq etgan olimlardan yana biri shveytsariyalik psixolog Jean Piaget hisoblanadi. Piaget bolalarning fikrlash jarayoni ularning faoliyat va muloqot jarayonida rivojlanishini ta’kidlaydi. Uning tadqiqotlariga ko‘ra, maktabgacha yosh davrida bolalar atrofdagi olamni o‘rganish jarayonida ko‘proq savollar beradi, suhbatlashadi va shu orqali o‘z bilim doirasini kengaytiradi.

Pedagogika sohasida maktabgacha ta’lim va bolalar nutqini rivojlantirish masalalarini o‘rganishda mashhur pedagog Konstantin Ushinsky ning ilmiy ishlari ham muhim ahamiyatga ega. U bolalar tarbiyasida ona tilining ahamiyati katta ekanligini ta’kidlab, bolalarning nutqiy rivojlanishi ularning fikrlash qobiliyatini shakllantirishda muhim rol o‘ynashini qayd etgan.

XULOSA. Xulosa qilib aytganda, maktabgacha yoshdagi bolalarda muloqot ko‘nikmalarini shakllantirish va rivojlantirish ularning har tomonlama barkamol shaxs bo‘lib shakllanishida muhim o‘rin tutadi. Muloqot bola hayotining dastlabki davrlaridan boshlab uning ijtimoiylashuvi, nutqiy rivojlanishi, tafakkuri hamda hissiy holatining shakllanishiga bevosita ta’sir ko‘rsatadi. Ayniqsa maktabgacha yosh davrida bola atrofdagi insonlar bilan faol muloqot qilish orqali yangi bilim va

[28] Hasanboyeva O., To‘raqulova X. *Maktabgacha pedagogika*. Toshkent: Fan va texnologiya, 2017.
[29] Yo‘ldosheva Sh. *Maktabgacha yoshdagi bolalar nutqini rivojlantirish metodikasi*. Toshkent, 2020.

tajribalarni egallaydi, o‘z fikrini ifodalashga, boshqalarni tinglashga hamda jamoada faol ishtirok etishga o‘rganadi[30].

Tadqiqotlar shuni ko‘rsatadiki, bolalarda muloqot ko‘nikmalarini rivojlantirishda oila va maktabgacha ta’lim muassasasi muhim rol o‘ynaydi. Oila muhitida ota-onalarning bola bilan samimiy suhbatlashishi, uning savollariga javob berishi va fikr bildirishiga imkon yaratishi bolada nutqiy faollik va o‘ziga ishonchni rivojlantiradi. Maktabgacha ta’lim tashkilotlarida esa tarbiyachining pedagogik mahorati, to‘g‘ri tashkil etilgan mashg‘ulotlar, interaktiv metodlar va o‘yin faoliyati bolalarda samarali muloqot ko‘nikmalarini shakllantirishga yordam beradi.

Shuningdek, muloqot ko‘nikmalarining rivojlanishi bolalarning psixologik holatiga ham ijobiy ta’sir ko‘rsatadi. Bola tengdoshlari va kattalar bilan erkin muloqot qila olgan sari unda ijtimoiy faollik, ochiqlik, hamkorlik va empatiya kabi muhim shaxsiy sifatlar shakllanadi. Bu esa bolalarning jamiyatga moslashuvini osonlashtiradi hamda kelajakdagi ta’lim jarayonida muvaffaqiyatli bo‘lishiga zamin yaratadi.

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EKOLOGIK TA’LIM-TARBIYANI TA’LIM MUASSASALARDA OLIB BORISH

Danayev D. A.

Anorboyev A.

Abdulla Qodriy nomidagi Jizzax Davlat Pedagogika Unversiteti

Annotatsiya: *Ushbu maqolada bugungi kunda global muammoga aylangan ekologik inqirozning oldini olishda ta'lim muassasalarining o'rni va ahamiyati tahlil qilinadi. Yosh avlodda ekologik madaniyat, tabiatga mas'uliyatli munosabat va ekologik ongni shakllantirishning pedagogik-psixologik asoslari yoritilgan. Shuningdek, o'quv jarayoniga ekologik bilimlarni integratsiya qilish usullari, zamonaviy interfaol metodlar hamda xalqaro tajribalardan foydalanish masalalari ko'rib chiqilgan. Maqola ekologik ta'lim-tarbiya tizimini takomillashtirish bo'yicha taklif va tavsiyalarni o'z ichiga oladi.*

Kalit so'zlar*: Ekologik ta'lim, Ekologik tarbiya, Ekologik madaniyat, Barqaror rivojlanish, Tabiatni muhofaza qilish, Ekologik ong, Pedagogik texnologiyalar, Inson va tabiat, Global ekologik muammolar, Ekologik mas'uliyat, Uzluksiz ta'lim*

Аннотация: *В данной статье анализируется роль и значение образовательных учреждений в предотвращении экологического кризиса, ставшего сегодня глобальной проблемой. Выделены педагогические и психологические основы формирования экологической культуры, ответственного отношения к природе и экологического сознания у молодого поколения. Также рассмотрены методы интеграции экологических знаний в образовательный процесс, современные интерактивные методы и использование международного опыта. Статья содержит предложения и рекомендации по совершенствованию системы экологического образования и воспитания.*

Ключевые слова*: Экологическое образование, Экологическое воспитание, Экологическая культура, Устойчивое развитие, Охрана природы, Экологическое сознание, Педагогические технологии, Человек и природа, Глобальные экологические проблемы, Экологическая ответственность, Обучение на протяжении всей жизни*

Abstract: *This article analyzes the role and importance of educational institutions in preventing the ecological crisis, which has become a global problem today. The pedagogical and psychological foundations of the formation of ecological culture, responsible attitude to nature and ecological awareness in the younger generation are highlighted. Also, methods of integrating ecological knowledge into the educational process, modern interactive methods and the use of international experience are considered. The article contains proposals and recommendations for improving the system of ecological education and upbringing.*

Keywords*: Environmental education, Environmental education, Environmental culture, Sustainable development, Nature protection, Environmental awareness Pedagogical technologies, Man and nature, Global environmental problems, Environmental responsibility, Continuous education.*

2017 — 2021-yillarda O‘zbekiston Respublikasini rivojlantirishning beshta ustuvor yo‘nalishi Harakatlar strategiyasi bo‘yicha belgilangan vazifalarni so‘zsiz amalga oshirish, respublika hududlaridagi ekologik muammolar yechimiga ta’lim tizimini joriy qilish bilan hissa qo‘shish, o‘sib kelayotgan yosh avlodning ekologik savodxonligini oshirish, ekologik ongi va ekologik madaniyatini shakllantirish va rivojlantirish, ekologik ta’lim va tarbiya jarayonini samarali tashkil etish maqsadida Vazirlar Mahkamasi qaror qiladi: Unda “Ta’lim to‘g‘risida”gi va “Tabiatni muhofaza qilish to‘g‘risida”gi O‘zbekiston Respublikasi qonunlariga muvofiq uzluksiz ta’lim tizimida ekologik ta’limni rivojlantirishning asosiy tamoyillarini belgilash, ularni ta’lim-tarbiya jarayoniga izchillik bilan bosqichma-bosqich tatbiq qilish va shu asosda ekologik ta’limning samaradorligini yangi bosqichga ko‘tarish;

ta’lim dasturlarini mavjud ekologik muammolar va ularni bartaraf etish vazifalaridan kelib chiqib takomillashtirish;

ta’lim oluvchilarning e’tiborini umumbashariy ekologik muammolarga qaratish orqali ularning ona tabiatning qayta tiklanmaydigan manbalarini saqlab qolish va ulardan oqilona foydalanish borasidagi mas’uliyatini kuchaytirish;

ekologik ta’limning samarali shakllari va usullarini ishlab chiqish hamda joriy etish;

ekologik ta’lim sifatini, kadrlar tayyorlash tizimi samaradorligini hamda barqaror rivojlanish kafolatlarini va ustuvorligini ta’minlovchi normativ-huquqiy, moddiy-texnika va axborot bazasini yaratish;

ekologiya va atrof muhitni muhofaza qilish sohasidagi vakolatli davlat organlari va ta’lim sohasining o‘zaro manfaatli hamkorligini rivojlantirish.

Ekologiya va atrof muhitni muhofaza qilish davlat qo‘mitasi, Halq ta’limi vazirligi, Oliy va o‘rta maxsus ta’lim vazirligi hamda Maktabgacha ta’lim vazirligi Konsepsiya va Tadbirlar rejasining bajarilishi to‘g‘risida har chorakda Vazirlar Mahkamasiga axborot taqdim etilishini ta’minlasinlar. Mazkur qarorning bajarilishini nazorat qilish O‘zbekiston Respublikasi Bosh vazirining birinchi

o‘rinbosari — transport vaziri A.J. Ramatov, Ekologiya va atrof muhitni muhofaza qilish davlat qo‘mitasi raisi B.T. Qo‘chqorov, Bosh vazir o‘rinbosari A.A. Abduxakimov, xalq ta’limi vaziri Sh.X. Shermatov, oliy va o‘rta maxsus ta’lim vaziri I.U. Majidov va maktabgacha ta’lim vaziri A.V. Shin zimmasiga yuklansin.

Ekologik ta’lim bu shunchaki tabiatni sevish emas, balki yashab qolish strategiyasidir. Buning bir necha fundamental sabablari bor:

1.Antropogen bosimning ortishi: Aholi soni ko‘payishi va sanoatning rivojlanishi tabiiy resurslarga bo‘lgan talabni keskin oshirdi. Insoniyat tabiatdan olayotgan narsasini qayta tiklashni o‘rganmasa, resurslar tugashi muqarrar.

2.Global iqlim o‘zgarishi: O‘zbekiston iqlim o‘zgarishlariga eng zaif hududlardan biri (Orol fojiasi, chang bo‘ronlari, suv tanqisligi). Yosh avlod bu muammolar ichida yashashga va ularga yechim topishga tayyor bo‘lishi kerak.

3.Iqtisodiy samaradorlik: "Yashil iqtisodiyot"ga o‘tish uchun ekologik savodxon kadrlar kerak. Resurslarni tejaydigan mutaxassis korxonaga ham, davlatga ham iqtisodiy foyda keltiradi.

4.Dunyoqarashni o‘zgartirish: Insoniyat uzoq vaqt tabiatga "hokim" ko‘zi bilan qaradi. Ekologik ta’limning maqsadi — insonni tabiatning bir qismi, uning himoyachisi ekanligini anglatish (ekotsentrik dunyoqarash).

Aholining ekologik madaniyatini va atrof-muhitga ehtiyotkorona munosabatda bo‘lishini shakllantirishda ekologik ta’lim muhim ahamiyatga ega. “Tabiatni muhofaza qilish to‘g‘risida”gi O‘zbekiston Respublikasi Qonunining 4-moddasida "...barcha turdagi ta’lim muassasalarida ekologiya o‘quvining majburiyligi” qayd etib o‘tilgan.

Ekologik ta’limning bosh maqsadi aholining barcha qatlamlarida, jumladan, maktabgacha va maktab ta’limida, shuningdek, kollej, texnikum va litsey o‘quvchilari, oliy ta’lim muassasalari va oliy ta’limdan keyingi ta’lim jarayonlarida atrof-muhitni asrash muammolariga ongli munosabatni shakllantirishdan iboratdir.

O‘zbekiston Respublikasi Prezidentining 2023 yil 23 noyabrdagi “Respublikada yashillik darajasini yanada oshirish, “Yashil makon” umummilliy loyihasini izchil amalga oshirish orqali ekologik barqarorlikni ta’minlash chora-tadbirlari to‘g‘risida”gi farmoni bilan tasdiqlangan milliy dasturida “barcha ta’lim turlarida ekologik ta’lim-tarbiyani mustaqil o‘quv kursi sifatida tegishli yo‘nalishdagi kadrlar tayyorlash o‘quv rejasining majburiy fanlar blokiga kiritish” bo‘yicha Maktab va maktabgacha ta’lim vazirligiga, Oliy ta’lim, fan va innovatsiyalar vazirligiga, Ekologiya vazirligiga hamda manfaatdor vazirlik va idoralarga Ishchi guruh tuzilgan holda o‘rganish va Ishchi guruh xulosalarini o‘rnatilgan tartibda 2024 yil mart oyiga qadar Vazirlar Mahkamasiga kiritish belgilangan. Hozirgi kunda esa O‘zbekistonda ekologik ta’lim-tarbiya shunchaki nazariy fan emas, balki davlat strategiyasining hayotiy bo‘lagiga aylandi. “Yashil makon” umummilliy loyihasi va 2030-yilgacha bo‘lgan Barqaror rivojlanish maqsadlari (BRM) doirasida oliy ta’lim muassasalarida (OTM) talabalarning ekologik madaniyatini yuksaltirish bo‘yicha amalga oshirilayotgan ishlarni quyidagi yo‘nalishlarda tahlil qilish mumkin:

1. “Yashil makon” — Amaliy Ekologik Maktab

“Yashil makon” loyihasi talabalar uchun shunchaki ko‘chat ekish kampaniyasi emas, balki amaliy ekologik laboratoriya vazifasini o‘tamoqda.

Mas’uliyatni his qilish: Talabalar o‘zi ekkan daraxtni raqamlashtirish (e-yashil platformasi) va uning parvarishi uchun mas’ul bo‘lish orqali tabiat bilan bevosita bog‘lanmoqda.

Akademik bog‘liqlik: Masalan, Jizzax davlat pedagogika universiteti kabi OTMlarda talabalar hududning iqlimiga mos daraxt turlarini tanlash bo‘yicha ilmiy izlanishlar olib borishmoqda.

2. 2030-yilgacha Barqaror Rivojlanish Maqsadlari

O‘zbekiston o‘z zimmasiga olgan 17 ta global maqsadning bir nechtasi bevosita ekologik ta’limga daxldor:

4-maqsad (Sifatli ta’lim): Ta’lim mazmuniga barqaror rivojlanish tamoyillarini singdirish.

13-maqsad (Iqlim o‘zgarishiga qarshi kurash): Talabalarni iqlim o‘zgarishining oqibatlarini yumshatish bo‘yicha innovatsion g‘oyalarini qo‘llab-quvvatlash.

Hozirgi holat: OTMlarda dars o‘tish metodikasi o‘zgardi — endi talaba faqat muammoni eshitmaydi, balki o‘zining mutaxassisligi doirasida (masalan, bo‘lajak geograf yoki kimyogar sifatida) yechim taklif qiladi.

3. “Yosh ekolog” to‘garaklari: Ekofaol yoshlar markazi

OTMlar qoshidagi to‘garaklar bugungi kunda “Ekologik liderlik” maktabiga aylangan. Ularning faoliyati quyidagilarni qamrab oladi:

Peer-to-peer (Tengdosh tengdoshga): Ekofaol talabalar o‘z tengdoshlariga plastikdan voz kechish, energiya tejamkorlik va chiqindilarni saralash madaniyatini o‘rgatishmoqda.

Ekologik aksiyalar: "Plastiksiz shahar", "Toza qirg‘oq" kabi aksiyalar orqali talabalar ijtimoiy faollik ko‘rsatishmoqda.

Ilmiy startaplar: To‘garak a’zolari tomonidan chiqindini qayta ishlash yoki muqobil energiya manbalaridan foydalanish bo‘yicha kichik innovatsion loyihalar ishlab chiqilmoqda.

4. Ekologik fanlar o‘qitilishidagi transformatsiya

Hozirgi kunda oliy ta’limda ekologiya fanlari integradiv yondashuv asosida o‘qitilmoqda. Ekologiya endi faqat biologiya bilan emas, balki iqtisodiyot (yashil iqtisodiyot), huquq (ekologik huquq) va IT (ekomonitoring) bilan bog‘lab o‘rgatilyapti. Raqamli ta’limda esa Geografik axborot tizimlari (GAT) va masofadan zondlash orqali ekologik vaziyatni tahlil qilish darslarning ajralmas qismiga aylandi.

5. Ekofaol talaba — jamiyatning yangi qiyofasi

Bugungi kunning "Ekofaol talabasi" quyidagi xususiyatlari bilan ajralib turadi:

Ekologik nazorat: U atrof-muhit ifloslanishiga befarq qaramaydi, qonunbuzarliklar haqida xabar berishda ijtimoiy tarmoqlar va mobil ilovalardan unumli foydalanadi.

Turmush tarzi: Uning kundalik hayotida qayta ishlanadigan mahsulotlar, qog‘oz isrofini kamaytirish va tejamkorlik ustuvor. OTMlarda talabalar tomonidan ko‘ngilli guruhlar tuzilib. Ular universitet hududida va mahallalarda ekologik reydlar o‘tkazadi, daraxtlarni parvarishlaydi va "Yashil makon" loyihasida ko‘ngilli sifatida qatnashadi.

Ekologik startaplar va loyihalar: Ekofaol talabalar faqat daraxt ekish bilan cheklanmay, muammoning innovatsion yechimlarini taklif qilmoqdalar. Masalan:

- Chiqindilarni qayta ishlash bo‘yicha kichik uskunalar loyihalashtirish.
- Talabalar turar joylarida energiya tejovchi qurilmalarni o‘rnatish g‘oyalari.
- Plastik idishlar o‘rniga ekologik toza qog‘oz yoki mato paketlarni targ‘ib qilish.
- Media-ekologiya va targ‘ibot: Ekofaol yoshlar ijtimoiy tarmoqlarda (Instagram, Telegram, TikTok) ekologik chellenjlar uyushtirib, tengdoshlari orasida "ekologik trend"larni yoyishmoqda. Ular "Eko-bloger" sifatida tabiatga zarar yetkazilgan holatlarni jamoatchilikka ko‘rsatib, nazorat o‘rnatishda ishtirok etishadi.

Bog‘cha yoshidagi bolalarga esa ekologik ongni shakllantirish asosan his-tuyg‘u va o‘yinlar orqali amalga oshiriladi. Maqsad — bolada tabiatga nisbatan mehr uyg‘otish va uning bir bo‘lagi ekanligini anglatishdir. Shu asosda turli metodlar olib borilmoqda. Bunga turli misollar keltirish mumkin:

- "Tabiat burchaklari" va "Ekologik yo‘lakchalar": Har bir guruhda o‘simliklar va jonivorlar (baliqlar, toshbaqalar) parvarish qilinadigan maxsus joylar tashkil etilgan. Bolalar o‘qituvchi nazoratida gullarga suv quyishni, ularni parvarishlashni o‘rganadi. "Ekologik yo‘lakcha"larda esa turli daraxtlar va gullarning nomlarini yod oladilar.
- "Yashil bog‘chalar": Ko‘plab bog‘chalarda kichik tomorqalar tashkil etilgan bo‘lib, u yerda bolalar sabzavotlar (masalan, piyoz, sarimsoq) qanday o‘sishini kuzatishadi. Bu ularda "mehnatsevarlik" va "tabiat in’omlarini qadrlash" ko‘nikmasini hosil qiladi.
- Didaktik o‘yinlar va ertaklar: "Suv qayerdan keladi?", "Chiqindini qayerga tashlash kerak?" kabi mavzularda interfaol o‘yinlar o‘tkaziladi. Tabiat haqidagi ertaklar orqali hayvonlarga ozor bermaslik, daraxt shoxlarini sindirmaslik tushuntiriladi.
- "Tejamkorlik saboqlari": Bolalarga qo‘l yuvishda suvni keraksiz oqizmaslik, xonadan chiqishda chiroqni o‘chirish kabi ilk ekologik-iqtisodiy tushunchalar beriladi.

Zotan, ekologik tarbiya global miqyosdagi omon qolish strategiyasiga aylangan. Binobarin, davlatimiz rahbari Birlashgan Millatlar Tashkiloti Bosh Assambleyasining 75-sessiyasida jahon hamjamiyati e'tiborini yana bir bor davrimizning o'tkir muammolaridan biri — Orolbo'yi hududidagi ekologik holatga qaratib: “Bugungi kunda har bir mamlakat bu jarayonning salbiy ta'sirini his etmoqda. Ming afsuski, bunday o'zgarishlar Markaziy Osiyo taraqqiyotiga ham katta xavf tug'dirmoqda”, – deya ta’kidlagan edilar.

Darhaqiqat, muayyan geografik hududning o'ziga xos iqlimi, ijtimoiy-ekologik, etnografik xususiyatlari tabiat bilan inson o'rtasidagi o'zaro aloqa va munosabatlar xarakterini belgilab beradi. Bugun ekologik xavf shunday miqyosga yetdiki, u barcha mamlakatlarni o‘z harakatlarini qayta ko‘rib chiqishga majbur etmoqda. Dunyo bo‘ylab hayvonot dunyosining qisqarishi, tropik o‘rmonlarning

kesilishi va atmosferaga chiqarilayotgan millionlab tonna karbonat angidrid gazlari global iqlim o‘zgarishini keltirib chiqardi.

Bunday global inqirozlarga qarshi kurashishda oliy ta’lim muassasalari va ilmiy-tadqiqot institutlarining o‘rni beqiyosdir. Hozirgi kunda sanoat korxonalariga faqat sifatli mahsulot ishlab chiqarish emas, balki atrof-muhitga zarar yetkazmaslik ham asosiy talab sifatida qo‘yilmoqda.

Shu maqsadda, Toshkent kimyo-texnologiya instituti kabi nufuzli dargohlarda sanoat chiqindilarini tozalash bo‘yicha keng ko‘lamli ilmiy ishlar amalga oshirilmoqda. Xususan, “ALUTEX” qo‘shma korxonasi bilan ishlab chiqarish suvlarini tuzsizlantirish, shuningdek, shahar kanalizatsiya suvlaridagi cho‘kmalarni bartaraf etish bo‘yicha olib borilayotgan amaliy tadqiqotlar bunga yorqin misoldir.

Bundan tashqari, xalqaro hamkorlik aloqalari — Germaniya olimlari bilan chiqindilarni qayta ishlash loyihalari, Rossiyaning Qozon federal universiteti bilan imzolangan memorandumlar — ekologik ta’lim va ilm-fan uyg‘unligini yangi bosqichga olib chiqmoqda. Bunday hamkorliklar kelajakda nafaqat malakali kadrlar tayyorlash, balki sohaga oid zamonaviy adabiyot va qo‘llanmalar yaratish orqali ekologik madaniyatni jamiyatning barcha qatlamlariga singdirishga xizmat qiladi. Garchi oliy ta’lim va ilmiy-tadqiqot institutlarida salmoqli ishlar olib borilayotgan bo‘lsa-da, bugungi kunda tizimda quyidagi to‘siqlar ko‘zga tashlanmoqda:

- Nazariy bilim va amaliyotning uzilishi: Ko‘p hollarda talabalar global iqlim o‘zgarishi haqida nazariy ma’lumotga ega, biroq sanoat korxonalaridagi chiqindilarni tozalash yoki "yashil texnologiyalar"ni qo‘llash bo‘yicha real ko‘nikmalar yetishmaydi.
- Kadrlar tayyorlashdagi biryoqlama yondashuv: Ekologik ta’lim ko‘pincha faqat biologik yo‘nalish deb qaraladi. Vaholanki, zamonaviy sanoatda ekolog-muhandis, ekolog-iqtisodchi va ekolog-huquqshunos kabi kompleks mutaxassislarga ehtiyoj yuqori.

- Mahalliy muammolarga e’tiborning sustligi: Darsliklarda ko‘proq dunyo miqyosidagi muammolar yoritilib, talaba o‘zi yashayotgan hududdagi (masalan, mahalliy zavod chiqindisi yoki suv tanqisligi) muammolarni tahlil qilishga o‘rgatilmaydi.
- Infratuzilma va laboratoriya yetishmovchiligi: Ko‘plab hududiy OTMlarda zamonaviy ekologik monitoring o‘tkazish, suv va havo tarkibini tahlil qilish uchun yetarli moddiy-texnik baza shakllanmagan.

Ushbu muammolarni bartaraf etish va ekologik ta’lim samaradorligini oshirish uchun quyidagi choralar ko’rishimiz mumkin:

- "Ta’lim – Fan – Ishlab chiqarish" klasterini kuchaytirish: Toshkent kimyo-texnologiya instituti misolidagi kabi, talabalarning amaliyotini bevosita sanoat korxonalarida, filtratsiya va tozalash stansiyalarida tashkil etish. Har bir bitiruv ishi aniq bir ekologik muammoning yechimiga qaratilishi kerak.
- Raqamli ekologiyani joriy etish: Ekologik ta’lim jarayoniga Geografik axborot tizimlari (GAT) va masofadan zondlash texnologiyalarini o‘rgatishni kiritish. Bu yoshlarga ekologik holatni real vaqt rejimida xaritalash va bashorat qilish imkonini beradi.
- "Yashil universitet" (Green University) modeliga o‘tish: OTMlarning o‘zini ekologik namuna maskaniga aylantirish. Ya’ni, quyosh panellari o‘rnatish, suvni qayta ishlash tizimini yo‘lga qo‘yish va qog‘ozsiz (digital) ta’limga o‘tish orqali talabaga "ekologik turmush tarzi"ni amalda ko‘rsatish.
- Xalqaro tajriba va hamkorlikni kengaytirish: Germaniya, Rossiya va boshqa rivojlangan davlatlar bilan hamkorlikda "Dual ta’lim" tizimini rivojlantirish. Bunda talaba ham xalqaro nazariyani o‘rganadi, ham zamonaviy xorijiy texnologiyalarni boshqarishni o‘zlashtiradi.
- Ekologik madaniyatni rag‘batlantirish: Ekofaol talabalarni faqat ma’naviy emas, balki moddiy (maxsus stipendiyalar, grantlar) rag‘batlantirish tizimini yo‘lga qo‘yish orqali yoshlar orasida "yashil liderlik"ni shakllantirish.

Xulosa qilib aytganda, O‘zbekistonda uzluksiz ekologik ta’lim-tarbiya tizimini rivojlantirish — bu shunchaki o‘quv jarayoni emas, balki mamlakatimizning barqaror kelajagini ta’minlovchi strategik zaruriyatdir. Zero, tabiatga bo‘lgan munosabat insonning ma’naviy qiyofasini va jamiyatning madaniyat darajasini belgilovchi asosiy mezondir.

Bugun biz ko‘rib chiqqan maktabgacha ta’limdagi ilk ekologik tushunchalar, oliy ta’limdagi ilmiy tadqiqotlar va “Yashil makon” kabi umummilliy loyihalar bir maqsadga — tabiat bilan uyg‘un yashaydigan, resurslarni qadrlaydigan va global iqlim o‘zgarishlariga tayyor bo‘lgan “ekofaol avlod”ni tarbiyalashga xizmat qiladi. Toshkent kimyo-texnologiya instituti va boshqa nufuzli OTMlarning sanoat korxonalari bilan hamkorligi, xalqaro ilmiy aloqalarning kengayishi esa nazariy bilimlarni amaliy yechimlarga aylantirish imkonini bermoqda. Biroq, ko‘zlangan natijaga erishish uchun faqat ta’lim muassasalarining harakati kifoya qilmaydi. Bu jarayonda har bir fuqaro, har bir oila va tadbirkorlik subyektlari ekologik mas’uliyatni o‘zining kundalik hayot tarziga aylantirishi lozim. **Zero, tabiatni asrash — bu hayotni asrash demakdir.**

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MATEMATIKA TA’LIMINING O‘QUVCHILAR INTELLEKTUAL RIVOJLANISHIDAGI AHAMIYATI

Dusanova Dilnoza Xurazbayevna

Samarqand shahar 20-umumiy o‘rta ta’lim maktabi

furqatxoliqulov1985@gmail.com

Annotatsiya. *Ushbu maqolada matematika fanining o‘quvchilar intellektual rivojlanishidagi o‘rni, matematik madaniyatni shakllantirishdagi ahamiyati hamda*

matematik ta’lim jarayonida masalalardan foydalanishning samarali usullari yoritilgan. Shuningdek, matematik masalalarga an’anaviy va muammoli yondashuv usullari tahlil qilinib, o‘quvchilarda mustaqil fikrlash, mantiqiy mushohada yuritish hamda kompetensiyalarni shakllantirishdagi roli ko‘rsatib berilgan.

Kalit so‘zlar: *matematika ta’limi, kompetensiya, matematik madaniyat, muammoli ta’lim, nostandart masalalar, mantiqiy tafakkur.*

Abstract. *This article discusses the role of mathematics in the intellectual development of students, its importance in the formation of mathematical culture, and effective methods of using problems in the process of mathematical education. It also analyzes traditional and problem-based approaches to mathematical problems, and shows their role in the formation of independent thinking, logical observation, and competencies in students.*

Keywords: *mathematics education, competence, mathematical culture, problem-based education, non-standard problems, logical thinking.*

Kirish. Matematika inson tafakkurini rivojlantiruvchi eng muhim fanlardan biri hisoblanadi. Ushbu fan nafaqat hisob-kitob qilish yoki matematik formulalarni o‘zlashtirish bilan cheklanib qolmay, balki insonning intellektual salohiyati, mantiqiy fikrlashi, diqqat-e’tibori va iroda sifatlarini rivojlantirishda muhim ahamiyat kasb etadi. Matematika insonni maqsadga erishish yo‘lida qat’iyatli bo‘lishga, muammolarni izchil va algoritmik tarzda hal etishga o‘rgatadi. Shuningdek, matematika olamni bilishning asosi bo‘lib, tevarak-atrofdagi voqea va hodisalarning qonuniyatlarini ochib berishda muhim rol o‘ynaydi. Fan-texnika, ishlab chiqarish, iqtisodiyot hamda zamonaviy texnologiyalar rivoji matematik bilimlarsiz tasavvur etib bo‘lmaydi. Shu sababli matematik madaniyat umuminsoniy madaniyatning ajralmas tarkibiy qismi hisoblanadi. Bugungi kunda ta’lim tizimida matematikani o‘qitishga yangicha pedagogik yondashuvlar qo‘llanilmoqda. Xususan, faqat nazariy bilimlarni berishga asoslangan an’anaviy ta’limdan voz

kechib, o‘quvchilarning matematik bilimlarni kundalik hayotda qo‘llay olish kompetensiyalarini shakllantirishga alohida e’tibor qaratilmoqda.

Asosiy qism. Matematik ta’limda kompetensiyaviy yondashuv.

Zamonaviy ta’lim tizimida kompetensiyaviy yondashuv muhim o‘rin egallaydi. Ushbu yondashuv o‘quvchilarda faqat nazariy bilimlarni emas, balki real hayotda uchraydigan muammolarni hal qila olish qobiliyatini ham shakllantirishga qaratilgan.

Matematik ta’limda kompetensiyaviy yondashuv quyidagi vazifalarni amalga oshirishni nazarda tutadi:

- o‘quvchilarning mustaqil fikrlash ko‘nikmalarini rivojlantirish;
- matematik bilimlarni amaliyotda qo‘llay olish malakasini shakllantirish;
- kasbiy faoliyatda zarur bo‘ladigan matematik kompetensiyalarni rivojlantirish;
- o‘quvchilarning mantiqiy va tanqidiy fikrlash qobiliyatlarini mustahkamlash.

Bugungi globallashuv sharoitida mamlakatlarning dunyo hamjamiyatiga integratsiyalashuvi, ilm-fan va texnologiyalarning jadal rivojlanishi yosh avloddan yuqori bilim va malakani talab qiladi. Ayniqsa, zamonaviy mehnat bozorida raqobatbardosh bo‘lish uchun matematik bilimlarni mukammal egallash muhim hisoblanadi. Shu sababli ta’lim tizimida ilg‘or milliy va xalqaro tajribalar asosida yangi standartlar joriy etilmoqda.

Matematik masalalarning ta’lim jarayonidagi ahamiyati. Matematika fanini o‘qitishda masalalardan foydalanish alohida ahamiyatga ega. Matematik masalalar o‘quvchilarning bilimlarini mustahkamlash bilan birga ularning mantiqiy fikrlash qobiliyatlarini ham rivojlantiradi.

Ta’lim jarayonida ayniqsa amaliy va nostandart masalalardan foydalanish o‘quvchilarning matematika faniga bo‘lgan qiziqishini oshiradi. Bunday masalalar o‘quvchilarda analiz, sintez, analogiya, umumlashtirish, deduksiya va induksiya kabi mantiqiy fikrlash jarayonlarini rivojlantiradi. Shuningdek, nostandart

masalalarni yechish jarayonida o‘quvchilar intuitsiya, moslashuvchanlik va ijodiy fikrlash kabi muhim sifatlarni rivojlantiradi. Ayrim hollarda bunday masalalarning yechimi darhol topilmasligi mumkin. Masalani bir necha bor urinishlar orqali hal etish jarayoni esa o‘quvchilarda sabr-toqat, tirishqoqlik va iroda kabi shaxsiy fazilatlarning shakllanishiga yordam beradi.

Quyida o‘quvchilarni fikrlash qobiliyatini rivojlantiruvchi bir nechta misollarni ko‘rib chiqamiz:

1-misol. Ixtiyoriy haqiqiy a son uchun $\frac{a^2+2}{\sqrt{a^2+1}} \geq 2$ tengsizlik bajarilishini isbotlang.

Isbot. $\frac{a^2+2}{\sqrt{a^2+1}} = \frac{a^2+1+1}{\sqrt{a^2+1}} = \frac{a^2+1}{\sqrt{a^2+1}} + \frac{1}{\sqrt{a^2+1}} = \sqrt{a^2+1} + \frac{1}{\sqrt{a^2+1}}$. Ikkita musbat o‘zaro teskari sonlar yig‘indisining xossasiga ko‘ra, $\sqrt{a^2+1} + \frac{1}{\sqrt{a^2+1}} \geq 2$.

Demak, $\frac{a^2+2}{\sqrt{a^2+1}} \geq 2$. Isbotlandi.

2-misol. $f(x)$ funksiya ixtiyoriy musbat x va y o‘zgaruvchilar $f(xy) = f(x) + f(y)$ tenglikni qanoatlantiradi. Agar $f(\frac{1}{2007}) = 1$ bo’lsa, $f(2007)$ ni hisoblang.

Yechish. Shartga ko‘ra, $f(1 \cdot 1) = f(1) + f(1)$ yoki, $f(1) = 2f(1)$. Bu yerdan, $f(1) = 0$ kelib chiqadi. Bundan tashqari barcha musbat sonlar uchun

$$f(1) = f(x \cdot \frac{1}{x}) \Leftrightarrow 0 = f(x) + f(\frac{1}{x}) \Leftrightarrow f(x) = -f(\frac{1}{x}) \text{ bajariladi.}$$

Bundan, $x = 2007$ da masala shartiga ko‘ra, $f(2007) = -f(\frac{1}{2007}) \Leftrightarrow f(2007) = -1$.

Demak, $f(2007) = -1$.

Matematik masalalarga yondashuv usullari. Matematika ta’limida masalalarga ikki asosiy yondashuv mavjud:

An’anaviy yondashuv

1. Masala shartini tahlil qilish;
2. Yechish usulini aniqlash;
3. Yechish jarayoni;
4. Natijani ma’lum javob bilan solishtirish.

Bu yondashuvda o‘quvchi tayyor algoritm asosida ishlaydi.

Muammoli yondashuv

1. Muammoli vaziyatni tahlil qilish;
2. Muammoni qo‘yish;
3. Yetishmaydigan ma’lumotlarni aniqlash;
4. Gipotezalar shakllantirish;
5. Gipotezalarni tekshirish;
6. Muammoni matematik masalaga aylantirish;
7. Masala yechish usulini izlash;
8. Yechish jarayoni;
9. Natijani tekshirish;
10. Yechimni asoslash.

Bunday yondashuv o‘quvchilarning tadqiqotchilik faoliyatini rivojlantiradi va mustaqil bilim olishga yordam beradi.

Xulosa. Matematika ta’limi o‘quvchilarning intellektual rivojlanishida muhim o‘rin tutadi. U nafaqat nazariy bilimlarni, balki mantiqiy fikrlash, mustaqil qaror qabul qilish va muammolarni tahlil qilish ko‘nikmalarini ham shakllantiradi.

Ta’lim jarayonida amaliy va nostandart masalalardan foydalanish hamda muammoli yondashuvni qo‘llash o‘quvchilarning matematika faniga bo‘lgan qiziqishini oshiradi va ularning ijodiy hamda tanqidiy fikrlash qobiliyatlarini rivojlantiradi.

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TEXNOLOGIYA FANI DARSLARIDA PEDAGOGIK INNOVATSIYALARNI QO‘LLASH ORQALI O‘QUVCHILARNING IJODKORLIK QOBILIYATLARINI RIVOJLANTIRISH

Ergasheva Noila Olimjonovna
Termiz davlat pedagogika instituti
E-mail: olimjonovnanoila04010310@gmail.com

Annotatsiya. *Ushbu maqolada texnologiya fani darslarida zamonaviy pedagogik innovatsiyalarni qo‘llash orqali o‘quvchilarning ijodiy tafakkuri va amaliy ko‘nikmalarini rivojlantirishning samarali yo‘llari yoritilgan. Shuningdek, texnologiya fanlarini o‘qitishda pedagogik innovatsiyalarni qo‘llashni hisobga olgan holda o‘quvchilarning ijodkorlik qobiliyatlarini rivojlantirishga qaratilgan ta’lim amalyotini takomillashtirish va uning samaradorligini oshirish bo‘yicha muhim ko‘rsatmalarni yoritiladi.*

Kalit so‘zlar: *Ijodkorlik, qobiliyat, muammolar, pedagogik innovatsiya, ta’lim, baholash, standartlashtirish, ijodiy jihatlar, ta’lim amaliyoti, ko‘nikmalarni rivojlantirish.*

Аннотация. *В этой статье рассматриваются эффективные способы развития творческого мышления и практических навыков учащихся за счет применения современных педагогических инноваций на уроках технологии. Также будут освещены важные направления совершенствования образовательной практики и повышения ее эффективности, направленные на развитие творческих способностей учащихся с учетом применения педагогических инноваций в преподавании технологических дисциплин.*

Ключевые слова: *творчество, способности, проблемы, педагогические инновации, образование, оценка, стандартизация, творческие аспекты, образовательная практика, развитие навыков.*

Annotation; *this article covers effective ways to develop creative thinking and practical skills of students through the application of modern pedagogical innovations in the lessons of technology. It will also highlight important guidelines for improving educational practice and improving its effectiveness, aimed at developing the creativity abilities of students, taking into account the application of pedagogical innovations in the teaching of technology disciplines.*

Keywords: *creativity, ability, problems, pedagogical innovation, education, assessment, standardization, creative aspects, educational practice, skill development.*

KIRISH.

Texnologiya fani darslarida pedagogik innovatsiyalarni qo‘llash orqali o‘quvchilarning ijodkorlik qobiliyatlarini rivojlantirish fan tizimidagi dolzarb va muhim muammolardan hisoblanadi. Boshqa sohalardagi kabi ta’lim jarayonlaridagi tezkorlik va yangi texnologiyalar o‘quv jarayonlariga to‘g‘ridan to‘g‘ri ta’sir ko‘rsatib, olib borilayotgan dars jarayonlarining bir qancha sifat ko‘rsatgichlarini oshirib, shu bilan bir qatorda pedagoklardan o‘z kasb malakalarini uzuksiz yangilab

borishni talab ham qilmoqda. Ayni shu holatlar yuzasidan pedagoklarimiz inovatsion pedagogik texnologiylarni ishlab chiqish, ularni ta'lim tizimida qo'llash, dars jarayonlarida o'quvchilarga berilayotgan bilimni yaxshiroq va osonroq yetqazish uchun kasb kompetensiyalariga ega bo'lishi ta'lim berishdagi sifat ko'rsatkichlarining birinchi pillapoyasi hisoblanadi.

ADABIYOTLAR TAHLI VA METODOLOGIYASI.

Pedagogik texnologiya – o'quv jarayonining o'quvchilar va o'qituvchi uchun so'zsiz qulay sharoitlarni ta'minlashni loyihalash, tashkil etish va o'tkazish bo'yicha hamma detallari o'ylab chiqilgan birgalikdagi pedagogik faoliyat modelidir deydi V.M.Monaxov. Shunday ekan innovatsion pedagogik texnologiyalarni o'quv jarayonida qo'llash axborotlar almashinuvi, uni o'zlashtirilishi va bu jarayonning davom etishiga hissa qo'shadi.

Ijodiy qobiliyatlarning shakllanishi haqida bir qancha nazariyalar mavjud. Ayrim olimlar fikriga ko'ra, bu qobiliyatlar asta-sekin, vaqtlar davomida shakillanadigan jarayon bo'lib uni birdaniga rivojlatirishning iloji yo'q. Shunday ekan nafaqat jamiyat balki insondagi qobiliyatlar ham rivoj topadi, innsonlar raqobatda bir biriga o'xshamaydigan narsalarni yaratishda davom etadi

Ta'lim berishning asosiy vazifasi–o'quvchilarning shaxsiy imkoniyatlari va ijodkorlik qobiliyatlarinini rivojlantirish. O'qituvchi va o'quvchilar o'rtasidagi ijodiy hamkorlik muhiti orqali o'quvchilar o'z ijodiy salohiyatini to'laqonli namoyon eta oladilar va tashqaridan bildirilgan fiklarni ham tahlil qiladilar. Rossiyalik olimlar ham bu borada turli fikrlar bildirgan. Masalan, I.P. Volkov ijodiy faoliyatga jalb etish orqali bu qobiliyatlarni rivojlantirish kerakligini aytgan bo'lsa, G.S. Alsxuller ijodiy fikrlash texnikasini o'rgatish zarurligini ta'kidlagan. I.P. Ivanov esa bu jarayon ijtimoiy faollik va madaniyatni yuksaltiruvchi vosita ekanligini qayd etgan.

Innovatsion pedagok

Pedagokning innovatsion kasbiy faollik bilan shug'ullanishga tayyorgarlik bosqichi, bu kasb jarayonida talab etiladigan zarur ko'rsatkichlardan bittasi. Bu orqali pedagok innovatsion faoliyatda ijodiy izlanishda bo'ladi, ta'limning shakli va

mazmunini takomillashtirish hususida g‘oyalar genatsiyasi ishlashda davom etadi. Yangiliklar kashf etish uni o‘quv jarayonida qo‘llash o‘quvchilarda ham yaratuvchilik, ijodkorlik, mustaqil fikr yuritish, mantiqiylik va borliqqa ongli munosabatni to‘g‘ri bildish kabi yosh avlod uchun muhim aqliy jarayonlarning rivojlanishiga hissa qo‘shadi.

“Innovatsiya” bu lotincha so’z bo’lib, yangilanish, “yangilik” ma’nosini ifoda etadi. Innovatsion ta’lim-tarbiya jarayonining shakli va mazmunini takomillashtirishga xizmat qiluvchi yangi g‘oyalar yaratishni ko’zda tutadi. Innovatsion g‘oyalar zamirida ijodkorlik yotadi negaki har bir shaxs yangilik yaratish jarayonida o‘z aqliy, ruxiy va jismoniy holat nuqati nazaridan bu ishga ijodiy yondoshadi va uning qilayotgan ishida yuqoridagi holatlar akslanadi. Pedagogik innovatsiyalar ta’lim sifati va samaradorligi ortishiga xizmat qiladi. Hozirgi jamiyatdagi har qanday yangilanish jarayonlari, islohotlar mohiyati bilan uzviy bog‘liq holda ro’y beradi. Davlat ta’lim standartlarining yangilanib borayotganligi; o’quv-metodik adabiyotlar, darsliklar, dasturlar, ta’lim sohalariga oid klassifikatorlar mazmun-mohiyati takomillashib borayotganligi yangi-yangi pedagogik konsepsiyalarga turtki bermoqda. Bu kabi yangilanishlar pedagogik innovatsiyalarning ta’lim sohalari va uzluksiz ta’lim tizimiga jadal kirib borishini taqazo etmoqda.

Texnologiya fani o‘quvchilarda nafaqat bilim, balki ijodkorlik va analitik fikrlashni rivojlantirishda muhim rol o‘ynaydi. Bugungi kunda pedagogik innovatsiyalarni qo‘llash o‘quvchilarning bilim olish jarayonini yanada samarali va qiziqarli qilishga yordam beradi. Texnologiya fanlarida pedagogik innovatsiyalarni qo‘llashning ahamiyati.

- **Pedagogik innovatsiyalar tushunchasi**: Pedagogik innovatsiyalar - bu yangi ta’lim uslublari, metodlar va texnologiyalarni ta’lim jarayoniga joriy etishdir. Ular o‘quvchilarning faolligini oshirish, ijodiy yondashuvni rivojlantirish va bilimlarni chuqurroq o‘zlashtirishga yordam beradi.

- **Texnologiyalarning roli**: Texnologiya fanlari o‘quvchilarga yangi bilimlarni o‘zlashtirishda va real hayotda qo‘llashda innovatsion yondashuvlarni qo‘llash

imkonini beradi. Ular yasalayotgan buyumni modellashtirish, ilmiy asosga ega tajribalar o‘tkazish, dars jarayonida passiv tizm o‘rniga aktiv tizimni o‘rnatish va boshqa ko‘plab pedagogik ta’lim vositalarni o‘z ichiga oladi.

O‘quvchilarning ijodkorligini rivojlantirish

Texnologiya fanida o‘quvchilar ijodkorligini rivojlantirishda qo‘llanishi mumkin bo‘lgan ba’zi usullar:

Tajriba o‘tkazish: O‘quvchilarga real muammolarni yechish uchun tajribalar o‘tkazish va natijalarni tahlil qilish imkonini berish. O‘quvchi mato kamligi sabab tikayotgan buyumiga o‘zgartirishlar kiritadi.

Yangi g‘oyalarni ishlab chiqish: O‘quvchilardan yangi biror bir buyum tayyolash uchun yangicha yondoshuv yoki innovatsion yechimlar taklif qilishni so‘rash.

Interaktiv o‘yinlar va simulyatsiyalar: Darslarni qiziqarli va o‘yin tarzida tashkil qilish orqali o‘quvchilarning faolligini oshirish.

Innovatsion Yondashuvlar

1. Interaktiv Darslar

Interaktiv darslar o‘quvchilarni faollashtirish va ijodiy fikrlashlarini rivojlantirish uchun samarali vositadir. Misol uchun, guruhlarda muammo yechish va ijodiy loyiha ishlari orqali o‘quvchilar o‘z fikrlarini erkin ifoda etish imkoniyatiga ega bo‘ladilar.

2. Axborot Texnologiyalaridan Foydalanish

Kompyuterlar, internet va mobil ilovalar orqali ta’lim jarayonini samarali tashkil etish mumkin. O‘quvchilar ushbu vositalar yordamida turli xil loyiha va tadqiqotlar olib borishda o‘z ijodkorliklarini namoyon etadilar. Masalan, onlayn platformalarda o‘z fikrlarini muhokama qilish yoki video loyihalar yaratish orqali ular ijodkorlik ko‘nikmalarini rivojlantiradilar.

3. O‘yin asosida ta’lim

O‘yinli ta’lim usullarini qo‘llash orqali o‘quvchilarni dars jarayoniga jalb qilish va ularning motivatsiyasini oshirish mumkin. Bu o‘quvchilarni yangi bilimlarni o‘rganishga, ijodiy fikrlashga va jamoaviy ishga tayyorlaydi.

Pedagogik innovatsiyalarni qo‘llash orqali o‘quvchilarning ijodkorlik qobiliyatlarini rivojlantirish, zamonaviy ta’lim tizimining ajralmas qismi hisoblanadi. Texnologiya fani darslarida innovatsion uslublarni qo‘llash yordamida o‘quvchilarning kreativ fikrlash ko‘nikmalari va ijodkorlik qobiliyatlari quyidagi yo‘nalishlarda rivojlanishi mumkin:

Interactive Learning (Interaktiv o‘qitish): O‘quvchilarga texnologiya fanida interaktiv o‘quv materiallari taqdim etish, masalan, simulatsiyalar, o‘yinlar va multimedia resurslari orqali ijodkorlikni rag‘batlantirish.

Problem-Based Learning (Muammo asosida o‘qitish): O‘quvchilarga real hayotdagi muammolarni hal qilish vazifalarini berish. Bu usul o‘quvchilarning analitik fikrlash va ijodiy yechimlar topish qobiliyatlarini rivojlantiradi.

Project-Based Learning (Loyihaga asoslangan o‘qitish): O‘quvchilarni o‘zlarining loyiha g‘oyalarini ishlab chiqishga va amalga oshirishga rag‘batlantirish. Bunday loyihalar ijodiy fikrlashni, hamkorlikni va muammolarni hal qilishni o‘rgatadi.

Collaborative Learning (Hamkorlikda o‘qitish): O‘quvchilarni kichik guruhlarga bo‘lib, birgalikda ishlashga undash. Bunda o‘zaro fikr almashish va yaratuvchanlikni rag‘batlantirish mumkin.

Technology Integration (Texnologiyani integratsiya qilish): O‘quvchilarga Robototexnik asboblarini (masalan, 3D chop etish, virtual reallik, kodlash) o‘rganishda yordam berish, bu esa ularning ijodkorlik ko‘nikmalarini rivojlantiradi.

Feedback Mechanisms (Kompensatsiya mexanizmlari): O‘quvchilarga o‘z ishlariga haqiqiy va konstruktiv fikrlarni taqdim etish, bu esa ularning ijodiy ishlari ustida yanada ko‘proq ishlashlariga yordam beradi.

Mind Mapping (Fikr xaritalari): O‘quvchilarning g‘oyalarini vizual ravishda tasvirlash imkoniyatini beradi. Bu usul ijodiy jarayonlarni yaxshiroq tushunishga va fikrlarni bog‘lashga yordam beradi.

Ijodiy fikrlashni rivojlantirish uchun ochiq bo‘lmagan, murakkab va to‘liq bo‘lmagan vaziyatlardan foydalanish samarali hisoblanadi. O‘quv jarayoni ijodiy

faoliyatga asoslanishi, o‘quvchilarning shaxsiy xususiyatlariga ijobiy ta’sir ko‘rsatib, bir qancha muhim fazilatlarni shakllantiradi.

Xulosa

O‘zbekistonning ta’lim tizimi yangilanishni davom ettirayotgani va texnologiya fanlarini o‘qitishda innovatsion pedagogik metodlarni qo‘llashga alohida e’tibor qaratilayotgani muhimdir. Texnologiya fanlari – bu o‘quvchilarni nafaqat amaliy ko‘nikmalar, balki ijodkorlik, mustaqil fikrlash va analitik yondashuvlarni rivojlantirishga yo‘naltirilgan fanlar bo‘lib, pedagogik innovatsiyalar bu jarayonni yanada samarali qilishda katta rol o‘ynaydi. Zamonaviy ta’lim tizimida ijodkorlik va innovatsion fikrlash qobiliyatlarini rivojlantirish o‘ta muhim ahamiyatga ega. Texnologiya fani darslari o‘quvchilarda nafaqat nazariy bilimlar bilan ta’minlaydi, balki ularda amaliy ko‘nikmalarni ham shakllantiradi. Pedagogik innovatsiyalarni joriy etish orqali o‘quvchilarning ijodkorlik qobiliyatlarini rivojlantirish ta’lim jarayonini samarali va qiziqarli qilishi mumkin. Texnologiyalar, xususan, interaktiv ta’lim platformalari, ko‘rgazmali materiallar, virtual laboratoriyalar va boshqa raqamli resurslar o‘quvchilarning ijodkorlik qobiliyatlarini rivojlantirishda muhim rol o‘ynaydi. Ular o‘quvchilarga:

- Erkin fikrlash imkoniyatini beradi,
- Qiziquvchanlik va yangilikka ochiqlikni rag‘batlantiradi,
- Muammoni yechish jarayonida ijodkorlik ko‘nikmalarini rivojlantirish imkonini yaratadi.

Ushbu usullar yordamida o‘quvchilar o‘z ijodiy fikrlash qobiliyatlarini rivojlantirishi mumkin. Pedagoglar bu innovatsiyalarni o‘quv jarayoniga muvaffaqiyatli ravishda tatbiq etish orqali o‘quvchilarda qiziqish va motivatsiyani oshirishlari lozim.

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TARJIMON TALABALARIGA TARJIMA VA TAHRIR FANINI O'QITISHDA SINERGETIK YONDASHUVNING NAZARIY-METODOLOGIK ASOSLARI

Farxodova Dilnoza Jumaboy qizi

O‘zbek davlat jahon tillari universiteti

dilnozad268@gmail.com

Anotatsiya. *Mazkur maqolada tarjimon talabalariga tarjima va tahrir fanini o'qitishda sinergetik yondashuvning nazariy-metodologik asoslari tahlil qilinadi. Sinergetikaning ochiq tizimlilik, nolinearlik va o'zo'zini tashkil etish kabi tamoyillari tarjima jarayoniga tatbiq etilib, uning didaktik imkoniyatlari asoslab beriladi. Tadqiqot natijalari sinergetik yondashuv tarjima jarayonida variantlilikni ta'minlashi, talabalarining refleksiv fikrlashini rivojlantirishi hamda ularning mustaqil qaror qabul qilish kompetensiyasini shakllantirish*

Kalit so'zlar: *tarjimon talabalari, tarjima va tahrir, sinergetik yondashuv, tizimlilik, didaktika va kompetensiya*

Annotation. *This article examines the theoretical and methodological foundations of the synergetic approach to teaching translation and editing to student translators. The principles of synergetics, such as system openness, nonlinearity, and self-organization, are interpreted in relation to the translation process, and their didactic potential is revealed. The results of the study demonstrate that the synergetic approach promotes the development of translation variability and the formation of reflective thinking.*

Key words: *translation students, translation and edit, synergetic approach, systemicity, competence*

Kirish

Zamonaviy tarjima ta'limi tizimi murakkab kommunikativ faoliyatni egallagan mutaxassisni shakllantirishga yo'naltirilgan bo'lib, bu jarayon oddiy lingvistik

bilimlarni o'zlashtirish bilan cheklanmaydi. Tarjima va tahrir faoliyati mazmunni qayta qurish, kontekstni talqin qilish hamda kommunikativ maqsadni yangi til vositalari orqali ifodalash kabi ko'p bosqichli jarayonni o'z ichiga oladi. Shu sababli tarjima ta'limida chiziqli va reproduktiv metodlar yetarli samara bermaydi.

So'nggi yillarda pedagogik tadqiqotlarda sinergetik yondashuv ta'lim jarayonini tushuntirish va tashkil etishda muhim nazariy asos sifatida qaralmoqda. Sinergetika murakkab, ochiq va nolinear tizimlarning o'zo'zini tashkil etish qonuniyatlarini o'rganadi. Tarjima jarayoni ham aynan shunday tizimga xos bo'lib, unda yagona to'g'ri yechim emas, balki ko'plab ehtimoliy variantlar mavjud bo'ladi.

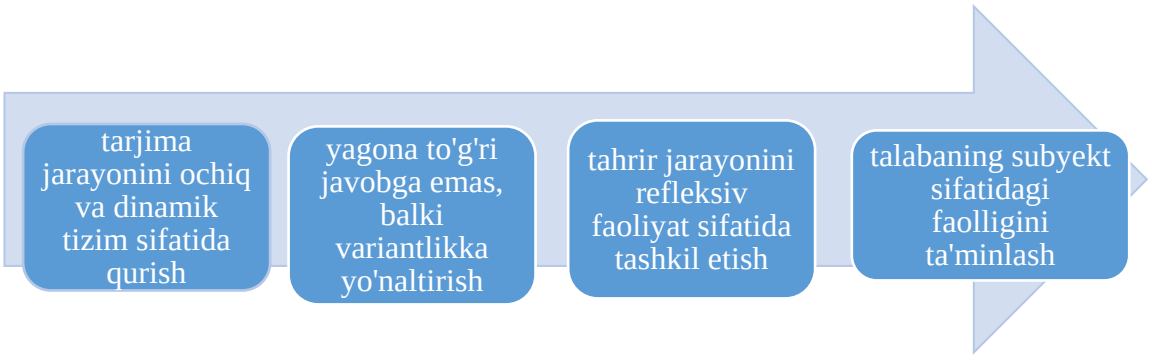
Mazkur maqolaning maqsadi tarjimon talabalariga tarjima va tahrir fanini o'qitishda sinergetik yondashuvning nazariy va metodologik asoslarini ochib berish hamda uning didaktik imkoniyatlarini asoslashdan iborat.

Methodology

Tadqiqot metodologiyasi umumilmiy va xususiy ilmiy yondashuvlar sintezi asosida shakllantirildi. Avvalo, sinergetikaning asosiy kategoriyalari - ochiq tizimlilik, nolinearlik, o'zo'zini tashkil etish va bifurkatsiya tushunchalari tahlil qilindi va ular tarjima faoliyatining ichki mexanizmlari bilan bog'landi.

Nazariy tahlil shuni ko'rsatadiki, tarjima jarayoni qat'iy algoritmik modelga emas, balki ehtimollik va variantlilikka asoslangan faoliyatdir. Har bir tarjima vazifasi o'ziga xos “bifurkatsiya nuqtalari”ni yuzaga keltiradi, ya'ni tarjimon bir nechta muqobil variantlar orasidan tanlov qilishga majbur bo'ladi. Bu esa sinergetik tizimning asosiy belgilaridan biri hisoblanadi.

Metodik nuqtai nazardan, sinergetik yondashuv tarjima ta'limini quyidagi tamoyillar asosida tashkil etishni nazarda tutadi: (1-rasmga qarang)



Shuningdek, sinergetik yondashuv tarjima faoliyatini faqat natija emas, balki jarayon sifatida o'rganishni talab qiladi. Bu esa ta'limda jarayoniylik va refleksiya komponentlarini kuchaytiradi.

Mazkur tadqiqotda sinergetik yondashuv tarjima va tahrir fanini o'qitishning metodologik asosi sifatida qaraldi. Ushbu yondashuvga ko'ra, tarjima jarayoni oddiy va chiziqli jarayon emas, balki murakkab, o'zgaruvchan va ko'p variantli faoliyat hisoblanadi. Shu sababli uni o'qitishda ham mos, ya'ni ochiq va moslashuvchan metodika qo'llanilishi zarur.

Dars jarayonida tarjima faoliyati tayyor qoidalarni yodlash orqali emas, balki matn bilan faol ishlash orqali tashkil etildi. Talabalarga bir xil matn berilib, undan bir nechta tarjima variantlarini ishlab chiqish vazifasi qo'yildi.

Tarjima jarayonida talabalar quyidagi ketma-ketlikda ishladi:
1. avvalo matn mazmunini tushundi;
2. so'ng uni o'z tilida ifodalashga harakat qildi;
3. keyin esa o'z tarjimasini qayta ko'rib chiqdi va tahrir qildi;

Bu jarayon ularga tarjimani bosqichma-bosqich anglashga yordam berdi.

Tahrir ishlari alohida ahamiyatga ega bo'ldi. Talabalar faqat xatolarni tuzatish bilan cheklanmay, balki matnning ma'nosi, uslubi va tushunarliligini ham tekshirdi. Ular o'z ishlari va guruhdoshlarining tarjimalarini solishtirib, qaysi variant yaxshiroq ekanini asoslaydilar.

Darslarda guruh bilan ishlash ham qo'llanildi. Talabalar kichik guruhlarga bo'linib, bir xil matn ustida ishladi va yakunda umumiy xulosaga keldi. Bu usul ularning fikr almashish va o'z qarorini himoya qilish ko'nikmalarini rivojla

Natijalar

Nazariy-metodologik tahlil natijalari shuni ko'rsatadiki, sinergetik yondashuv tarjima va tahrir fanini o'qitishda sifat jihatidan yangi didaktik modelni shakllantiradi.

Birinchidan, tarjima jarayonida variantlilik prinsipi ustuvor ahamiyat kasb etadi. Talabalar birgina “to'g'ri tarjima” tushunchasidan chiqib, turli kontekstual

yechimlarni ishlab chiqishga o'rganadi. Bu esa tarjimaning ijodiy mohiyatini ochib beradi.

Ikkinchidan, tahrir faoliyati chuqurlashadi. An'anaviy yondashuvda tahrir ko'proq xatolarni tuzatishga qaratilgan bo'lsa, sinergetik modelda u matnning semantik, stilistik va pragmatik xususiyatlarini kompleks tahlil qilishga yo'naltiriladi. Natijada tahrir refleksiv va analitik faoliyatga aylanadi.

Uchinchidan, talabalarda mustaqil qaror qabul qilish kompetensiyasi shakllanadi. Tarjima jarayonidagi tanlov vaziyatlari ularni turli variantlarni baholash va optimal yechimni aniqlashga undaydi. Bu esa professional tarjimon uchun zarur bo'lgan muhim ko'nikmalardan biridir.

To'rtinchidan, o'zo'zini tashkil etish mexanizmlari faollashadi. Talabalar o'z faoliyatini rejalashtirish, nazorat qilish va baholash orqali ta'lim jarayonining faol subyektiga aylanadi.

Shunday qilib, sinergetik yondashuv tarjima ta'limini statik bilim berish modelidan dinamik va interaktiv tizimga o'tkazadi.

Xulosa

Mazkur tadqiqot natijalari shuni ko'rsatadiki, tarjima va tahrir fanini o'qitishda sinergetik yondashuv asosida tashkil etilgan o'quv jarayonida talabalar tarjima faoliyatining mohiyatini chuqurroq anglaydi, muqobil variantlar ustida ishlash orqali analitik va tanqidiy fikrlash ko'nikmalarini rivojlantiradi. Shuningdek, tahrir jarayonining refleksiv tashkil etilishi talabalarni matn bilan ongli ishlashga yo'naltiradi hamda ularning mustaqil qaror qabul qilish kompetensiyasini shakllantiradi.

Ushbu yondashuvning yana bir muhim jihati shundaki, u talabani passiv bilim oluvchidan faol va mustaqil subyekt darajasiga olib chiqadi. Natijada tarjima va tahrir jarayoni faqat natijaga yo'naltirilgan faoliyat sifatida emas, balki bosqichma-bosqich shakllanuvchi, tahlil va refleksiyaga asoslangan murakkab jarayon sifatida qaraladi.

Shu bilan birga, sinergetik yondashuv tarjima ta'limida zamonaviy didaktik tamoyillarni uyg'unlashtirishga, xususan, jarayoniylik, interaktivlik va refleksivlikni

kuchaytirishga imkon beradi. Bu esa tarjimon tayyorlash jarayonining sifatini oshirishda muhim omil bo'lib xizmat qiladi.

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OLIY TA’LIMDA AKSIOLOGIK MUHITNI SHAKLLANTIRISH MEXANIZIMI

G‘aybullayev Quvonchbek G‘olibjon o‘g‘li
Buxoro davlat universiteti

Annotatsiya. *Mazkur maqolada oliy ta’lim tizimida aksiologik muhitni shakllantirish mexanizmlari ilmiy-nazariy va amaliy jihatdan tahlil qilinadi. Aksiologik yondashuvning mazmuni, uning ta’lim jarayonidagi o‘rni hamda talabalarda umuminsoniy va milliy qadriyatlarni shakllantirishdagi ahamiyati ochib beriladi. Shuningdek, oliy ta’lim muassasalarida qadriyatlarga asoslangan*

ta'limiy muhitni yaratishning pedagogik, tashkiliy va ijtimoiy-madaniy omillari yoritiladi. Muallif tomonidan aksiologik muhitni shakllantirishda professor-o'qituvchilarning shaxsiy namunalari, ta'lim mazmunining qadriyatlarga yo'naltirilganligi, interfaol metodlardan foydalanish, ma'naviy-ma'rifiy tadbirlar hamda talabalar faol ishtirokini ta'minlash muhim mexanizmlar sifatida asoslanadi.

Kalit so'zlar: *aksiologiya, aksiologik muhit, oliy ta'lim, ta'lim jarayoni, qadriyatlar tizimi, umuminsoniy qadriyatlar, milliy qadriyatlar, shaxs kamoloti, ma'naviy-axloqiy tarbiya, pedagogik yondashuv, ta'lim sifati.*

Аннотация. *В данной статье научно-теоретически и практически анализируются механизмы формирования аксиологической среды в системе высшего образования. Раскрывается сущность аксиологического подхода, его роль в образовательном процессе и значение в формировании у студентов общечеловеческих и национальных ценностей. Освещаются педагогические, организационные и социокультурные факторы создания ценностно ориентированной образовательной среды в высших учебных заведениях. Обосновывается, что личный пример преподавателей, ценностная направленность содержания образования, использование интерактивных методов обучения, духовно-просветительская работа и активное участие студентов выступают ключевыми механизмами формирования аксиологической среды*

Ключевые слова: *аксиология, аксиологическая среда, высшее образование, образовательный процесс, система ценностей, общечеловеческие ценности, национальные ценности, развитие личностию*

Abstract. *This article provides a theoretical and practical analysis of the mechanisms for forming an axiological environment in higher education. It reveals the essence of the axiological approach, its role in the educational process, and its importance in shaping universal and national values among students. The pedagogical, organizational, and sociocultural factors involved in creating a value-oriented educational environment in higher education institutions are examined. The study substantiates that teachers' personal example, value-oriented educational*

content, the use of interactive teaching methods, spiritual and educational activities, and active student participation are key mechanisms in forming an axiological environment.

Keywords: *axiological environment, higher education, educational process, value system, universal values, national values, personality development, moral education, pedagogical approach, quality of education*

KIRISH

Globallashuv jarayonlari, axborot oqimining keskin ortishi hamda jamiyat hayotidagi ijtimoiy-madaniy o‘zgarishlar ta’lim tizimi oldiga nafaqat bilimli, balki yuksak ma’naviy-axloqiy fazilatlarga ega, mustaqil fikrlovchi va qadriyatlarga sodiq shaxsni tarbiyalash vazifasini qo‘ymoqda. Ayniqsa, oliy ta’lim muassasalari jamiyatning intellektual salohiyatini shakllantiruvchi asosiy institut sifatida talabalarda umuminsoniy va milliy qadriyatlarni qaror toptirishda muhim o‘rin tutadi. Shu nuqtai nazardan, oliy ta’limda aksiologik muhitni shakllantirish masalasi zamonaviy pedagogikaning dolzarb yo‘nalishlaridan biri hisoblanadi.

Aksiologiya — qadriyatlar haqidagi ta’limot bo‘lib, u shaxsning dunyoqarashi, hayotiy pozitsiyasi va ijtimoiy xulq-atvorini belgilovchi mezonlarni o‘z ichiga oladi. Ta’lim jarayonida aksiologik yondashuvni qo‘llash talabalarda insonparvarlik, vatanparvarlik, mas’uliyat, bag‘rikenglik, ijtimoiy faollik kabi sifatlarni rivojlantirishga xizmat qiladi. Biroq bunday sifatlar o‘z-o‘zidan shakllanmaydi; ular maqsadga yo‘naltirilgan pedagogik faoliyat, ijtimoiy-madaniy ta’sirlar hamda ta’lim muassasasida yaratilgan muhit orqali tarkib topadi.

ADABIYOTLAR SHARHI VA NAZARIY ASOS

Oliy ta’limda aksiologik muhitni shakllantirish muammosi pedagogika, falsafa, sotsiologiya va psixologiya fanlari kesishgan nuqtada o‘rganiladigan murakkab ilmiy yo‘nalish hisoblanadi. Aksiologiya - qadriyatlar haqidagi ta’limot sifatida XIX asr oxiri -XX asr boshlarida mustaqil ilmiy yo‘nalish sifatida shakllangan bo‘lib, unda qadriyatlarning mohiyati, tuzilishi, jamiyat va shaxs hayotidagi o‘rni tadqiq

etiladi. Mazkur nazariy asos keyinchalik pedagogik aksiologiya rivojiga zamin yaratdi.

Pedagogik aksiologiya doirasida ta’limning asosiy vazifasi nafaqat bilim berish, balki shaxsning qadriyatlar tizimini shakllantirishdan iborat ekani ta’kidlanadi. Ilmiy manbalarda ta’lim jarayonini qadriyatlarga yo‘naltirish talabalarning ma’naviy-axloqiy rivojlanishini ta’minlash, ijtimoiy mas’uliyatini oshirish va fuqarolik pozitsiyasini mustahkamlashga xizmat qilishi qayd etilgan. Shu jihatdan, oliy ta’lim muassasasi nafaqat kasbiy tayyorgarlik maskani, balki shaxsning dunyoqarashi va hayotiy qadriyatlari shakllanadigan ijtimoiy-madaniy makon sifatida qaraladi.

Zamonaviy pedagogik tadqiqotlarda aksiologik yondashuv kompetensiyaviy yondashuv bilan uzviy bog‘liqlikda ko‘rib chiqiladi. Chunki bugungi kunda mutaxassisdan faqat kasbiy bilim emas, balki etik me’yorlarga rioya qilish, jamoada ishlash, bag‘rikenglik, mas’uliyat, halollik kabi qadriyatlarga asoslangan kompetensiyalar ham talab etiladi. Shu sababli oliy ta’lim mazmunini insonparvarlashtirish va demokratlashtirish orqali talaba shaxsini har tomonlama rivojlantirish zarurati alohida ta’kidlanadi.

Aksiologik muhit tushunchasi pedagogik adabiyotlarda ta’lim jarayonining barcha komponentlari — maqsad, mazmun, metod, vosita, tashkiliy shakl va subyektlararo munosabatlarning qadriyatlarga yo‘naltirilgan holda uyg‘unlashuvi sifatida izohlanadi. Bunday muhitda o‘qituvchi nafaqat bilim beruvchi, balki ma’naviy yetakchi va shaxsiy namuna sifatida namoyon bo‘ladi. Talabalar esa ta’lim jarayonining faol subyekti sifatida o‘z qadriyatlarini anglash, baholash va amalda qo‘llash imkoniyatiga ega bo‘ladi.

MUHOKAMA VA TAQQOSLASH

Oliy ta’limda aksiologik muhitni shakllantirish masalasi zamonaviy pedagogik tadqiqotlarda turli yondashuvlar asosida talqin qilinmoqda. Bir qator olimlar bu jarayonni, avvalo, ta’lim mazmunini qadriyatlarga yo‘naltirish orqali amalga oshiriladi, deb hisoblaydilar. Ularning fikricha, o‘quv dasturlariga milliy va umuminsoniy qadriyatlarni singdirish, gumanitar fanlar ulushini oshirish hamda

kasbiy tayyorgarlikni axloqiy mezonlar bilan uyg‘unlashtirish aksiologik muhitni shakllantirishning asosiy yo‘li hisoblanadi.

Boshqa tadqiqotchilar esa muhitning shakllanishida pedagogik munosabatlar tizimi hal qiluvchi ahamiyatga ega ekanini ta’kidlaydilar. Ya’ni, o‘qituvchi va talaba o‘rtasidagi hamkorlik, o‘zaro hurmat, adolat va ishonchga asoslangan muloqot mavjud bo‘lgan taqdirdagina qadriyatlar samarali o‘zlashtiriladi. Bu yondashuvga ko‘ra, aksiologik muhit avvalo insoniy munosabatlar madaniyatida namoyon bo‘ladi.

Shuningdek, ayrim ilmiy qarashlarda oliy ta’lim muassasasining ijtimoiy-madaniy faoliyati -ma’naviy-ma’rifiy tadbirlar, volontyorlik, ijtimoiy loyihalar, talabalar jamoatchiligi faoliyati - aksiologik muhitni boyituvchi asosiy omil sifatida ko‘rsatiladi. Bu nuqtai nazar ta’limni faqat auditoriya bilan cheklamasdan, uni keng ijtimoiy makon bilan bog‘lash zarurligini asoslaydi.

Taqqoslash natijalari shuni ko‘rsatadiki, yuqoridagi yondashuvlarning har biri muayyan jihatdan to‘g‘ri bo‘lsa-da, ularning alohida holda qo‘llanishi yetarli samara bermaydi. Masalan, faqat ta’lim mazmunini qadriyatlarga yo‘naltirish, ammo o‘qituvchining shaxsiy namunasida bu qadriyatlar namoyon bo‘lmasa, kutilgan natija yuzaga kelmaydi. Xuddi shuningdek, ijobiy psixologik muhit mavjud bo‘lsa-da, agar o‘quv jarayoni mazmunan qadriyatlardan yiroq bo‘lsa, talabalarda barqaror aksiologik qarashlar shakllanmaydi. Zamonaviy oliy ta’lim tizimida kompetensiyaviy yondashuv ustuvor ahamiyat kasb etayotganligi bois, aksiologik muhitni shakllantirish ham kasbiy kompetensiyalar bilan uzviy bog‘liqlikda qaralmoqda. Bugungi mutaxassisdan nafaqat professional bilim, balki ijtimoiy mas’uliyat, halollik, bag‘rikenglik, ekologik madaniyat kabi qadriyatlarga asoslangan sifatlar ham talab etiladi. Shu jihatdan, aksiologik muhit kasbiy tayyorgarlikning ajralmas komponentiga aylanib bormoqda.

XULOSA VA TAVSIYALAR

Oliy ta’limda aksiologik muhitni shakllantirish zamonaviy ta’lim tizimining eng muhim vazifalaridan biri hisoblanadi. Tadqiqot natijalari shuni ko‘rsatadiki, qadriyatlarga asoslangan muhit talabalarning nafaqat kasbiy tayyorgarligini, balki

ma’naviy-axloqiy kamolotini, fuqarolik pozitsiyasini va ijtimoiy mas’uliyatini shakllantirishda hal qiluvchi omil bo‘lib xizmat qiladi. Aksiologik muhit ta’lim mazmuni, pedagogik munosabatlar, professor-o‘qituvchilarning shaxsiy namunalari, tarbiyaviy faoliyat hamda ijtimoiy-madaniy ta’sirlarning uyg‘unligi natijasida yuzaga keladi.

Shuningdek, mazkur muhitni samarali tashkil etish talabalarda umuminsoniy va milliy qadriyatlarga hurmat, bag‘rikenglik, vatanparvarlik, halollik, mas’uliyat kabi sifatlarning barqaror shakllanishiga yordam beradi. Aksiologik yondashuv asosida tashkil etilgan ta’lim jarayoni shaxsni har tomonlama rivojlantirish, uning ichki motivatsiyasini kuchaytirish hamda mustaqil hayotga tayyorlashga xizmat qiladi.

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TEXNOLOGIK TA’LIM O‘QITUVCHILARINING AMALIY KOMPETENSIYALARINI RIVOJLANTIRISH

Gadaymuratov Shuhrat Mamayusupovich

Termiz davlat pedagogika instituti

Annotatsiya: *Ushbu maqola bo’lajak texnologik ta’lim o‘qituvchilarining kasbiy kompetensiyalarini rivojlantirishda qo’yiladigan talablarning va pedagogik jarayonlarning mukammalligi tahlil qilingan.*

Kalit so‘zlar: *kompetensiya, Texnologik xarita, texnologiya, amaliy mashg’ulot, texnologik ta’lim praktikumi, muammoli, ta’lim, maxsus texnologik, ijtimoiy-kommunikativ, yog’och, kadr, ichlab chiqarish, sub’ektiv,texnologik jarayon, bo‘lajak texnologik ta’lim o‘qituvchi,rivojlantirish.*

Аннотация: *В данной статье анализируются требования и совершенствование педагогических процессов в развитии профессиональных компетенций будущих учителей технологического образования.*

Ключевые слова: *технология, производственная практика, технологическая практика, профессиональная компетентность, проблемный, образование, специально-технологический, социально-коммуникативный, дерево, кадры, производственный, субъектный, технологический процесс, будущий учитель технологического развития, разработка, методика.*

Abstract: *This article analyzes the requirements and the perfection of pedagogical processes in developing the professional competencies of future technological education teachers.*

Keywords: *technology, practical training, technological education practicum, professional competence, problematic, educational, special technological, social communicative, wood, frame, production, subjective,*

technological process, future technological education teacher, development, methodology.

Jahon ta’lim tizimi jarayonida yosh avlodni intellektual rivojlantirishni sifat jihatidan yangi darajaga ko‘tarish, o‘quv-tarbiya jarayoniga ta’limning innovatsion shakllari va usullarini joriy etish jamiyat taraqqiyotida muhim o‘rin egallaydi. Fan-texnika va texnologiyalar jadal sur’atlar bilan rivojlanayotgan hozirgi sharoitda, dunyoda sanoat tarmoqlarini rivojlantirish, raqobatbardosh kadrlar tayyorlash, ijodkor mutaxassislarga bo‘lgan talab va ehtiyoj yanada kuchayib bormoqda.

Dunyo miqiyosida ta’lim sifatini oshirish va raqamli texnologiyalar asosida takomillashtirish orqali yosh avlodga bilim berishning yangi metodlaridan foydalanilmoqda. Birlashgan Millatlar Tashkilotining maorif, fan va madaniyat masalalari bilan shug‘ullanuvchi tashkiloti (UNESCO) uzluksiz ta’lim tizimida fan, ta’lim va ishlab chiqarish sohasida pedagoglarni tayyorlash hamda malakasini oshirish jarayonida raqamlashtirilgan ta’lim resurslaridan foydalanishga katta e’tibor bermoqda.

Respublikamizda fan, ta’lim va ishlab chiqarish integratsiyasini ta’minlashga barcha sohalarda, jumladan, ta’lim sohasida ham keng qo‘llash bo‘yicha tegishli ko‘rsatmalar va qarorlar qabul qilingan. Jumladan, davlatimiz rahbarining Oliy Majlisga 2020 yilgi Murojaatnomasida “Taraqqiyotga erishish uchun raqamli bilimlar va zamonaviy axborot texnologiyalarini egallashimiz zarur va shart. Bu bizga yuksalishning eng qisqa yo‘lidan borish imkoniyatini beradi”, - deya ta’kidlab, besh yil ichida raqamli iqtisodiyotga o‘tish vazifasini qat’iy maqsad sifatida belgilab bergandilar.

O‘zbekiston Respublikasi Prezidentining 2019 yil 8 oktabrdagi PF-5847-son “O‘zbekiston Respublikasi oliy ta’lim tizimini 2030 yilgacha rivojlantirish konsepsiyasini tasdiqlash to‘g‘risida”gi [4], 2020 yil 5 oktabrdagi PF-6079-son “Raqamli O‘zbekiston — 2030” strategiyasini tasdiqlash va uni samarali amalga oshirish chora-tadbirlari to‘g‘risida”gi [5], 2020 yil 6 noyabrdagi PF-6108-son “O‘zbekistonning yangi taraqqiyot davrida ta’lim-tarbiya va ilm-fan sohalarini

rivojlantirish chora-tadbirlari to‘g‘risida”gi [6], 2022 yil 28 yanvardagi PF-60 son “2022-2026 yillarga mo‘ljallangan Yangi O‘zbekistonning taraqqiyot strategiyasi” to‘g‘risida”gi farmonlari [10], 2022 yil 21 iyundagi PQ-289-son “Pedagogik ta’lim sifatini oshirish va pedagog kadrlar tayyorlovchi oliy ta’lim muassasalari faoliyatini yanada rivojlantirish chora tadbirlari to‘g‘risida”gi Qarori hamda boshqa me’yoriy-huquqiy hujjatlarda belgilangan vazifalar shular jumlasiga kiradi.

Mamlakatimizdagi ijtimoiy-iqtisodiy o‘zgarishlar, ko‘plab ijtimoiy institutlarni va birinchi navbatda ishlab chiqarish kuchlarini tayyorlash orqali ijtimoiy-iqtisodiy jarayonlar bilan bevosita bog‘liq bo‘lgan ta’lim tizimini modernizatsiya qilish zaruratini keltirib chiqarmoqda. Oliy ta’limi tizimi – ishlab chiqarish jarayonlarida dinamiklikning kuchayishi, axborot oqimining ko‘payishi sharoitida samarali faoliyat yurita oladigan, malakali pedagog kadrlarni tayyorlashni talab qiladi.

Zarur shaxsiy va kasbiy fazilatlarga ega bo‘lgan kasbiy kompetensiyali mutaxassislarni tayyorlash bo‘yicha ijtimoiy buyurtmani amalga oshirish o‘z navbatida mavjud fan-ta’limni o‘zgartirmasdan, ta’limga kompetensiyaga asoslangan yondashuvni tadbiq etmasdan amalga oshirish mumkin emas. Bu ta’lim mazmunini yangilashning muhim kontseptual qoidalaridan hisoblanadi.

Bo‘lajak o‘qituvchining ijodiy faoliyati o‘quv-pedagogik faoliyatining nostandart usullarida, o‘z ishini rasmiylashtirishdagi o‘ziga xosliklarda, pedagogik vaziyatlarni hal qilishda mustaqil yechimlarni topa bilishda, izlanish faoliyatiga layoqatlilikda, amaliy topshiriqlarni va usullarni tanlashga erkin yondashishda, tashabbuskorlikda, o‘z taklif va g‘oyalarini erkin ifodalashda namoyon bo‘ladi.

Texnologik ta’lim yo‘nalishi bo‘yicha bo‘lajak texnologik ta’limi o‘qituvchisining amaliy kompetensiyalarini rivojlantirishda ta’lim oluvchining ijodiy faoliyati katta rol o‘ynaydi. Ijodiy faoliyatda intuitsiya, diqqat, kuzatuvchanlik, hissiyot, idrok, xotira, tafakkur, tasavvur, iroda va boshqa xususiyatlar safarbar qilinadi.

Darhaqiqat bo‘lajak texnologiya fani o‘qituvchilarining ishlab chiqarish faoliyati turlarining mazmuni bilan belgilanadigan kasbiy kompetensiyalari

rivojlangan bo‘lishi kerak. Shu munosabat bilan Oliy ta’lim muassasalarida Bo‘lajak texnologiya fani o‘qituvchilarining texnologik kompetensiyalarini shakllantirish jarayonini loyihalash alohida ahamiyatga ega. [14]

Bo‘lajak texnologik o‘qituvchilari faoliyatida umumkasbiy va mutaxassislikka oid bilimlarni qay darajada egallaganligi katta ahamiyatga ega, chunki duradgor o‘z ijodiy faoliyatida egallagan bilimlarga tayanadi.

Duradgor nafaqat muhit va personajlarni o‘zaro munosabatini, Bajaryotgan ishini texnologik xarita orqali ketma-ket ishlarini bajaradi, balki manbasini va hattoki bajarish asbob vositalarini ham o‘rnatadi. [15]

Bo‘lajak texnolog o‘qitish jarayoni faol fikrlash faoliyati bilan bog‘liq.Bo‘lajak texnologiya fan o‘qituvchisining faol fikrlashini zamonaviy loyixani yaratish jarayonida uning amaliy ishida kuzatish mumkin. Hatto ijodiy fikrlash ma’lum topshiriq va bitta ijodiy ish bilan cheklangan holda ham talabalarning eskizlar va maketlarda bajarilgan ishlari doim individualdir. Bu har bir talabaning fikrlash jarayoni uning hayotiy tajribasi, kuzatishlari, dunyoqarashi, fantaziyasi, didi, tayyorgarlik darajasi bilan belgilanadi.

Muammoga asoslangan ta’lim - bu o‘quv vazifalarini qo‘yish, ularni hal qilish usullarini tanlash, diagnostika qilish va olingan natijalarni baholashni bosqichma-bosqich tashkil etish hisoblanadi.

Bo‘lajak texnolog o‘qitish jarayoni faol fikrlash faoliyati bilan bog‘liq.[18].Bo‘lajak texnologiya fan o‘qituvchisining faol fikrlashini zamonaviy loyixani yaratish jarayonida uning amaliy ishida kuzatish mumkin. Hatto ijodiy fikrlash ma’lum topshiriq va bitta ijodiy ish bilan cheklangan holda ham talabalarning eskizlar va maketlarda bajarilgan ishlari doim individualdir. Bu har bir talabaning fikrlash jarayoni uning hayotiy tajribasi, kuzatishlari, dunyoqarashi, fantaziyasi, didi, tayyorgarlik darajasi bilan belgilanadi. [19]

Shunday qilib, fikrlash faoliyatini tahlil qilib, bilish faoliyatining eng yuqori va mukammal bosqichi sifatidagi tafakkurning sub’ektning amaliy faoliyati (mazkur holda, badiiy-ijodiy faoliyati) bilan uzluksiz aloqasi to‘g‘risida xulosa chiqarish mumkin. Inson yaratgan barcha narsa amalda tekshiriladi, amaliyot esa tafakkur

natijalarini qo‘llanishining asosiy sohasi hisoblanadi. Texnologiya fani o’qituvchilarini kasbiy kompitensiyalar tayyorlashda Oliy ta’limi muassasalarida amaliy topshiriqlar orqali moddiy texnik bazalarda o‘qitish, bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalarini rivojlantirishning pedagogik shart-sharoitlari yetarli darajada o‘rganilmagan.

Adabiyotlar tahlili

Bo‘lajak texnologik ta’lim o‘qituvchilarining kasbiy kompetentsiyani shakllantirish va oliy ta’lim muasasalarida “kompetensiya” va “kompetensiya” kabi tushunchalarining mazmun-mohiyatlarini o‘rganish va tahlil qilish, kasbiy kompetensiyani shakllantirish va rivojlantirish muammolari bo‘yicha Q.M.Abdullaeva, N.A.Muslimov, Sh.S.Sharipov, M.B.Urazova, Yu.M.Bundina, Ye.V.Gabdraxmanova, P.A.Koveshnikov, S.A.Murtazina, I.B.Torshina R.X.Jo‘raev, D.J.Sharipova, M.X.Toxtaxodjaeva, N.N.Azizxodjaeva, P.T.Magzumov, U.N.Nishonaliev, A.R.Xodjabaev, X.F.Rashidov, U.I.Inoyatov, U.Sh.Begimqulov, M.B.O‘rozova, O.A.Qo‘ysinov, D.Mamatov, N.Sh.Shodiev, Q.T.Olimov, O‘.Q.Tolipov va boshqalar tomonidan tadqiq qilingan. N.N.Azizxodjaeva, O‘.Q.Tolipov, B.Ziyomuhamedov, N.Saidahmedovlar oliy ta’lim muassasalarida pedagogik texnologiyalarni qo‘llash masalalari bo‘yicha ilmiy-tadqiqot ishlarini amalga oshirganlar.

MDH davlatlari olimlaridan B.M.Teplov, V.D.Shadrikov,E.F.Zeer, I.Ya.Lerner, I.S.Yaximanskiy, A.A.Verbiskiy, V.P.Bespalko, A.V.Doljenko, V.A. Slastyonin, G.M.Andreeva, A.A.Bodalev, Ya.L.Kolomenskiy, Yu.K.Babanskiy, O.A.Abdulina, I.L.Lerner, A.V.Mudrik, B.L.Farberman kabi olimlar shaxslararo munosabatlar masalalarini o‘rgangan tadqiqot ishlari olib borilgan.

Xorijiy davlatlarda bo‘lajak o‘qituvchilarni tayyorlashning nazariy jihatlarini V.I.Baydenko, A.A.Verbiskiy, N.A.Grishina, E.F.Zeer, I.A.Zimnyaya, N.V.Kuzmina, A.I.Kuleshova, A.K.Markova, N.V.Skachkova, A.V.Xutorskiy, R.Boyasis, K.Kameron, R.Kuinn, R.Marr, Dj.Raven, S.Uiddet, S.Xolliford D.Guilford, E.Ball, C.R.Berger, D.Pepper, J.Pavelka, kasbiy tayyorlash texnologiyasini G.Selwyn, B.Bloom, T.Dora, sub’ekt faoliyati va kasbiy shakllanish

jarayonining determinant omillari va bosqichlarini G.Spenser, R.Mohan, H.Miyakawa, Y.Xuqin tomonidan tadqiq qilingan.

Tadqiqot ishi muammosiga oid ilmiy izlanishlar va adabiyotlar tahlili shuni ko‘rsatadiki, oliy ta’lim muassasalarida bo‘lajak texnologik ta’lim o‘qituvchilarni tayyorlash jarayonlari samaradorligini oshirish, kasbiy kompetentsiyani zamonaviy yondashuvlar asosida rivojlantirish imkoniyatlari mavjudligi tadqiqot mavzusining dolzarbligini belgilab beradi.

- kasbiy kompetensiyalarga ega bo‘lgan bo‘lajak texnologiya fani o‘qituvchilarini tayyorlashning ijtimoiy buyurtmasi hamda ularning mazmuni va tuzilishi haqidagi g‘oyalar yetarli darajada o‘rganilmaganligi;
- bo’lajak o’qituvchilarning kasbiy kompetentsiyalarini rivojlantirish samaradorligini oshirishga alohida yondashuvlarning mavjudligi va amaliy o‘quv amaliy kampetsiyalarni o‘rganish jarayonida ushbu muammoni hal qilishga imkon beruvchi didaktik tizim sifatida texnologik jarayonlarga asoslangan ta’limning maxsus tadqiqotlarining yo‘qligi;
- texnologiya fanlarida amaliy mashg’ulotlar o‘qitish metodlari orqali talabalarning kasbiy kompetensiyalarini rivojlantirish jarayonini loyihalash va amalga oshirish zarurati, bu maqsadga erishish uchun noan’anaviy o‘qitish usullarilaridan foydalanish yuzasidan metodik tavsiyalarning yetarli emasligi;
- o‘quv fanlarini o‘rganishda talabalarning texnologik kompetentsiyalarini shakllantirishda talabalarni kasbiy tayyorlash jarayonining potentsial imkoniyatlari va ushbu jarayonni muvaffaqiyatli amalga oshirishga yordam beradigan tashkiliy-pedagogik sharoitlarning loyihalashtirilmaganligi.

Tadqiqot metodologiyasi

Bizning o‘rganishlarimiz shuni ko‘rsatadiki, texnologik jarayonlarga asoslangan o‘qitish metodikalari orqali bo‘lajak texnologiya fani o‘qituvchilarining texnologik kompetentsiyalarini rivojlantirish jarayonining mazmun-uslubiy ta’minotining yetarli darajada rivojlantirish uchun quyidagi vazifalarni bajarish lozim:

❖ bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalari maxsus mazmun-uslubiy ta’minotga muhtoj bo‘lgan oliy ta’lim muassasalarining talabalarini, texnologik jarayonlarni loyihalash asosida kasbiy tayyorlashning asosiy maqsadlaridan biri sifatida qarash, ularning mazmuni va tuzilishiga aniqlik kiritish;

❖ texnologik ta’lim praktikum amaliy mashg’ulot fanini o‘rgatish jarayonida talabalarning kasbiy kompetensiyalarini shakllantirishga yo‘naltirilgan, texnologik jarayonlarga asosida rivojlantirish metodikkasining mohiyatini aniqlash.

❖ texnologik jarayonlarni loyihalashga asoslangan ta’lim orqali talabalarning texnologik kompetensiyalarini muvaffaqiyatli rivojlantirishga yordam beradigan asoslangan tashkiliy-pedagogik shart-sharoitlarni yaratish.

Bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalarining mazmuni va tuzilishiga aniqlik kiritish asosida biz quyidagi mualliflik ta’rifini ishlab chiqdik. Texnologik kompetentsiya bu - sub’ektning mavjud maxsus texnologik va ijtimoiy-kommunikativ bilimlar, ko‘nikmalar va kasbiy ahamiyatga ega bo‘lgan fazilatlarga asoslangan moddiy ishlab chiqarish sohasidagi texnologik faoliyatning ma’lum bir yo‘nalishi va darajasidagi kasbiy vazifalarni muvaffaqiyatli hal qilishga tayyorligi hisoblanadi. Bu tayyorlik sub’ektning texnologik faoliyatning tipik va nostandart vaziyatlarida kasbiy muammolarni hal qilishning eng yaxshi usullarini aniqlash, ishlab chiqish va qo‘llash qobiliyatida namoyon bo‘ladi. Bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetentsiyalari turlari quyidagilardan iborat:

texnologik faoliyat, texnik (uskunalar, ishlab chiqarishning ayrim turlari texnologiyalari bilan bog‘liq) va loyihalash;

texnologik faoliyatni amalga oshirish darajalariga ko‘ra, malaka (mutaxassisning ish turi bo‘yicha texnologik faoliyatni amalga oshirish), funktsional (kasbiy funktsiyalarni bajarish) va operatsion (alohida texnologik operatsiyalarni bajarish).

Texnologik ta’lim yo’nalishining darajasi sub’ektining kasbiy kompetensiyasi quyidagi o‘zaro bog‘liq komponentlarni birlashtirgan yaxlit tizim sifatida taqdim etiladi: maxsus texnologik, ijtimoiy-kommunikativ, sub’ektiv. Texnologik

jarayonlarni loyihalashga asoslangan ta’limning mohiyati talabalarning texnologik kompetentsiyalarini rivojlantirishga qaratilgan bo‘lib, biz buni o‘quv jarayonini kasbiy kompetensiyaga yo‘naltirilgan o‘quv vazifalari tizimi orqali amalga oshirish deb belgilaymiz, bu asosli va ijodiy-improvizatsiyaga qaratilgan faoliyatning birligidir. Biz tomonimizdan bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalarini, texnologik jarayonlarni loyihalash asosida o‘qitish orqali kasbiy kompetensiyalarini rivojlantirish jarayonining tashkiliy tuzulmaviy modeli ishlab chiqilgan bo‘lib, bu talabalar kasbiy sikl fanlari o‘quv dasturlarini o‘zlashtirganlarida texnologik kompetensiyalarni bosqichma-bosqich rivojtirishni ta’minlaydi.

Tahlillar natijalari

Bo‘lajak texnologiya fani o‘qituvchilarining o‘quv fanlarini o‘rganish jarayoniga texnologik faoliyat holatlarini imkon qadar ishlab chiqarish sharoitlariga yaqinlashtirish va talabalarga kompetentsiya shaklida taqdim etish talabalarning kelajakdagi kasbiy faoliyatini modellashtirish imkonini beradi. Ushbu model asosida faoliyatga yo‘naltirilgan o‘quv vazifalarining zaruriy shartlari quyidagilar:

o‘quv jarayonini tashkil etish, talabalarni nazoratdan o‘tkazish va auditoriyada fanlararo kompetensiyaga yo‘naltirilgan vazifalarni hal qilishni ta’minlash;

talabalarda kasbiy ahamiyatga ega bo‘lgan fazilatlarni rivojlantirishga yordam beradigan faol o‘qitish usullariga asoslangan o‘quv va kasbiy faoliyatga talabani jalb qilish;

o‘qituvchi va talabalar o‘rtasidagi dialogik munosabatlar, bu texnologik kompetensiyalarni shakllantirishda talabaning sub’ektiv pozitsiyasini rivojlantirishni ta’minlash;

o‘quv jarayonining samaradorligini aniqlash va uni o‘z vaqtida tuzatish imkonini beradigan kasbiy tsikllarning o‘quv fanlarini o‘rganishda talabalarning texnologik kompetentsiyalarini rivojlantirish monitoringini olib borish;

Bo‘lajak texnologiya fani o‘qituvchilarining texnologik kompetentsiyalarining mazmuni va tuzilishi talabalarning texnologik kompetensiyalarini rivojlantirishga yo‘naltirilgan muammoli topshiriqlar asosida o‘qitishning mohiyati ochib berish;

Bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalari va texnologik jarayonlarga asoslangan o‘qitishning mohiyati to‘g‘risidagi asoslangan nazariy pozitsiyalar va xulosalar ishlab chiqilgan jarayon va ularni shakllantirishning tasdiqlangan tashkiliy-pedagogik shartlari tashkiliy, boshqaruv, eksperimental va kasbiy vakolatlarni shakllantirish jarayonini mazmunli va uslubiy ta’minlashni rivojlantirish uchun asos bo‘ladi.

Mamlakatimizdagi ta’lim tizimini tashkil etish prinsiplari, mazmuni, ta’lim-tarbiya jarayonining shakl va usullarini yangi ta’lim texnologiyalari talablari darajasida tubdan isloh qilishni taqozo etmoqda.Texnologik jarayonlarni loyihalash orqali bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalarini rivojlantirishga asoslangan ta’limining amaldagi joriy holati va to‘plangan tajribalar tahliliga ko‘ra, bir qator hulosalarni berishimiz mumkin:

1. Bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyasi - sub’ektning mavjud maxsus texnologik va ijtimoiy-kommunikativ bilim, ko‘nikma va malakalarga asoslangan holda moddiy ishlab chiqarish sohasidagi texnologik faoliyatning ma’lum bir yo‘nalishi va darajasidagi kasbiy muammolarni muvaffaqiyatli hal qilishga tayyorligi hamda kasbiy ahamiyatga ega bo‘lgan fazilatlar majmuidir. Bu tayyorgarlik sub’ektning texnologik faoliyatning tipik va nostandart vaziyatlarida kasbiy muammolarni hal qilishning eng yaxshi usullarini aniqlash, ishlab chiqish va qo‘llash qobiliyatida namoyon bo‘ladi. Kasbiy kompetentsiyalari turlari quyidagilardan iborat: texnologik faoliyat, texnik (uskunalar, ishlab chiqarishning ayrim turlarining texnologiyalari bilan bog‘liq) va loyihalash va muhandislik; texnologik faoliyat, malaka (mutaxassisning ish turi bo‘yicha texnologik faoliyatni amalga oshirish), funktsional (kasbiy funktsiyalarni bajarish) va operatsion (alohida texnologik operatsiyalarni bajarish) darajalariga bo’linadi. Texnologik faoliyatning har bir yo‘nalishi va darajasi sub’ektining texnologik kompetensiyasi quyidagi o‘zaro bog‘liq komponentlarni birlashtirgan yaxlit tizim sifatida taqdim etiladi: maxsus texnologik, ijtimoiy-kommunikativ, sub’ektiv.

2. Talabalarning texnologik kompetentsiyalarini rivojlantirish kasbiy va ijodiy faoliyat birligi bo‘lgan kompetensiyaga yo‘naltirilgan o‘quv vazifalari tizimi orqali ta’lim jarayonini qurish sifatida belgilanadigan texnologik jarayonlarga asoslangan ta’lim orqali amalga oshiriladi. Texnologik ta’lim praktikumi fanlarini o‘rganishda bo‘lajak texnologiya fani o‘qituvchilarining texnologik kompetentsiyalarini rivojlantirishga qaratilgan faoliyat bu jarayonning asosiy omili hisoblanadi. O‘quv vazifalarining kompetensiyaga yo‘naltirilgan tizimi - bu talabalarga maxsus texnologik va kommunikativ bilim, ko‘nikma va malakalarni o‘zlashtirishga qaratilgan texnologik faoliyat holatlarini taqdim etish shakli bo‘lgan o‘zaro bog‘liq mavzuga, amaliyotga va kasbiy faoliyatga yo‘naltirilgan vazifalar hamda kasbiy tsikllarning o‘quv fanlarini o‘rganish jarayonida talabalarning texnologik kompetentsiyalarini rivojlantirishni ta’minlaydigan kasbiy ahamiyatga ega fazilatlarni rivojlantirish majmuasidir.

3. Texnologik jarayonlarga asoslangan ta’lim asosida bo‘lajak mutaxassislarning texnologik kompetensiyalarini rivojlantirish jarayoni uch bosqichdan iborat bo‘lib, uning mazmuni o‘quv rejadagi mavjud fanlarini o‘rganish jarayonida qo‘llaniladigan kompetensiyaga yo‘naltirilgan vazifalarning funksional maqsadi bilan belgilanadi. Birinchi bosqich o‘quv jarayonida predmetga yo‘naltirilgan vazifalardan foydalanishni o‘z ichiga oladi va talabalarda muayyan texnologik kompetentsiyalarning bir qismi sifatida mutaxassisning ko‘nikma va malakalarini o‘zlashtirish uchun zarur va yetarli bo‘lgan maxsus texnologik bilimlar to‘plamini shakllantirishga qaratilgan. Ikkinchi bosqich amaliyotga yo‘naltirilgan vazifalardan foydalanishni o‘z ichiga oladi va bu talabalarda texnologik kompetentsiyalarni, kasbiy ahamiyatga ega bo‘lgan fazilatlarni rivojlantirish uchun zarur va yetarli bo‘lgan yaxlit maxsus texnologik va kommunikativ ko‘nikmalar tizimini shakllantirishga qaratilgan. Uchinchi bosqich kasbiy vazifalardan foydalanishni o‘z ichiga oladi va talabalarda texnologik faoliyatning kasbiy vazifalarini uni amalga oshirish sohalari va darajalarida hal qilishning optimal usullarini aniqlash, ishlab chiqish va qo‘llash ko‘nikmalarini, kasbiy ahamiyatga ega fazilatlarni rivojlantirishga qaratilgan.

4. Texnologik jarayonlarni loyihalashga asoslangan ta’lim asosida bo‘lajak Texnologiya fani o‘qituvchilarining texnologik kompetentsiyalarini muvaffaqiyatli rivojlantirishga yordam beradigan tashkiliy-pedagogik shartlar quyidagilardir: fanlarni o‘rganish jarayoniga texnologik faoliyat holatlarini kiritish orqali talabalarning kelajakdagi kasbiy faoliyatini modellashtirish.

5. Ishlab chiqarish sharoitlariga imkon qadar yaqin bo‘lgan va talabalarga kompetentsiyaga yo‘naltirilgan o‘quv vazifalari shaklida taqdim etiladigan texnologik faoliyat holatlarida o‘quv jarayonini tashkil etish, talabalarni attestatsiyadan o‘tkazish va auditoriyada fanlararo kompetensiyaga yo‘naltirilgan vazifalarni hal qilishni ta’minlaydi;

6. Talabalarda kasbiy ahamiyatga ega bo‘lgan fazilatlarni rivojlantirishga yordam beradigan faol o‘qitish usullariga asoslangan o‘quv va kasbiy faoliyatga talabaning jalb qilish; o‘qituvchi va talabalar o‘rtasidagi amaliy mashg’ulotlar munosabatlarini yaxshilsh, bu kasbiy kompetensiyalarni shakllantirishda talabaning sub’ektiv pozitsiyasini rivojlantirishni ta’minlaydi;

7. O‘quv jarayoni kursining samaradorligini aniqlash va talabalarning kasbiy kompetentsiyalarini shakllantirish bosqichlarida o‘z vaqtida tuzatish imkonini beradigan kasbiy tsikllarning o‘quv fanlarini o‘rganishda talabalarning texnologik kompetentsiyalarini rivojlantirish monitoringi.

Xulosa Ushbu xulosalar asosida o‘quv fanlarining tarkibiy qismida talabalarga ilm-fan asoslari to‘g‘risidagi bilimlarni texnologik jarayonlarni loyihalash orqali amaliyotga joriy qilish, inson faoliyati, umumiy, raqamli va moddiy madaniyatning turlarini shakllantirishning umumiy tamoyillari, o‘ziga xos ko‘nikmalarini o‘zlashtirish, shuningdek, raqamli texnologiyalar asosida amaliy muammolarning innovatsion yechimlarini topish va hayotga tatbiq etish imkonini beradi. O‘z navbatida bu bo‘lajak texnologiya fani o‘qituvchilarining kasbiy kompetensiyalarini rivojlanishiga hizmat qiladi.

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O‘QUVCHILARGA TEXNOLOGIYA FANINI O‘QITISHDA AMALIY TOPSHIRIQLARNI BAJARISH KO‘NIKMALARINI RIVOJLANTIRISHNING PEDAGOGIK - PSIXOLOGIK XUSUSIYATLARI

Imanov Baxtiyor Berdiyevich

Termiz davlat pedagogika instituti

E-mail: baxtiyar1957Imanov@mail.com

Qulmamatova Xurshida Abduxamidovna

Termiz davlat pedagogika instituti

E-mail: Khurshida1977Kulmamatova@ gmail.com

Annotatsiya. *Maqolada o‘quvchilarga texnologiya fanining mavzularini qiziqarli va sifatli o‘qitishda zamonaviy tikuv texnologiyalaridan foydalanish asosida amaliy topshiriqlarni bajarish tushintirilgan. Shuningdek, o‘quvchilarni texnologiya faniga bo‘lgan qiziqishlarini intensiv oshirishda layoqatlari, kreativ g‘oyalari, ijodiy fikrlash orqali buyumlarni tayyorlash tasavvuriga egaligi, mustaqil ishlar va amaliy topshiriqlarni yangi metodlar bo‘yicha bajarish ko‘nikmalarini rivojlantirishda pedagogic-psixologik xususiyatlarning ahamiyati yoritilgan.*

Kalit so‘zlar: *dars, ko‘rgazma, amaliy, topshiriq, mustaqil, pedagogik, psixologik, ta’lim, vosita, jihoz, texnika, ta’rif, tushuncha.*

Abstract. *The article explains the implementation of practical tasks based on the use of modern sewing technologies in teaching students interesting and high-quality topics of technology. It also highlights the importance of pedagogical and psychological characteristics in intensively increasing students' interest in technology, developing their abilities, creative ideas, imagination for making things through creative thinking, and developing skills in independent work and practical tasks using new methods.*

Keywords: *lesson, exhibition, practical, task, independent, pedagogical, psychological, education, tool, equipment, technique, definition, concept*

Dunyo mamlakatlarining pedagogik tajribalaridan ma’lum bo‘lishicha, texnologiya fanidan o‘qituvchilarni o‘qitish metodlarini tanlashga o‘rgatish uchun maktabda muayyan sharoitlar yaratilgan bo‘lishi kerak. Darhaqiqat, fan o‘qituvchisi maqbul metodlarni tanlay bilishi uchun o‘quvchilarning psixologik layoqati, aqliy tayyorgarligini ham inobatga olishi muhim. Bunda fan o‘qituvchilarining darslarga tayyorgarligi, mavzularni ko‘rgazmalar, tarqatma materiallar, metodlardan foydalanib o‘qitishdagi muammolar va o‘quvchilarning fanni o‘zlashtirishlari, amaliy topshiriqlarni qanday tartibda bajarishlari, bilim, ko‘nikmalari tahlil qilindi. Amaliy dars mashg‘ulotlarida o‘quvchilarga buyumlarni tayyorlash uchun qanday topshiriqlar berilgan, nimalardan foydalanilganligi ham kuzatildi.

Texnologiya fanidan tajriba–sinov ishlari davomida umumta’lim maktablarining o‘qituvchisi va o‘quvchilariga so‘rovnoma savollar, testlar, amaliy topshriqlarning turlari tarqatildi va tushunchalar berildi. So‘rovnoma savollariga olingan javoblarni tahlil qilish mobaynida o‘qituvchi amaliy topshiriqlarni o‘quvchilar to‘g‘ri bajarishini tushuntirgan bo‘lsalar-da, ammo texnologiya fani o‘qituvchilarining aksariyati o‘quvchilarga mavzularni o‘rgatishda amaliy topshiriqlar turlari va ularni bajarish ko‘nikmalarini rivojlantirishda pedagogik–psixologik xususiyatlar hamda metodlarni bilishmaydi.

Ma’lumki, texnologiya fanidan nazariy va amaliy shakllarda darslar o‘tiladi. Ushbu fandan maktablarning ayrim sinflarida o‘quvchilarning sonida kelib chiqib o‘g‘il bolalar va qizlar bolalarga bo‘linib yoki bo‘linmaydigan umumiy darslar tashkil etiladi. Bunday holatlarda o‘quvchilarga bilim, ko‘nikmalar hosil bo‘lishi uchun psixologik xususiyatlar va pedagogik mahoratlarga asoslanib malakali o‘qituvchilar dars berishadi.

Pedagogik tomondan o‘qitishning asosiy vazifasi sifatida o‘quvchilarning bilimlar egallashi, ko‘nikmalar hosil qilishi, fikrlashni faollashtirish nazarda tutiladi. Misol uchun, D.N.Bogoyavlenskiy va N.A.Menchinskiylar ta’kidlashicha: “O‘quvchilarda tafakkurni rivojlantirish uchun muammolar yuzaga keltirish kerak”, -deb hisoblashgan.

O‘qituvchi va o‘quvchilardagi qobiliyatlar barcha faoliyat turlariga xos bo‘lib, uning muvaffaqiyatli amalga oshirilishida muhim masalalarni hal qilishda G.Perkins tomonidan taklif etilgan “intellektual chegara” nazariyasi keng ommalashgan va u o‘tkazilgan ko‘plab tadqiqotlar natijasida har qanday faoliyat turini egallash uchun zaruriy va yetarli intellektual daraja talab qilinishini ta’kidlaydi.

Ba’zi mualliflar mehnat faoliyati odamning ehtiyojlariga muvofiq moslashishini (A.Maslou), yaxshi mehnat sharoitlarida samaradorlikni yuqori bo‘lishini (F.Gersberg), mehnat jarayonida insonni baholashga turlicha yondashishni (D.Makregor)lar tatqiq qilganlar. O‘quvchilar texnologiya fanidan ta’lim olish jarayonida amaliy vazifalarni bajarishi uchun o‘qituvchining o‘zida ham ijodiy qobiliyat, keng tafakkur hamda pedagogik mahorat mujassamlangan bo‘lishi lozim. Bulardan tashqari, butun dunyodagi fan-texnika olamida sodir bo‘layotgan yangiliklardan xabar bo‘lib, o‘quvchilarga yangi ma’lumotlar berishi, kasb-hunarlar egallashlari uchun pedagogik-psixologik tomondan qiziqtirib tayyorlab borishi kerak.

Psixolog olim E.G‘oziyev “o‘quvchilar qiziqishini bir nechta darajalarga ajratgan: a) sinchkovlik; b) qiziquvchanlik; v) bilishga qiziqish; g) turg‘un yoki kasbiy qiziqishlardir. Sinchkovlik qiziqishning biror narsaga nisbatan kuchli intilishdan iborat qisqa muddatli turi yoki darajasidir. Qiziquvchanlik shaxsning voqelikdagi narsa va hodisalarga, ularning bilishga nisbatan faol munosabatidan iborat qiziqish darajasidir. Bilishga qiziqish anglashilgan darajadagi, maqsadga muvofiqlashgan, jismoniy va aqliy faoliyatining yangi qirralarini egallashga yo’naltirilgan turidir. Turg‘un qiziqish shaxsning kasbiy ko‘nikmalar, malakalar va bilimlarini egallash hamda kasbiy tayyorgarlik darajasi bilan uyg‘unlashgan, maqsadga erishish yo’lida faollik ko‘rsatuvchi turlaridir”.

Fan o‘qituvchisi texnologiya darslari mobaynida pedagogik metodlarni o‘quvchilarga o‘rgatib, bilimlarning shakllanishiga ko‘mak bo‘ladigan, aqliy rivojlanishiga ko‘ra o‘quv vositalarini tanlay olishi muhim vazifalardan biri hisoblanadi. O‘quvchilar 9-sinfda o‘qishi mobaynida turli xildagi kasb-hunarlar

haqida ma’lumotlarni egallab boradi. Jumladan, texnologiya fanidan o‘tiladigan darslarda mahsulotlar ishlab chiqarish, hunarmandchilik turlari, ro‘zg‘orshunoslik asoslari, ijodiy loyiha tayyorlash va kasb tanlashga doir mavzular o‘rgatiladi. Mavzulardagi amaliy ishlarni bajarish barobarida o‘quvchilar kasblar haqida ijodiy loyihalar tuzadi, qobiliyatlarini shakllantiradi, yangi manbalarni o‘rganadilar. Shuningdek, o‘quvchi qizlar buyumlar yasash, kiyimlar tikish va uy-ro‘zg‘or uchun kerakli narsalarni tayyorlashni darsda va darsdan tashqari vaqtda amaliy topshiriqlarni bajarishni o‘rganib, kasb-hunarlarning ayrim turlarini tushunishlari uchun ijodiy qobiliyat bilan birga bilim, ko‘nikmalari shakllanib boradi. Qobiliyatlar kishida tabiiy yoki orttirilgan bilimlar asosida mukammalashib boradi. Ko‘nikma ham ta’lim jarayonlarida o‘rgangan bilimlarni amalda qo‘llash orqali rivojlanib boradi. Jumladan, o‘quvchilar amaliy ishlar bajarishni ota-onasidan, o‘qituvchisidan va atrofidagi kishilardan ko‘rib o‘rganadi, o‘zi ham o‘sha ishlarni takroran mustaqil bajarib ko‘rganda ko‘nikmalar shakllanadi. Bunday hollarda ijodiy iqtidor, layoqat va qobiliyatlar rivojlanib boradi.

Ko‘nikma - o‘quvchilarning ilgarigi darslarda o‘rgangan tajriba va bilimlari asosida doimgi faoliyat yoki ish-harakatda qobiliyatni takror amalga oshirish deb ta’riflanadi.

O‘quvchilarda ko‘nikmalarning hosil bo‘lishi yillar davomida o‘rganilgan bilimlarini amalda qayta qo‘llay olishi hisoblanadi. Ko‘nikma doimiy bilimlarga asoslanadi, malakaning negizi shaklanishiga bog‘liqdir. Ko‘nikma ikki turga ajratiladi:

1. Mazmuni bo‘yicha amaliy va aqliy;
2. Shakllariga ko‘ra oddiy va murakkab bo‘ladi.

Texnologik jarayonda amaliy ko‘nikmalar o‘qituvchining mehnat faoliyatini amalga oshirishga qaratilgan bo‘lsa, aqliy ko‘nikmalarda esa o‘qituvchilarning olgan bilimlarini o‘zlashtirishga yo‘naltirilgan bo‘ladi. Ko‘nikma oddiylikdan murakkablikka tomon doim o‘sib boradi va o‘quvchilarning texnologiya fanidan olgan bilimlari ham o‘zaro rivojlanib boradi. Ko‘nikmalarni egallangan bilimlar

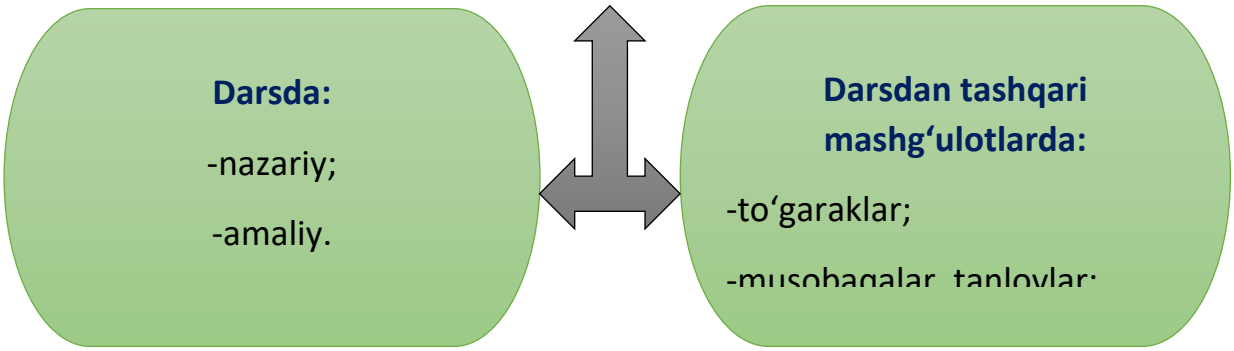
bilan adashtirmaslik lozim, chunki ta’lim jarayonidagi o‘rganilgan bilimlar to‘g‘ri aks ettirilgan mulohazalarda ifodalanadi. Ko‘nikmalar asosan aqliy va jismoniy harakatlarda amalga oshiriladi.

Texnologiya fanini o‘rganish davomida orttirilgan bilimlar o‘quvchi xatti-harakatining nazariy asosi hisoblanadi, ko‘nikmalar hosil bo‘lishida esa o‘quvchilar mehnatning shakllanishi jarayonida ko‘rish, eshitish, takroran vazifani bajarish orqali amaliy ishlaridagi harakatlarning qanday amalga oshirilishi bo‘yicha tasavvurga ega bo‘ladi va bevosita o‘zlari ham ishtirok etadi. O‘quvchilarda ko‘nikmalar shakllanishi uchun o‘qituvchi bajarib ko‘rsatgan ishlarni qayta harakatlar bilan o‘zlari bajarib ko‘rishi shart. Texnologiya fanini o‘rganishning turli bosqichlarida o‘quvchilarda shakllangan ko‘nikmalarning darajasi har xil bo‘ladi. Masalan, oddiy elementar ko‘nikmalar asta-sekin murakkab ko‘nikmalarga aylansa, murakkab ko‘nikmalar juda ko‘p marta qaytarilishi natijasida malakalar shakllanib boradi.

Malaka o‘quvchilar amalga oshirayotgan ishning tez-tez va aniq bajarishga bog‘liq holdagi avtomatlashtirgan komponenti hisoblanib, amaliy topshiriqlarni qayta takrorlashlar hisobiga takomillashib boradi.

O‘quvchilarni ta’lim olish jarayonidagi mehnat ko‘nikmalarining shakllanishi uchun tafakkur va aqliy qobiliyatining o‘zigina yetarli bo‘lmaydi. Ular yetarlicha murakkab ko‘nikmalarning shakllanishi uchun bevosita amaliy mehnat faoliyatida uzoq vaqt turli xil mashqlar bajarishlari shart. Ushbu ko‘nikmalar o‘quvchilarda 1.3.4 –rasmda ko‘rsatilganidek ta’lim jarayonlarida rivojlanib boradi.

Ta’limda ko‘nikmalarni shakllantirish



1-rasm. Ko‘nikmalarni o‘quvchilarda shakllantirish

Texnologiya fanidan mutaxassis o‘qituvchining shaxsiy xususiyatlari qatorida qobiliyatlari orqali kasbiy faoliyatning motivatsion asoslariga ko‘ra ko‘nikma va malakalari o‘sib boradi. Bunga ijtimoiy yetuklik, o‘z – o‘zini nazorat qilish, erkin muloqot yuritish, ishonuvchanlik, mustaqillik, muvaffaqiyatga intilish, yutuqqa ehtiyoj, o‘zini baholay olish kiradi. Texnologiya fani o‘qituvchisining kasbiy tajribasiga o ‘quvchi ishonchini qozona bilish, safarbarlik, amalga oshirgan mehnatini hisobga olish va odilona baholash, kuzatuvchanlik, qatiyatlilik, chidamlilik, turli xil murakkab texnikalardan foydalana bilish, uzoqni ko‘ra olishlik, tartiblilik, tadbirkorlik, ularni bilim olishida qulay sharoit yaratish, tashabbuskorlik, amaliy mehnatga moyillik xislatlari kiradi.

Amaliy topshiriq – o‘quvchi tomonidan amalga oshiriladigan, belgilangan muddatda bajarilishi mumkin bo‘lgan texnologik operatsiya turi.

Yuqorida qayd etilgan fikrlardan kelib chiqib, texnologiya fanidan o‘rganilgan muammolar, ularning yechimlaridan xulosa qilganimizda, biz o‘quvchilarga ko‘pgina buyumlar tayyorlashni o‘rgatishimiz va o‘rganishimizni bir darsning o‘zida to‘liq bajara olmaymiz. Amaldagi darsda belgilangan maqsad asosida vazifalarni o‘rgatgan vaqtimizda ham darsni to‘liq tugatishga ulgurmaymiz. Shuning uchun o‘quvchilarning qiziqishlari, qobiliyatlariga ko‘ra o‘tiladigan darsdagi mavzularni, turli xil vazifalarni sinfdan tashqari ishlarda, qo‘shimcha mashg‘ulotlarda amalga oshirishimiz uchun qiziqarli metodlardan to‘garaklar o‘tkazilsa, internet materiallari yordamida yangi buyumlarni tayyorlashning oson usullari o‘rgatilsa, fanning ahamiyati yana ham katta bo‘ladi. O‘quvchilarga mavzularni nazariy darslarda tushuntirib, ular olgan bilimlaridan samarali natijalarga erishish uchun amaliy mashg‘ulotlarda topshiriqlarni bajarganda ko‘nikmalari rivojlanadi va malakalari shakllanadi.

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FORMATION OF SOCIO-CULTURAL COMPETENCE OF SENIOR STUDENTS BY MEANS OF WEBQUEST TECHNOLOGY

Jalilova Xolidaxon Fayzullo qizi

Namangan State University

Abstract: *This article is devoted to the research of the formation of sociocultural competence in the process of teaching a foreign language at the senior stage with the help of web quest technology. The relevance of this article is because sociocultural competence is one of the structural components of communicative competence, which is key in the context of global intercultural communication. The aim of the research is to provide the theoretical basis and practical verification of the effectiveness of using web quest technology in the formation of the sociocultural competence of senior students in a foreign language class. Obviously, web quest technology has many advantages compared to other technologies, as it includes all types of information. Consequently, web quest technology provides an opportunity to implement various tasks. The article describes the experimental work, namely, its*

purpose, tasks, stages, conditions, content, methods of teaching the formation of the sociocultural competence of senior student

Keywords: *Web Quest technology, foreign language teaching, Socio-cultural competence, intercultural communication, senior students*

Introduction. The development of socio-cultural competency is understood as one of the fundamental goals of modern education, particularly in the context of foreign language studies. Sociocultural competency helps pupils to appreciate cultural variety, respect social norms, and develop tolerance for different societies, all of which are required for global citizenship. Recent pedagogical research highlights the importance of combining interactive and student-centered strategies to achieve these goals (Byram, 1997; Seelye, 1993). Among such ways, WebQuest technology, developed by Bernie Dodge (1995), has grown in favour as an effective educational tool. It provides students with authentic Internet-based projects, promotes inquiry-based learning, and encourages collaborative problem solving. This study analyses how WebQuest technology contributes to the development of sociocultural competency among senior students, particularly in the setting of English language training. The main purpose of teaching English language in the secondary school is to develop the personality of the pupil in close connection with the teaching of the culture of the country of a foreign language contributing to the desire to participate in intercultural communication and independently improve in the classroom activities.

Literature Review: As previously stated, in 1995, Bernie Dodge, a professor of educational technology at San Diego State University, created a system for using the internet to teach any subject at any grade level. He called his venture WebQuest and published a brief overview of his proposal on the internet. Since then, professionals around the world have included WebQuest into their courses (Schwartz & Willing, 2001:p.104). A WebQuest is divided into six sections that introduce students to the activity and explain the duties involved. These six core components are universal to all WebQuests and serve distinct functions in ensuring

transformative learning occurs. Dodge (1995; 1997: p.2) identifies six fundamental components of WebQuest:

1. An introduction provides background material to assist the student in leading the WebQuest program.

2. A task that is both doable and enjoyable, allowing students to learn and improve their existing knowledge by gathering information through the WebQuest. Students are introduced to an inquiry-based activity.

3. A list of the information resources required to complete the assignment. Many (but not all) of the resources are integrated into the WebQuest page as links to World Wide Web content. Potential information sources include web publications, professionals available via e-mail or real-time conferencing, internet searchable databases, and books and other papers physically present in the learner's environment.

4. Process Description: The learners should be given a detailed explanation of the procedures that will lead them to complete the work.

5. Resources for organising information, such as timelines, concept maps, and cause-and-effect diagrams.

6. A conclusion to remind learners of what they have learnt and encourage them to broaden their experience (Dodge (2001: p.7-9), Schwartz and Willing (2001: p.104), Chatel and Nodell (2002: p.4-10), Macgregor and Lou (2005: p.162), Sanders (2006: p).

Methodology: The rapid development of information and communication technology, together with the strong demand for foreign language fluency, necessitates the employment of educational approaches and work structures that encourage active learning. This work plans to provide a web quest for university students to increase their foreign-language competency formation. While web quests are readily available on the internet, not all are appropriate for certain school groups. Thus, we chose several ways and methods based on WebQuest technology to assess its usefulness in the process of developing future professionals' foreign-language competencies. Such as a quasi-experimental design with two groups of students. The

experimental group was taught using WebQuest-based activities, whereas the control group was taught in the traditional teacher-centered approach. As previously stated, 30 senior students come from a non-linguistic high school. They were divided into two groups of thirteen senior pupils apiece. Some techniques selected:

1. Pre- and post-tests to evaluate sociocultural knowledge, attitudes, and communication skills.

2. Methods for assessing collaboration, intercultural awareness, and problem-solving strategies during activities.

3. Student reflection pieces about their experiences. Students in the experimental group completed WebQuests on themes such as "British and Uzbek Food," "Youth Culture in the UK," and "Global Environmental Problems." Each WebQuest had an introduction, task, technique, resources, assessment, and conclusion. Students collaborated in groups, conducted online research, and presented their results through multimedia projects.

Results and Discussion: The findings revealed that students who participated in WebQuest activities significantly increased their intercultural competency.

1. The experimental group outperformed the control group by 25% in terms of cultural differences and foreign customs.

2. The observation found that WebQuest participants were more tolerant, respectful, and open to diverse points of view.

3. Group presentations exhibited enhanced teamwork, communication, and critical thinking about cross-cultural concerns.

4. In their reflection essays, 70% of participants stated that WebQuests helped them "understand cultures beyond textbooks" and made studying "more engaging."

The findings show that WebQuest technology is an effective tool for helping senior students achieve intercultural competency. In contrast to traditional teaching approaches, WebQuests immerse students in real-life scenarios where language is used as a tool for intercultural communication and problem solving. This is consistent with constructivist learning theory, which encourages active knowledge building through collaboration (Vygotsky, 1978). Furthermore, the use of digital

materials adapts the educational process to the digital lifestyles of today's students. However, a few issues were identified: Teachers must be trained before they can construct effective WebQuests. Initially, pupils with low levels of digital literacy faced obstacles. Reliable Internet connectivity was critical to success. Despite these difficulties, WebQuest technology had a generally favourable and revolutionary effect, indicating its wide range of applications in language instruction and other fields.

Conclusion: The study found that WebQuest technology significantly contributes to senior students' sociocultural competency development. WebQuests combine inquiry-based learning, online research, and group projects to help students develop the multicultural understanding, tolerance, and communication skills required for twenty first century citizenship. Educational institutions could use WebQuest projects in their lessons to promote global competency, particularly when teaching foreign languages. The long-term impacts and cross-cultural comparisons of WebQuest's use in different educational contexts should be investigated in future research.

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OLIY TA'LIM TIZIMIDA PEDAGOG KADRLARNING AMALIY KOMPETENTLIGINI RIVOJLANTIRISH: XORIJIY VA MILLIY TADQIQOTLAR TAHLILI

Jaynarov Obid Shavkatovich

Oliy ta'lim tizimi kadrlarini qayta tayyorlash va malakasini oshirish instituti

jaynarovobid88@gmail.com

Annotatsiya: ***Mazkur maqolada oliy ta’lim tizimida faoliyat yuritayotgan pedagog kadrlarning amaliy kompetentligini rivojlantirishning nazariy-metodologik asoslari hamda zamonaviy pedagogik yondashuvlari tahlil qilinadi. Tadqiqot jarayonida pedagoglarning kasbiy kompetentligini rivojlantirishga oid xorijiy va O‘zbekiston olimlarining ilmiy qarashlari qiyosiy tahlil qilinib, amaliy kompetentlikni shakllantirish va rivojlantirishning samarali pedagogik mexanizmlari aniqlanadi. Shuningdek, malaka oshirish tizimida innovatsion pedagogik texnologiyalarni qo‘llash, refleksiv faoliyatni rivojlantirish hamda professional hamkorlikni tashkil etishning ahamiyati asoslab beriladi. Tadqiqot natijalari pedagog kadrlarning kasbiy rivojlanishini ta’minlash hamda ta’lim jarayonining samaradorligini oshirishga xizmat qiladi.***

Kalit so‘zlar: *amaliy kompetentlik, pedagog kadrlar, malaka oshirish, kompetensiyaviy yondashuv, innovatsion pedagogik texnologiyalar, refleksiv faoliyat.*

Abstract:*This article analyzes the theoretical and methodological foundations of developing the practical competence of pedagogical staff working in the higher education system, as well as modern pedagogical approaches. In the research process, the scientific views of foreign and Uzbek scholars on the development of teachers’ professional competence are comparatively analyzed, and effective pedagogical mechanisms for the formation and development of practical competence are identified. In addition, the importance of applying innovative pedagogical technologies in professional development systems, developing reflective activities, and organizing professional collaboration is substantiated. The research results contribute to improving the professional development of teachers and enhancing the effectiveness of the educational process.*

Keywords: *practical competence, pedagogical staff, professional development, competency-based approach, innovative pedagogical technologies, reflective activity.*

Kirish: Bugungi kunda ta’lim tizimini modernizatsiya qilish hamda uning samaradorligini oshirish masalasi jahon miqyosida dolzarb muammolardan biri hisoblanadi. Global ta’lim makonida amalga oshirilayotgan islohotlar pedagog kadrlarning kasbiy tayyorgarligi va amaliy kompetentligini rivojlantirishni ta’lim tizimi rivojlanishining muhim omili sifatida qarashni taqozo etmoqda. Ayniqsa, oliy ta’lim tizimida faoliyat yuritayotgan pedagoglarning kasbiy salohiyati ta’lim jarayonining sifati va samaradorligini belgilovchi asosiy omillardan biridir. Zamonaviy ta’lim jarayonida pedagoglardan nafaqat chuqur nazariy bilimlarga ega bo‘lish, balki ularni real pedagogik vaziyatlarda samarali qo‘llay olish, innovatsion pedagogik texnologiyalardan foydalanish hamda talabalarning mustaqil fikrlash va ijodiy faoliyatini rivojlantirish talab etilmoqda. Shu sababli pedagoglarning amaliy kompetentligini rivojlantirish masalasi pedagogika fanining dolzarb ilmiy yo‘nalishlaridan biri sifatida keng o‘rganishni taqoza etmoqda va bu sohadagi ilmiy tadqiqotlarning dolzarbligini belgilaydi

Asosiy qisim. Pedagoglarning kasbiy kompetentligini rivojlantirish muammosi ko‘plab xorijiy va mahalliy olimlarning ilmiy tadqiqotlarida o‘z aksini topgan. Xususan, kompetensiyaviy yondashuv nazariyasi A.V. Xutorskoy, I.A. Zimnyaya, V.A. Slastenin, E.F. Zeer, A.A. Verbitskiy kabi olimlar tomonidan keng o‘rganilgan. Ushbu tadqiqotlarda pedagoglarning kasbiy kompetentligi nazariy bilimlar, amaliy ko‘nikmalar hamda refleksiv faoliyatning integrativ natijasi sifatida talqin qilinadi. Shuningdek, zamonaviy pedagogika fanida pedagoglarning kasbiy rivojlanishi uzluksiz ta’lim jarayoni sifatida qaraladi. Xalqaro tadqiqotlar pedagoglarning professional rivojlanish jarayoni ta’lim sifatini oshirishning muhim omillaridan biri ekanligini ko‘rsatadi. Xususan, pedagoglarning kasbiy kompetentligini rivojlantirishda refleksiv faoliyat, professional hamkorlik hamda tajriba asosida o‘qitish muhim ahamiyatga ega.

O‘zbekiston pedagogika fanida ham pedagog kadrlarning kasbiy kompetentligini rivojlantirish masalalari keng o‘rganilmoqda. N.A. Muslimov, B.X. Xodjaev, R. Ishmuhamedov, Sh. Sharipov kabi olimlarning ilmiy tadqiqotlarida pedagoglarning kasbiy kompetentligini rivojlantirishning nazariy va metodik

asoslari ishlab chiqilgan. Mazkur tadqiqotlarda pedagoglarning kasbiy kompetentligini rivojlantirishda innovatsion pedagogik texnologiyalarni qo‘llash, pedagogik mahoratni oshirish hamda uzluksiz malaka oshirish tizimini takomillashtirish muhim omil sifatida ko‘rsatiladi.Shu bilan birga, ta’lim tizimida amalga oshirilayotgan islohotlar pedagog kadrlarning amaliy kompetentligini rivojlantirishning yangi mexanizmlarini ishlab chiqishni talab etmoqda. Ayniqsa, malaka oshirish tizimida zamonaviy pedagogik texnologiyalarni qo‘llash, pedagoglarning refleksiv faoliyatini rivojlantirish hamda professional hamkorlikni tashkil etish pedagoglarning kasbiy rivojlanishida muhim ahamiyat kasb etadi.

Zamonaviy jamiyatda ta’lim tizimining rivojlanishi davlatning ijtimoiy-iqtisodiy taraqqiyoti bilan bevosita bog‘liqdir. Ayniqsa, oliy ta’lim tizimida pedagog kadrlarning kasbiy salohiyati va amaliy kompetentligi ta’lim sifatining asosiy ko‘rsatkichlaridan biri hisoblanadi. Shuning uchun ham zamonaviy pedagogik tadqiqotlarda kompetensiyaviy yondashuv asosida pedagog kadrlarning kasbiy rivojlanish jarayonlarini o‘rganishga katta e’tibor qaratilmoqda.

Amaliy kompetentlikning nazariy asoslari

Pedagogik kompetentlik tushunchasi zamonaviy pedagogika fanining muhim kategoriyalaridan biri hisoblanadi. Kompetentlik pedagogning kasbiy faoliyatni samarali amalga oshirish qobiliyati sifatida talqin qilinadi.

Amaliy kompetentlik pedagogning nazariy bilimlarini real pedagogik vaziyatlarda qo‘llay olish qobiliyatini ifodalaydi. Pedagoglarning amaliy kompetentligini rivojlantirish quyidagi asosiy komponentlarni o‘z ichiga oladi:

- kognitiv komponent;
- operatsion komponent;
- motivatsion komponent;
- refleksiv komponent.

Mazkur komponentlarning o‘zaro uyg‘unligi pedagogning kasbiy faoliyatini samarali tashkil etish imkonini beradi.

Xorijiytadqiqotlar tahlili: So‘nggi yillarda pedagoglarning amaliy kompetentligini rivojlantirish masalasi xalqaro ilmiy tadqiqotlarda keng

o‘rganilmoqda. Scopus bazasida chop etilgan tadqiqotlarda pedagoglarning kasbiy kompetensiyasi ta’lim sifatining muhim omillaridan biri sifatida talqin qilinadi.

Xususan, Linda Darling-Hammond tadqiqotlarida pedagoglarning professional rivojlanishi ta’lim tizimi samaradorligini oshirishning asosiy omili ekanligi ta’kidlanadi. Olimning fikricha, pedagoglarning kasbiy kompetentligini rivojlantirish jarayoni uzluksiz professional ta’lim orqali amalga oshirilishi zarur.

John Hattie tomonidan ishlab chiqilgan “Visible Learning” konsepsiyasida o‘qituvchilarning kasbiy mahorati ta’lim jarayonining samaradorligiga bevosita ta’sir ko‘rsatishi ilmiy jihatdan asoslab berilgan.

David Kolb tajriba asosida o‘qitish nazariyasida pedagoglarning amaliy kompetentligini rivojlantirishda tajriba va refleksiya muhim rol o‘ynashini ta’kidlaydi.

Shuningdek, Andy Hargreaves pedagoglarning professional hamjamiyatlari orqali kasbiy rivojlanish jarayonini tashkil etish samarali natijalar berishini ko‘rsatadi.

O‘zbekiston olimlari tadqiqotlari: O‘zbekiston pedagog olimlari ham pedagog kadrlarning kasbiy kompetentligini rivojlantirish masalalarini keng o‘rganib kelmoqdalar.N.A. Muslimov pedagoglarning kasbiy kompetentligini rivojlantirish jarayoni uzluksiz ta’lim tizimi bilan uzviy bog‘liq ekanligini ta’kidlaydi. Olimning fikricha, pedagogning kasbiy kompetentligi nazariy bilimlar, pedagogik mahorat hamda amaliy tajriba uyg‘unligi asosida shakllanadi.

B.X. Xodjaev pedagoglarning kasbiy kompetentligini rivojlantirishda innovatsion pedagogik texnologiyalar muhim rol o‘ynashini ilmiy jihatdan asoslab beradi.

R.Ishmuhamedov zamonaviy pedagogik texnologiyalarni qo‘llash pedagoglarning amaliy kompetentligini rivojlantirishda samarali vosita ekanligini ko‘rsatadi.

Xorijiy, Rossiya va O‘zbekiston olimlari qarashlarining qiyosiy tahlili

Xorijiy olimlar	Ilmiy g‘oya	Rossiya olimlari	Ilmiy yondashuvi	O‘zbekiston olimlari	Amaliy kompetentlik bo‘yicha xulosa
Linda Darling-Hammond	O‘qituvchilarning professional rivojlanishi ta’lim sifatining asosiy omili	A.V.Xutorskoy	Kompetensiyaviy yondashuv nazariyasi	N.A. Muslimov	Pedagoglarning uzluksiz kasbiy rivojlanishi amaliy kompetentlikni shakllantiradi
John Hattie	“Visible Learning” orqali samarali o‘qitish strategiyalari	V.A. Slastenin	Pedagogik mahorat va kasbiy kompetentlik nazariyasi	B.X. Xodjaev	Zamonaviy metodlar pedagoglarning amaliy faoliyat samaradorligini oshiradi
David Kolb	Tajriba asosida o‘qitish nazariyasi (Experiential Learning)	A.A.Verbitskiy	Kontekstli ta’lim nazariyasi	R. Ishmuhamedov	Amaliy mashg‘ulotlar pedagog kompetentligini rivojlantiradi
Andy Hargreaves	Professional learning communities	N.V. Kuzmina	Pedagogik faoliyat professionalizmi	Sh. Sharipov	Pedagoglar hamkorligi kasbiy

	(PLC) nazariyasi				rivojlanishni tezlashtiradi
Michael Fullan	Ta’lim tizimida innovatsion o‘zgarishlar nazariyasi	E.F. Zeer	Kasbiy ta’lim psixologiyasi	M. Ochilov	Innovatsion yondashuvlar pedagog kompetentligini oshiradi
Donald Schön	Refleksiv amaliyot nazariyasi	L.M. Mitina	Pedagogning kasbiy rivojlanish psixologiyasi	O‘zbekiston pedagogika maktabi	Refleksiv tahlil pedagogning kasbiy o‘sishini ta’minlaydi

Xorijiy va O‘zbekiston olimlarining ilmiy qarashlarini qiyosiy tahlil qilish shuni ko‘rsatadiki, pedagoglarning amaliy kompetentligini rivojlantirish masalasida bir qator umumiy yondashuvlar mavjud.

Xorijiy tadqiqotlarda ko‘proq quyidagi jihatlarga e’tibor qaratiladi:

- refleksiv pedagogik faoliyat;
- professional hamjamiyatlar;
- tajriba asosida o‘qitish;
- raqamli kompetensiyalarni rivojlantirish.

O‘zbekiston olimlari tadqiqotlarida esa quyidagi yo‘nalishlar muhim o‘rin tutadi:

- pedagogik mahoratni rivojlantirish;
- innovatsion pedagogik texnologiyalarni qo‘llash;
- uzluksiz kasbiy ta’lim tizimini takomillashtirish.

Xulosa

Tadqiqot natijalari shuni ko‘rsatadiki, pedagog kadrlarning amaliy kompetentligini rivojlantirish ta’lim tizimining samaradorligini oshirishda muhim ahamiyatga ega.

Pedagoglarning kasbiy rivojlanishini ta’minlash uchun quyidagi yo‘nalishlarni rivojlantirish zarur:

- kompetensiyaga asoslangan ta’lim yondashuvini joriy etish;
- innovatsion pedagogik texnologiyalarni keng qo‘llash;
- pedagoglarning refleksiv faoliyatini rivojlantirish;
- professional hamkorlik va tajriba almashish tizimini takomillashtirish.

Mazkur yondashuvlar pedagoglarning amaliy kompetentligini rivojlantirishga hamda ta’lim sifatini oshirishga xizmat qiladi.

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SCIENTIFIC THEORETICAL SOURCES AND TRENDS OF TEACHING TECHNOLOGIES BASED ON FOREIGN EXPERIENCE

Khojimirzayeva Shakhnoza Shokir qizi
University of Business and Science
e.mail: shaxnozaxojimirzayeva@gmail.com

Abstract. *This article analyzes the scientific and theoretical foundations of the technologies for teaching preschoolers in the preparatory group in the preschool education system based on foreign experience. International scientific sources on modern pedagogical technologies were studied and innovative pedagogical approaches used in the preschool education system were analyzed. The results of the study showed that game activities, project methods and integrated educational technologies play an important role in the development of preschool children. The use of innovative pedagogical technologies in the preschool education process has shown that it is important to develop children's cognitive activity, independent thinking and creative abilities.*

Keywords: *preschool education, pedagogical technologies, innovative education, game technology, project method, integrated education.*

Nowadays, the development of the preschool education system, the introduction of modern pedagogical technologies into the educational process, and the effective preparation of children for school education are among the urgent pedagogical problems. Preschool education is an important stage in the intellectual, social and psychological development of children, during which the main cognitive

activity of children is formed. In recent years, in the process of modernization of the education system, special attention has been paid to the use of innovative pedagogical technologies in preschool educational organizations. In developed countries, special attention is paid to innovative pedagogical technologies, a child-centered educational model, and a developing educational environment in the organization of the preschool educational process. The use of modern pedagogical technologies in the educational process is of great importance in ensuring the intellectual development of children, developing independent thinking, and shaping their social activity. Therefore, the study of foreign pedagogical experiences in the preschool education system and the analysis of their scientific and theoretical foundations are of great scientific and practical importance.

Theoretical substantiation of pedagogical technologies for teaching preschoolers based on foreign experience requires, first of all, a correct understanding of modern international interpretations of preschool education. Today, in world pedagogy, preschool education is considered not only as a stage of formal preparation of a child for primary school, but also as a system that supports his physical, cognitive, speech, socio-emotional and moral development as a whole process.[1] UNESCO interprets preschool education as a crucial opportunity associated with rapid brain development from birth to eight years of age and assesses it not only as preparation for primary school, but also as the foundation for lifelong learning, emotional well-being and social harmony. [2] The World Health Organization associates early childhood development with a caring, safe and rich learning environment. Therefore, the theoretical foundations of pedagogical technologies used in the preschool preparatory group based on foreign experience are formed at the intersection of international scientific conclusions on the biopsychosocial nature of child development, the human rights-related value of education, and the quality of education.

In developing a theoretical approach to this issue, it is necessary to give a clear scientific content to the concept of "pedagogical technology". Based on foreign experience, pedagogical technologies used in the preschool preparatory group are

understood not as a set of separate methods or a technique for organizing individual classes, but as a systematic design model that ensures an integral connection between the goal, content, method, means, environment, assessment and expected results. OECD analyses indicate five main policy levers affecting the quality of preschool education - standards and financing, curriculum and pedagogy, human resources, monitoring and information, and cooperation with the family and the community - as factors that directly affect the quality of children's daily interactions. Here, while the curriculum sets the goals of development and education, pedagogy is interpreted as a strategy and technique that implements these goals. Therefore, when mastering foreign experience, the main attention should be paid not to the external form, but to this systemic connection.

One of the modern trends of foreign experience is the interpretation of preschool education as an inclusive and rights-based system. UNESCO and OECD materials identify as a priority the provision of quality early childhood education for all children, especially the adaptation of the educational environment for children with different linguistic, cultural, social or special needs. The OECD analysis of inclusive ECEC emphasizes the growing trend of perceiving diversity not as a problem, but as a resource and strength. In this regard, pedagogical technologies based on foreign experience in the preschool group should not be aimed at demanding the same result from all children in the same way, but at providing similar development opportunities through different paths. This theory in practice implies the adaptation of activities, visual support, additional language support, peer teaching and personalized assistance in cases where children in the group have different speech readiness, attention, social behavior or language environment. Here, inclusion is not just about children with special needs, but also about recognizing the individual developmental trajectory of each child.

The experience of foreign countries shows that in the effective organization of the preschool educational process, game activities, project methods, independent learning and a developing environment play an important role. Pedagogical

approaches such as Reggio Emilia, Anji Play, Montessori and HighScope are widely used in the preschool education system.

The issue of using innovative pedagogical technologies in the preschool education system has been studied by many foreign scientists. The HighScope model, developed by the American pedagogical scientist David P. Weikart, is based on the principle of active learning in the preschool education system. This model is aimed at developing children's independent activities, forming skills for planning and analyzing results. The main element of this model is the “plan–do–review” process. This process allows children to plan, implement and analyze their own activities.

The Reggio Emilia approach, formed in Italy, is an effective model for using innovative pedagogical technologies in the preschool education system. The founder of this pedagogical system is Loris Malaguzzi. The main idea of Reggio Emilia pedagogy is that the child is an active participant in his own development. This approach is aimed at developing children's creative activity, project-based learning, and creating a developmental learning environment.

The Anji Play methodology, which is widely used in the Chinese preschool education system, is also one of the important directions of modern pedagogical technologies. This pedagogical system is based on the free play activities of children. The Anji Play methodology allows children to make independent decisions, solve problems, and think creatively during play. Research shows that this methodology has a positive impact on children's social and intellectual development.

One of the pedagogical approaches widely used in the preschool education system is the Montessori education methodology. The founder of this pedagogical system is the Italian doctor and educator Maria Montessori. The main principles of Montessori pedagogy are: child-centered education, independent activity, the use of special didactic materials, and the creation of a developmental educational environment. The Montessori methodology is aimed at developing children's independent learning activities, and this system takes into account the individual development characteristics of children.

In recent years, special attention has also been paid to integrated educational technologies in the preschool education system. Integrated education involves the interrelationship of children in various areas of knowledge. The Phenomenon-Based Learning model used in the Finnish education system is a vivid example of integrated educational technology. In this model, children study various subjects not separately, but based on real-life phenomena. This approach develops children's: ability to solve problem situations, creative thinking, and cooperation skills.

The analyzed scientific sources show that modern pedagogical technologies are based on the active learning process of children in the preschool education system. Foreign experience shows the effectiveness of the following pedagogical approaches:

- game-based teaching technologies
- project-based education
- developmental learning environment
- child-centered learning model

In conclusion, it should be noted that the analysis of scientific and theoretical sources of teaching technologies based on foreign experience showed the need to introduce innovative pedagogical technologies in the preschool education system. Modern pedagogical technologies serve to ensure the intellectual development of children, form their independent thinking, and develop their social skills. Adapting these pedagogical technologies to the national preschool education system allows for the effective preparation of children for school education.

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РОЛЬ И ЗНАЧЕНИЕ МЕТАКОГНИТИВНОГО ПОДХОДА В ПРОЦЕССЕ ЧТЕНИЯ ХУДОЖЕСТВЕННЫХ ТЕКСТОВ

Kurbanbayeva Dilnoza
O‘zbekiston davlat jahon tillari universiteti
E-mail: dilnozakurbanbaeva7@gmail.com

Аннотация. *В статье рассматривается роль метакогнитивного подхода в процессе чтения художественных текстов. Особое внимание уделяется теоретическому осмыслению метакогниции как знания о собственных познавательных процессах, а также механизма их осознания, контроля и регуляции. Анализируются основные компоненты метакогнитивной деятельности читателя — осведомлённость, оценка и регуляция, — и раскрывается их значение в интерпретации художественного текста. Обосновывается, что метакогнитивный подход способствует не только повышению уровня понимания текста, но и развитию рефлексивного, интерпретативного и критического чтения. .*

Ключевые слова*: метакогниция, метакогнитивный подход, художественный текст, понимание текста, читательские стратегии, интерпретация, рефлексивное чтение.*

Abstract. *The article examines the role of the metacognitive approach in the process of reading literary texts. Particular attention is devoted to the theoretical interpretation of metacognition as knowledge of one’s own cognitive processes, as well as the mechanisms of their awareness, control, and regulation. The study analyzes the principal components of the reader’s metacognitive activity—awareness, evaluation, and regulation—and reveals their significance in the interpretation of literary texts. It is argued that the metacognitive approach*

contributes not only to improving the level of text comprehension, but also to fostering reflective, interpretive, and critical reading.

Keywords: *metacognition, metacognitive approach, literary text, text comprehension, reading strategies, interpretation, reflective reading.*

Annotatsiya. *Mazkur maqolada badiiy matnlarni o‘qish jarayonida metakognitiv yondashuvning o‘rni va ahamiyati tahlil qilinadi. Unda metakognitsiya shaxsning o‘z bilish jarayonlari haqidagi bilimlari, shuningdek, ularni anglash, nazorat qilish va tartibga solish mexanizmlari sifatida nazariy jihatdan talqin etiladi. Tadqiqotda o‘quvchining metakognitiv faoliyatining asosiy tarkibiy qismlari — metakognitiv bilim, baholash va regulyatsiya jarayonlari — ko‘rib chiqilib, ularning badiiy matnni talqin qilishdagi funksional ahamiyati yoritiladi. Metakognitiv yondashuv nafaqat matnni tushunish darajasini oshirishga, balki refleksiv, interpretativ va tanqidiy o‘qish ko‘nikmalarini rivojlantirishga ham xizmat qilishi asoslab beriladi. .*

Kalit so‘zlar: *metakognitsiya, metakognitiv yondashuv, badiiy matn, matnni tushunish, o‘qish strategiyalari, interpretatsiya, refleksiv o‘qish.*

Введение

В современной педагогике чтение рассматривается не как механический процесс декодирования, а как сложная интеллектуальная деятельность, включающая восприятие, осмысление, интерпретацию и оценку текста. Особенно сложным является чтение художественных произведений, поскольку оно предполагает работу не только с фактуальной, но и с подтекстовой, эмоционально-ценностной и символической информацией. В связи с этим всё более значимым становится метакогнитивный подход, позволяющий рассматривать читателя как активного субъекта, который осознаёт собственные мыслительные действия, управляет ими и корректирует их в ходе взаимодействия с текстом.

В обзорной работе по теории метакогниции подчёркивается, что Дж. Флавелл определял метакогницию как «knowledge and cognition about cognitive phenomena», то есть знание и познание, направленные на собственные

когнитивные процессы. Это определение стало методологической основой для многочисленных исследований, связывающих метакогнитивную осведомлённость с качеством чтения, понимания и учебной автономии. [3]

Применительно к художественному чтению значение метакогнитивного подхода особенно велико. Если при чтении учебного или научного текста доминирует задача точного извлечения информации, то художественный текст требует от читателя построения смыслов, соотнесения собственной читательской позиции с авторской, распознавания образной структуры и понимания эстетической функции языка. Поэтому метакогнитивный подход в данном контексте выступает не только как средство повышения учебной эффективности, но и как условие формирования зрелой интерпретационной культуры читателя. [6]

Современная трактовка метакогниции опирается на классические исследования, в которых данное явление понимается как особый уровень организации познавательной деятельности. В теоретическом обзоре, посвящённом развитию понятия, отмечается, что метакогниция включает знание о собственном мышлении, осведомлённость о его ходе и способность к его контролю и перестройке. При этом важным является не просто наличие знаний о стратегиях, а способность использовать их в конкретной познавательной ситуации. [3]

Одним из наиболее продуктивных подходов является рассмотрение метакогниции через три взаимосвязанные функции: «осведомлённость, оценка и регуляция». Согласно теоретической модели, метакогнитивная осведомлённость связана с пониманием того, что именно делает человек в процессе решения задачи; метакогнитивная оценка предполагает суждение об эффективности используемых способов мышления; а метакогнитивная регуляция проявляется в способности направлять, корректировать и оптимизировать собственную интеллектуальную деятельность. Иными словами, метакогниция делает познание рефлексивным и управляемым. [3]

С точки зрения структуры, в исследованиях обычно выделяются два ключевых компонента: «метакогнитивное знание» и «метакогнитивная регуляция». Первое включает декларативное знание о себе как о читателе, о текстах, задачах и стратегиях; второе связано с планированием, мониторингом понимания, обнаружением трудностей, корректировкой действий и итоговой оценкой результата. В ряде работ подчёркивается, что именно соединение знания и регуляции превращает чтение в осознанную стратегическую деятельность. [3]

Таким образом, метакогнитивный подход в обучении чтению ориентирован не только на то, чтобы студент «прочитал текст», но и на то, чтобы он понимал, «почему» текст оказался понятным или непонятным, «какие» стратегии сработали, «в какой момент» возникло затруднение и «каким образом» можно было его преодолеть. Такая позиция принципиально меняет роль обучающегося: он становится не пассивным получателем содержания, а активным субъектом собственного понимания. [4]

Вопрос о связи метакогнитивной осведомлённости и понимания прочитанного является одним из центральных в современной методике чтения. Исследования показывают, что метакогнитивная стратегия осмысленного чтения играет значительную роль в формировании понимания текста. В одной из обзорных статей подчёркивается, что метакогнитивная осведомлённость включает действия читателя по «планированию, мониторингу и оценки» учебной задачи, а также осознание того, происходит ли понимание в данный момент или нет. Там же отмечается, что опытные читатели используют разнообразные метакогнитивные стратегии значительно чаще, чем слабые читатели. [1]

Особенно важным является вывод о том, что обучение именно метакогнитивным стратегиям даёт более устойчивые и долговременные результаты, чем обучение отдельным когнитивным приёмам. В исследовании, опубликованном в «English Language Teaching», подчёркивается, что краткосрочные улучшения могут обеспечиваться и за счёт когнитивных

техник, однако именно метакогнитивная подготовка чаще ведёт к более стабильному приросту понимания текста в долгосрочной перспективе. [1]

Значимы и эмпирические подтверждения этой связи. В исследовании Ghazi Ghaith и Hind El-Sanyoura, посвящённом роли метакогнитивных стратегий в чтении на иностранном языке, анализировалось взаимодействие между использованием метакогнитивных стратегий и результатами понимания текста у школьников. Авторы исходили из того, что метакогнитивные стратегии выступают не периферийным, а медиирующим фактором чтения, связывающим познавательные ресурсы ученика с качеством интерпретации текста. [2]

Близкий вывод содержится и в исследовании, посвящённом чтению повествовательных текстов. В нём была зафиксирована статистически значимая корреляция между метакогнитивной осведомлённостью учащихся и их результатами в понимании narrative texts; авторы прямо указывают на существенную связь между этими переменными. Хотя данная работа относится к учебному, а не литературоведческому контексту, она важна тем, что показывает универсальность механизма: чем выше уровень осознанности читательских действий, тем продуктивнее понимание текста. [5]

Следовательно, в теоретическом плане метакогниция должна рассматриваться как внутренний механизм организации понимания. Она позволяет читателю не растворяться в тексте, а выстраивать управляемую траекторию чтения: прогнозировать, уточнять, сопоставлять, возвращаться к непонятным фрагментам, проверять гипотезы и переосмыслять уже прочитанное. Именно благодаря этому понимание становится не случайным результатом, а рефлексивно контролируемым процессом. [1]

Таким образом, метакогнитивный подход представляет собой одну из наиболее продуктивных теоретико-методических основ обучения чтению художественных текстов. Его ценность заключается в том, что он переводит чтение из плоскости спонтанного восприятия в сферу осознанной, управляемой и рефлексивной деятельности. Метакогниция позволяет

читателю понимать собственные стратегии, оценивать их эффективность, отслеживать затруднения и целенаправленно корректировать процесс понимания.

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METHODOLOGY FOR THE FORMATION OF SPEECH COMPETENCE OF PRIMARY SCHOOL STUDENTS BASED ON AN INTEGRATIVE APPROACH

Mamatraimova Dilshoda Chorshanbiyevna
Termez State Pedagogical Institute

Abstract: *This article provides an in-depth analysis of the methodological foundations for developing speech competence in primary school students through an integrative approach. Integrative teaching combines various subject areas, creating a holistic learning environment that enhances students' linguistic, communicative, and cognitive abilities. By linking language instruction with subjects such as reading literacy, environmental studies, visual arts, and technology, the integrative approach strengthens students' motivation and supports natural speech development.*

Findings demonstrate that the integrative approach significantly improves students' speech activity, coherence, grammatical accuracy, and cultural awareness, thereby fostering a more meaningful and context-driven language acquisition process.

Keywords: *primary education, integrative approach, speech competence, communicative development, cross-curricular integration, interactive methodology, linguistic skills, learner-centered teaching.*

Introduction. Speech competence is one of the main criteria for the linguistic, communicative, and social development of each student at the stage of primary education. In the context of modern globalization and the information society, children's speech culture, the ability to clearly and understandably express their thoughts, and the potential for communication not only increase the effectiveness of the educational process, but also are an important factor in preparing them for future social and academic activities. Therefore, the formation and development of speech skills is considered one of the priority tasks of preschool and primary education.In recent decades, pedagogical research has been aimed at identifying effective methods for the development of speech competence, including an integrative approach. An integrative approach means combining language teaching with other

subjects, enriching the learning process through games, practical exercises, projects, and interactive tasks. This method helps children not only acquire grammatical knowledge, but also develop skills in applying it in real communication situations.

Also, the integrative approach allows students to develop skills in understanding interdisciplinary connections, creative thinking, independent decision-making, and teamwork. For example, environmental, mathematics, or visual arts activities combined with In the modern education system, along with the introduction of interactive and integrative methods, students' speech activity, listening comprehension, vocabulary, and communication skills are being systematically developed. Therefore, the integrative approach is one of the main directions of modern pedagogical research in the formation of speech competence of primary school students.

This article is aimed at studying the theoretical foundations, methodological principles, and practical developments of this process and systematically covers effective methods of forming students' speech competence. The research results show the didactic effectiveness of the integrative approach, the

Literature review. The issue of forming the speech competence of primary school students has been researched for many years in the fields of pedagogy and linguistics. In recent decades, research in this area has significantly intensified. Researchers, including Bruner (1966), Vygotsky (1978), and Piaget (1970), emphasized the importance of activity and context in the formation of .Also, domestic researchers such as Makhmudova (2015), Karimova (2018) studied the practical aspects of the formation of speech competence in primary education. According to their results, integrative lessons are an effective tool for increasing children's vocabulary, developing listening comprehension skills, and strengthening communication skills. Studies show that children better master speech activity through games, projects, experiments, and interactive activities, which also stimulates their creative thinking abilities. Today, 70 percent of the countries of the world use integrative curricula and textbooks in the education system. Each country has developed and implemented different levels of integration, based on the nature

of the order placed on the education system of this country. For example, in the education system of Great Britain, integrative subjects are mainly introduced. Integrated subjects or separate subjects in Korea and Switzerland, integrated subjects in Australia, separate subjects in Japan, Northern Ireland, Wales, Hong Kong and Germany, subjects in the field of culture, human and nature, integrative subjects in Hungary, separate subjects in the Netherlands. In Ireland, all academic subjects are taught in blocks such as mathematics and technology. We are taking the first steps in this area. In particular, primary education is defined in the State Educational Standards on "Native Language," "Reading," The fields of education "Mathematics," "Nature," and "Man and Society" are defined. The field of education "Human and Society" embodies concepts related to a number of subjects. For example, concepts related to ethics, aesthetic education, economic knowledge, physical education, art education, legal knowledge, etc. Since the organization of the educational process based on integrative programs and textbooks is intended to achieve effectiveness as a result of the educational process, it is advisable to use different levels of integration.

International experience also confirms the effectiveness of the integrative approach. For example, Coyle (2007) and Mehisto (2010) showed that using the CLIL (Content and Language Integrated Learning) methodology, children can learn language in real contexts, understand interdisciplinary connections, and enhance speech activity. This approach enriches children not only with knowledge, but also with communicative and cultural skills.In recent years, Mamatraimova (2021) scientifically analyzed the effectiveness of the integrative approach in the formation of speech competence in primary school students. The research results showed that the integrative method significantly expands students' vocabulary, develops listening comprehension and communication skills, and also increases interest in lessons.At the same time, the analysis of the literature shows that the integrative approach to the formation of speech competence has not only pedagogical, but also

scientific significance. It serves not only to develop language skills, but also to form children's creative thinking, independent decision-making, and interdisciplinary understanding. From this point of view, the analysis of the literature confirms the integrative approach as one of the most effective methodological tools for primary school pedagogy. In the course of the scientific investigation,

traditional and contemporary scholarly literature in the fields of pedagogy, psychology, and methodology has been subjected to profound analysis. Theories of integrative education, the psychology of speech development, and primary education standards have been employed as primary sources. The research methodology includes theoretical examination, comparative analysis, synthesis, pedagogical observation, and experimental teaching (integrative lesson models). Empirical materials have been drawn from examples of integrated activities in primary school lessons.

Research methodology. The issue of forming speech competence in primary school students has long been researched in the fields of pedagogy and linguistics. Analysis of scientific literature shows that one of the effective ways to develop speech competence is the use of an integrative approach. The theories of cognitive development of Piaget, Vygotsky, and Bruner emphasize that children acquire knowledge through activity and communication, and at the same time, language and speech skills can be formed naturally and effectively. At the same time, Coyle and Mehisto's research shows the importance of implementing language learning through classes integrated with other subjects. This approach not only develops communicative and linguistic skills, but also increases cultural sensitivity and creative thinking. The importance of the integrative approach in the formation of speech competence of primary school students is highlighted. It has been scientifically and methodologically substantiated that the educational process, organized on the basis of interdisciplinary connections, serves the development of students' oral and written speech, independent thinking, and increased communicative activity. The elementary education stage plays an important role in

the formation of speech competence in students. It is during this period that the child learns to think correctly, fluently, and logically, to express their thoughts orally and in writing. Based on the requirements of modern education, the use of an integrative approach in the process of speech development, along with the traditional approach, is becoming an urgent issue.

Concept of speech competence

Speech competence is the student's ability to correctly and appropriately use language units, fluently express their thoughts in the process of communication, understand the interlocutor, and respond appropriately. It includes the following components:

Previous scientific sources, including articles and monographs on the integrative approach and CLIL methodology, serve as a basis for determining the methods for developing the components of speech competence - vocabulary, listening comprehension, sentence construction, and communication skills. At the same time, the analysis of the literature shows that integrative classes also contribute to increasing students' ability to understand interdisciplinary connections and creative thinking.The methodology of this study is aimed at the practical application of scientific conclusions obtained from the analysis of literature. The object of the study was the speech competence of primary school students, and students aged 7-10 years and practicing teachers were selected as participants. In the study, theoretical and empirical methods were used in harmony. Theoretical methods include literature analysis, philological and stylistic study of the text, and identification of the components of speech competence. Empirical methods include conducting integrative classes in practice, observation, interviews and conversations, as well as collecting and analyzing data obtained through diagnostic tests.

In the process of data analysis, students' speech activity, vocabulary, listening comprehension, and communication skills were systematically recorded. At the

same time, the effectiveness of the integrative approach in the lesson process was assessed, and the development of interdisciplinary connections and creative thinking skills was observed. For the reliability of the research, classes were conducted in the same conditions, and groups and methodological tools were standardized. Theoretical and empirical methods were used in combination, and the results were analyzed comparatively.As a result, the combination of literature review and research methodology made it possible to systematically study effective ways of forming the speech competence of primary school students based on an integrative approach. Thus, the positive influence of the integrative methodology on the development of children's speech activity, vocabulary, communication skills, and interdisciplinary connections has been scientifically proven. The integrative approach provides opportunities for teaching (integrative lesson models). Empirical materials have been drawn from examples

of integrated activities in primary school lessons. DISCUSSION AND RESULTS: The integrative approach provides opportunities for

eflectively applying inter-subject connections (eg, mother tongue and visual arts, mother tongue and natural science) in forming speech competence. In such lessons, pupils develop speech activity through text composition, storytelling, description, and discussion. Experimental results demonstrate that utilizing the integrative approach increases pupils' lexical richness by 25-35%, while enhancing communicative activity and creative thinking. The discussion highlights the advantages of integrative methods (increased motivation, formation of holistic knowledge) and challenges (requirements for teacher preparedness).

CONCLUSION: Forming speech competence on the basis of the integrative

approach has proven itself as an effective methodological direction in primary education. In the course of the scientific investigation,

traditional and contemporary scholarly literature in the fields of pedagogy, psychology, and methodology has been subjected to profound analysis. Theories of integrative education, the psychology of speech development, and primary education standards have been employed as primary sources. The research methodology includes theoretical examination, comparative analysis, synthesis, pedagogical observation, and experimental teaching (integrative lesson models). Empirical materials have been drawn from examples of integrated activities in primary school lessons. Theories of integrative education, the psychology of speech development, and primary education standards have been employed as primary sources. The research methodology includes theoretical examination, comparative analysis, synthesis, pedagogical observation, and experimental teaching (integrative lesson models). Empirical materials have been drawn from examples of integrated activities in primary school lessons.

Analysis and results. During the study, students' speech competence was assessed through lessons organized on the basis of an integrative approach. During the experimental classes, language learning was combined with other subjects - mathematics, environment, art, and technology. Interactive methods, game technologies, multimedia tools, and visual materials were used in the lessons. In this way, students had the opportunity to use the language in contextual and practical situations.The results of the observation and diagnostic tests showed that the students in the group using the integrative approach:

They became more active in speech activity and showed significant growth in the level of independent sentence construction and vocabulary expansion;

Skills of listening comprehension and interpretation of the text were developed at a high level;

In this way, students were able to use the language in contextual and practical situations.

The results of the observation and diagnostic tests showed that the students in the group using the integrative approach:

They became more active in speech activity and showed significant growth in the level of independent sentence construction and vocabulary expansion;

Skills of listening comprehension and interpretation of the text were developed at a high level;

Analysis based on the results of the empirical study showed that the speech competence of students in the experimental group was developed at a much higher level compared to the group where the integrative approach was not applied. This is explained, first of all, by the interactive nature of the lessons, interdisciplinary integration, and the possibility of using the language in practical situations.In conclusion, the results of the analysis show that the integrative approach is an effective tool in the formation of speech competence of primary school students. This methodology expands students' vocabulary, develops communication skills, strengthens interdisciplinary connections and creative thinking skills, and makes the lesson process interesting and motivational.

Conclusion. In this study, the methodological foundations of the integrative approach in the process of forming the speech competence of primary school students were studied. The research results showed that the organization of language learning in integration with other disciplines serves the effective development of students' communicative, linguistic, cultural, and cognitive skills.Based on the data of empirical observations and diagnostic tests, it was established that the students in the group using the integrative approach: were more active in speech activity, their vocabulary expanded, their abilities to communicate and express their thoughts were developed; interdisciplinary connections and creative thinking skills significantly increased. At the same time, interactive methods, game technologies, and multimedia tools encouraged students to actively participate by making lessons interesting and motivational.

The study showed that the integrative approach is an effective tool not only in the formation of speech competence, but also in the development of students' ability to think independently, make creative decisions, and engage in communication.

Therefore, the application of an integrative approach in the process of primary education is of great importance for pedagogical practice.

In conclusion, the integrative methodology allows expanding students' vocabulary, developing their speech activity, and making the lesson process interactive, interesting, and effective. The research results serve to strengthen the theoretical and practical foundations of the widespread introduction of an integrative approach in primary education.

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ONA TILI MASHG‘ULOTLARIDA AUDIOMATN TOPSHIRIQLAR USTIDA ISHLASH

Matniyazova Dilrabo Ulug‘bekovna

Annotatsiya. *Ushbu maqolada bo‘lajak ona tili va adabiyot o‘qituvchilarining ona tili mashg‘ulotlarida tinglab tushunish topshiriqlaridan samarali foydalanish, tinglash jarayonini boshqarish va o‘quvchilarni maqsadli yo‘naltirish ko‘nikmasini shakllantirish uchun zarur metodik tavsiyalar berildan. Shuningdek, tinglab tushunishni rivojlantiruvchi topshiriqlarni tizimli tashkil etishda audiomatnlardan samarali foydalanish usullari keltirilgan.*

Kalit so‘zlar. *Tinglab tushunish, ona tili, mashg‘ulot, metodika, topshiriq, mashq, ko‘nikma, nutq, audiomatn, multimedia.*

Annotation. *This article provides methodological recommendations for prospective native language and literature teachers on the effective use of listening comprehension tasks in native language lessons, managing the listening process, and developing students‘ ability to be purposefully guided. It also presents methods for effectively using audio texts in the systematic organization of tasks that develop listening comprehension skills.*

Keywords. *Listening comprehension, native language, lesson, methodology, task, exercise, skill, speech, audio text, multimedia*

Kirish. Bugungi globallashuv davrida bo‘lajak o‘quvchilarni bilim va salohiyatini yanada rivojlantirish ta’lim tizimidagi asosiy vazifalardan biri bo‘lib qolmoqda. Nutq faoliyatining asosiy turi hisoblangan tinglab tushunish o‘qituvchi uchun juda muhim bo‘lgan metodik, psixologik va jamiyatdagi muloqot ko‘nikmalarini shakllantiradi. Bo‘lajak o‘qituvchilarda tinglab tushunish topshiriqlari bilan ishlashni o‘rgatish bir qancha bosqichlarni o‘z ichiga oladi.

Birinchi bosqichda tinglashga tayyorgarlik, ya’ni mavzu yuzasidan motivatsiya, asosiy tushunchalarni faollashtirish va tinglashga tayyorgarlik amalga oshiriladi. Ikkinchi bosqichda audio materialni tinglash, ma’lumotni saralash, asosiyni ajratish, berilgan vazifaga mos tushunish ko‘nikmalari shakllantiriladi. Uchinchi bosqichda olingan ma’lumotni tahlil qilish va xulosa chiqarish, baholash va qayta bayon qilish ishlari bajariladi.

Ona tili mashg‘ulotlarida tinglab tushunish topshiriqlaridan samarali foydalanish o‘qituvchilarda diqqatni jamlash, situativ fikrlash, axborotni tez qabul qilish va muloqotga moslashish kabi kasbiy kompetensiyalarni rivojlantiradi. Shuningdek, autentik audio materiallar, turli mavzuda beriladigan matnlar, rolli vazifalar, situatsion mashqlar tinglash jarayonini yanada boyitadi. Tinglashni baholash mezonlarini o‘rgatish esa bo‘lajak pedagoglarga dars jarayonini tizimli tashkil etish imkonini beradi. Interfaol texnologiyalar, raqamli platformalar va multimedia materiallaridan foydalanish tinglab tushunish jarayonining samaradorligini yanada kuchaytiradi.

Asosiy qism. Tinglab tushunish ko‘nikmasining nazariy asoslari tinglab tushunish – eshitilgan nutqni idrok etish, mazmunini anglash va talqin qilish jarayonidir. U murakkab psixolingvistik jarayon bo‘lib, tinglovchining fonetik, leksik va grammatik bilimlariga tayanadi. Ona tili darslarida bu ko‘nikma o‘quvchilarning og‘zaki nutqini rivojlantirish, muloqot madaniyatini shakllantirishda muhim ahamiyatga ega. Bo‘lajak o‘qituvchi tinglab tushunishning mohiyatini chuqur anglagan holda, uni rivojlantirishga xizmat qiluvchi mashqlarni to‘g‘ri tanlay olishi zarur. Tinglab tushunishni rivojlantiruvchi topshiriqlar tizimi tinglab tushunishga yo‘naltirilgan mashqlarni tashkil etishda audiomatnlardan samarali foydalanish muhim hisoblanadi. Audiomatnlar mazmuni o‘quvchilarning yosh va til tayyorgarligiga mos bo‘lishi lozim.

Topshiriqlar quyidagi bosqichlarda tashkil etiladi:

1. Tinglashdan oldingi tayyorgarlik – mavzu bo‘yicha fikrlar bildirish, asosiy tushunchalarni aniqlash, lug‘aviy tayyorgarlik.

2. Tinglash jarayonidagi topshiriqlar – asosiy g‘oyani aniqlash, muhim axborotni ajratib olish.

3. Tinglashdan keyingi bosqich – matn mazmunini qayta hikoyalash, tahlil qilish va xulosa chiqarish.

Bo‘lajak ona tili o‘qituvchilari ushbu mashqlarni ishlab chiqish orqali metodik ijodkorlik va kasbiy mustaqillikni egallaydilar. Zamonaviy ta’lim tizimida ona tili fanining asosiy vazifalaridan biri o‘quvchilarda nutqiy kompetensiyani shakllantirishdan iboratdir. Maktab darsliklarida beriladigan aksariyat mashq va topshiriqlarning audiomatnlar asosida berilishi o‘quvchini ijtimoiy hayotni tushunishga, ma’lumotlarni saralashga, muloqot qilish madaniyati oshirishga, baholashga va o‘z dunyoqarashiga ko‘ra xulosa chiqarishga undovchi asosiy omil hisoblanadi. Unga ko‘ra o‘quvchi berilgan audiomatnni tinglaydi hamda olgan ma’lumotlarini tahlil qiladi. Masalan, o‘quvchiga audiomatn asosida bir nechta savollar berilishi mumkin. Bunda o‘quvchining eslab qolish va matnni ongida tahlil qilish qobiliyati rivojlanadi. Shuningdek matnga sarlavha tanlab qo‘yish ham o‘quvchida mantiqiy mushohada qilish ko‘nikmasini rivojlantiradi. Bundan tashqari matndagi iboralarni va uslubiy bo‘yoqdor so‘zlarning o‘rnini mos so‘zlar bilan almashtirib yozish va bunday holatda gaplarning mazmunida qanday o‘zgarish bo‘lganini izohlash ham juda samarali usul hisoblanadi. Shunday samarali usullardan biri matnga doir maqollar va hikmatli so‘zlar qatnashgan qisqa hikoya tuzishdir. Bunda o‘quvchi maqollarni, hikmatli so‘zlarni hayotda qanday o‘rin tutishini, qaysi holatlarda ularga murojaat qilishni hamda ulardan qanday saboq olishi mumkinligini anglaydi. o‘quvchilar audiomatn asosida tuzilgan bir qancha test topshiriqlarini bajarishi ham yaxshi natija beradi. Bunda o‘quvchi olgan ma’lumotlarini tahlil qilish bilan birga boshqa variantlar bilan ham taqqoslashni o‘rganadi. Yana shunday samarali usullardan biri audiomatn asosida tayyorlangan bir nechta hukm va xulosalar o‘qib eshittiriladi o‘quvchilar esa bularni to‘g‘ri yoki

noto‘g‘ri ekanini aniqlashadi. Bu usul o‘quvchilarda ma’lumotlardan to‘gri hamda oqilona xulosa chiqarish va hayotda qo‘llashga undaydi. Aralash holatda berilgan audiomatn voqealarini tartiblab yozish ham yaxshi usul hisoblanadi. Bunda o‘quvchining voqealar ketma-ketligini eslab qolish ko‘nikmasi mustahkamlanadi. Audiomatnda berilgan ma’lumotlar berilgan grammatik mavzuga qarab moslashtirilgan topshiriqlar berish va shu asosida bilim va ko‘nikmalarni shakllantirish va mustahkamlash mumkin. Jumladan, eshittirilgan audiomatndan so‘z turkumlarnini ajratib yozish, neologizmlarni ajratib yozish kabi. Monitor o‘rnatilgan sinflarda audiomatn eshittirilgach unda ekranda ko‘rsatilgan bir nechta rasmlar bilan bog‘liq ma’lumotlarni aniqlash ham yaxshi usullardan. Bu bilan o‘quvchi hayotda duch keladigan vaziyatlarda to‘g‘ri qaror qabul qilishga ko‘nikma hosil qiladi. Audiomatn ustida ishlashda o‘quvchi fakt va fikrni ajrata olishi juda muhimdir. Bunda o‘quvchi ilmiy isbotlangan xulosalarni insonlarning shaxsiy fikrlaridan farqlashi lozim. Matndan olingan xulosalarni daftarga qayd etish va uni o‘qib eshittirgach muhokama qilish ham yaxshi usullardan. Bunda o‘quvchi nima uchun bu xulosaga kelganligini dalillaydi. Bu esa o‘z navbatida atrofdagilarga fikrini erkin bayon etib uni izohlashni va dalillashni shakllantiradi. Berilgan audiomatn asosida savollar tuzish va ularni birma-bir oqib eshittish orqali savollarga javob topish ham yaxshi usuldir. Shoirlar ijodidan ba‘zi she‘rlarni audiomatn holatida tayyorlab eshittirish va shu asosida topshiriqlar bajarish mumkin. Masalan, misralarni sharhlash, she‘rda berilgan yangi so‘zlarni izohli lug‘atdan o‘qituvchi yordamida topish (kichik sinflarda), estetik zavq beruvchi va his-hayajon so‘zlarni qo‘llanilishini mushohada qilish ham samarali usul hisoblanadi. Bunda o‘quvchi she‘riyat olamiga sayohat qiladi va ba ‘zi hollarda shu orqali kelajakdagi kasbini ham aniqlab olishi mumkin. Har bir misrani tahlil qilishda avvalo, o‘qituvchi o‘quvchilarga biroz tushuncha berishi maqsadga muvofiqdir. So‘ngra o‘quvchining o‘zi matn asosida fikrlarini bayon qiladi.

Audiomatnlar bilan ishlashda o‘quvchilarda yetarli bilim va ko‘nikmani shakllantirish uchun o‘qituvchining o‘zi ham munosib darajada tayyorgarlik ko‘rishi

har qanday savol-javoblarda o‘zining adolatli va oqilona xulosasi bilan yechim berishi juda muhimdir. Aksariyat hollarda o‘quvchilar fikrlarini dalillashda ayovsiz bellashuvni yuzaga keltirishadi. Bunday hollarda o‘qituvchining to‘g‘ri qaror qabul qilishi hamda vaziyatga oydinlik kiritishi yuksak salohiyat va mahorat talab etadi.

Xulosa. Xulosa o‘rnida shuni aytish joizki, zamonaviy ta’limtizimida bo‘lajak ona tili o‘qituvchisining kasbiy tayyorgarligi faqat nazariy bilimlar bilan cheklanmay, balki nutqiy faoliyat turlarini rivojlantirishga yo‘naltirilgan metodik kompetensiyani ham o‘z ichiga oladi. Xususan, tinglab tushunish ko‘nikmasini rivojlantirish ona tili ta ‘limida muhim o‘rin tutadi. Shu bois bo‘lajak o‘qituvchilarni tinglab tushunishni rivojlantiruvchi mashqlar ustida ishlashga o‘rgatish dolzarb metodik masala hisoblanadi. Tadqiqotlar shuni ko‘rsatadiki, ona tili mashg‘ulotlarida tinglab tushunish topshiriqlarini muntazam qo‘llash o‘qituvchilarning metodik savodxonligini oshiradi, ular tomonidan tinglash jarayonini boshqarish va o‘quvchilarni samarali yo‘naltirish ko‘nikmasi shakllanadi.

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Maxmatqobilova Nigina
Shahrisabz State Pedagogical Institute
Avloyorova Gulshoda
Shahrisabz State Pedagogical Institute
E-mail: maxmatqobilovan@gmail.com

Abstract. *In the rapidly evolving landscape of modern education, the integration of emotional intelligence into foreign language teaching has become an essential area of scientific inquiry[31]. This article provides an in-depth analysis of how emotional intelligence contributes to students' cognitive, social, and communicative development. The research adopts an interdisciplinary perspective, combining insights from pedagogy, psychology, and applied linguistics to explore innovative strategies that enhance both emotional awareness and language proficiency[32]. The study demonstrates that emotional intelligence significantly affects learners' motivation, classroom engagement, and overall academic achievement. Special emphasis is placed on innovative teaching practices such as interactive learning, collaborative tasks, and the integration of digital technologies . The results indicate that emotionally supportive learning environments promote self-confidence, reduce anxiety, and facilitate more effective communication. Furthermore, the study highlights the long-term impact of emotional intelligence on learners' academic success and their ability to adapt to complex social and professional environments.* ***Keywords:*** *emotional intelligence, innovative education, foreign language teaching, student motivation, interactive learning, modern pedagogy*

[1] Goleman, D. (1995). *Emotional Intelligence*. New York: Bantam Books.
[32] Harmer, J. (2007). How to Teach English. London: Longman.

Introduction

The transformation of modern education systems under the influence of globalization and technological advancement has created new demands for both teachers and learners[33]. Today, educational success is no longer measured solely by academic knowledge but also by the ability to manage emotions, communicate effectively, and adapt to diverse social environments. In this context, emotional intelligence has emerged as a critical component of holistic education. Foreign language learning, in particular, is closely connected with emotional processes. Students are required to express themselves in unfamiliar linguistic contexts, which often leads to anxiety, fear of making mistakes, and lack of confidence. These emotional barriers can significantly limit their ability to acquire and use a new language effectively. Therefore, addressing emotional factors has become a central challenge in modern language pedagogy[34]. Recent innovations in education emphasize student-centered approaches that prioritize learners' emotional well-being. By integrating emotional intelligence into teaching practices, educators can create a more supportive and engaging learning environment. This not only improves language proficiency but also contributes to students' personal development. The purpose of this study is to explore the role of emotional intelligence in foreign language education and to identify innovative teaching methods that enhance both emotional and academic outcomes. The research also aims to contribute to ongoing discussions on modern educational challenges and development prospects.

Literature Review

The concept of emotional intelligence has gained significant attention in both psychological and educational research [1][10]. Early studies define emotional intelligence as the ability to recognize, understand, and regulate one's own emotions

[33] Harmer, J. (2007). How to Teach English. London: Longman.
[34] Mayer, J. D., & Salovey, P. (1997). What is Emotional Intelligence?

as well as those of others. This ability is considered essential for effective communication and social interaction[35]. In educational contexts, emotional intelligence is closely linked to student motivation and learning success. Researchers argue that learners who possess higher emotional awareness are more likely to participate actively in classroom activities and demonstrate better academic performance[36]. Emotional intelligence also plays a key role in reducing stress and anxiety, which are common challenges in foreign language learning [1][6]. Modern pedagogical theories emphasize the importance of affective factors in education. Humanistic approaches focus on the learner as a whole person, highlighting the need to address emotional as well as cognitive aspects of learning [2][3]. This perspective supports the integration of emotional intelligence into teaching methodologies. Recent studies also highlight the role of innovative teaching strategies in fostering emotional development. Interactive methods such as group discussions, role-playing, and problem-solving tasks encourage collaboration and empathy among students [7][8]. Furthermore, digital technologies provide new opportunities for creating engaging and personalized learning experiences [3][9]. Despite these advancements, traditional teaching methods still dominate many classrooms, often neglecting emotional aspects of learning. This gap between theory and practice underscores the need for further research and innovation in this field [4][5].

Research Methodology

This study is based on a comprehensive and multi-layered research design that integrates qualitative and analytical approaches. The methodology reflects modern interdisciplinary research practices and aims to provide a deeper understanding of the relationship between emotional intelligence and foreign language learning.

First, the **theoretical analysis method** was employed to examine existing literature in the fields of psychology, pedagogy, and linguistics. This provided a

[35] Vygotsky, L. S. (1978). Mind in Society. Harvard University Press.
[36] Harmer, J. (2007). How to Teach English. London: Longman.

solid conceptual framework for understanding emotional intelligence and its role in education.

Second, the **comparative method** was used to evaluate differences between traditional and innovative teaching approaches [37]. By comparing teacher-centered and student-centered models, the study identified the advantages of integrating emotional intelligence into modern pedagogy.

Third, the **descriptive-analytical method** was applied to interpret how emotional factors influence students' behavior, motivation, and academic performance[38]. This method focused on identifying patterns and relationships within the learning process.

The study also incorporated the **observational method**, which involved analyzing classroom interactions and teaching practices. This provided practical insights into how emotional intelligence is developed in real educational settings.

Additionally, the research utilized elements of the **case study method**, examining specific examples of classroom activities such as group work, discussions, and interactive exercises[39]. These cases illustrated how innovative teaching strategies can enhance emotional engagement and communication skills.

The **sociocultural approach** was applied, drawing on the idea that learning occurs through social interaction[40]. This perspective highlighted the importance of collaboration, peer support, and teacher guidance in developing emotional intelligence. **Moreover, it emphasizes that emotionally rich interactions enhance both cognitive and communicative skills, fostering a deeper understanding of language in authentic social contexts.**

Finally, the research included a **reflective method**, allowing the author to evaluate teaching experiences and identify effective practices. The combination of

[37] Richards, J. C. (2015). Key Issues in Language Teaching. Cambridge University Press.
[38] Brown, H. D. (2000). Principles of Language Learning and Teaching. Longman.
[39] Mayer, J. D., & Salovey, P. (1997). What is Emotional Intelligence?
[40] Vygotsky, L. S. (1978). Mind in Society. Harvard University Press.

these methods ensured a comprehensive analysis and strengthened the validity of the research findings.

Results and Discussion

The results of the study confirmed that emotional intelligence plays a crucial role in foreign language learning[41]. Students who are able to manage their emotions and interact effectively with others demonstrate higher levels of motivation and academic achievement. Interactive teaching methods were found to have a particularly positive impact . Activities such as group discussions, role-playing, and collaborative projects created opportunities for students to express their ideas and emotions[42]. These methods not only improved language skills but also fostered empathy and social interaction[43]. Digital technologies were also shown to enhance emotional engagement. Multimedia resources, online platforms, and educational applications provided dynamic and flexible learning environments, allowing students to learn at their own pace and reducing anxiety associated with traditional classroom settings . Teacher behavior was identified as a key factor. Supportive and empathetic teachers create a positive classroom atmosphere that encourages participation and reduces fear of mistakes. This highlights the importance of teacher training in emotional intelligence . Challenges remain, including limited resources, lack of awareness, and resistance to innovative methods . Addressing these issues is essential for the successful integration of emotional intelligence into educational practice.

Conclusion

The findings of this research demonstrate that emotional intelligence is an essential element of modern education and plays a significant role in foreign language learning . Integrating emotional and cognitive development leads to more

[41] Goleman, D. (1995). *Emotional Intelligence*. New York: Bantam Books.
[42] Mayer, J. D., & Salovey, P. (1997). *What is Emotional Intelligence?*
[43] Brown, H. D. (2000). *Principles of Language Learning and Teaching*. Longman.

effective and meaningful educational outcomes, helping students not only acquire language skills but also develop self-awareness, empathy, and social adaptability. Innovative teaching approaches, particularly interactive methods, collaborative projects, and the use of digital technologies, provide valuable tools for fostering emotional intelligence in learners. These approaches enhance academic performance, boost motivation, and create a classroom environment that is both supportive and engaging . Emotional intelligence empowers students to face challenges, manage learning-related stress, and communicate confidently in diverse social contexts. Moreover, the research highlights the crucial role of teachers in shaping emotionally intelligent learners. Educators who demonstrate empathy, provide constructive feedback, and promote reflective thinking contribute to the development of students' emotional competencies. This emphasizes the need for teacher training programs to include emotional intelligence development as a core component. The study also underscores the broader implications of integrating emotional intelligence in education. By fostering emotional and social skills alongside cognitive abilities, students are better prepared to adapt to the dynamic demands of modern society, including collaborative work, intercultural communication, and professional environments. Educational systems that prioritize emotional intelligence are likely to cultivate learners who are resilient, motivated, and capable of lifelong learning. Finally, the research points to future directions for both educational policy and classroom practice. Schools and higher education institutions should consider implementing structured programs to develop emotional intelligence systematically. Further interdisciplinary research is recommended to explore innovative methods, measure long-term outcomes, and investigate how emotional intelligence interacts with other pedagogical innovations.

In conclusion, the integration of emotional intelligence into modern foreign language education is not merely an instructional enhancement but a vital strategy for nurturing well-rounded, adaptable, and socially competent individuals. Through the combination of innovative teaching methods, supportive classroom

environments, and teacher guidance, emotional intelligence can be cultivated effectively, preparing students for success in both academic and real-world contexts.

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MAKTABGACHA TA'LIM TASHKILOTI TARBIYALANUVCHILARINING BILISH JARAYONLARINI RIVOJLANTIRISH METODIKASINING ILMIY PEDAGOGIK ASOSLARI

Maziyayeva Muqaddasxon Esonovana
Farg'ona viloyati pedagogik mahorat markazi
E-mail:muqaddasxonmaziyayeva@gmail.com

Annotatsiya. *Mazkur maqolada maktabgacha ta'lim tashkilotlarida tarbiyalanuvchilarini bilish jarayonlarini rivojlantirish metodikasining ilmiy pedagogikasi asoslaari mavzusi atroflicha yoritilgan. Tarbiyalanuvchilarga ta'lim-tarbiya berish jarayonida ularni har biri atrof-muhitni ko'ra bilishlari va idrok etishlari turlicha ekanligi hisobga olib ta'lim tarbiya berishga alohida to'xtalib o'tilgan. Har bir ta'lim oluvchini betakrorligini saqlab qolish va yanada rivojlantirish masalalari ochib berilgan.*

Kalit so'zlar: *ta'lim-tarbiya, maktabgacha ta'lim tashkiloti, tarbiyalanuvchi, neyropedagogik tamoyillar, bilish jarayoni, bilim, tafakkur, idrok.*

Annotation. *This article comprehensively discusses the scientific and pedagogical foundations of the methodology for developing the cognitive processes of children in preschool educational institutions. In the process of providing education and upbringing to children, special attention is given to the fact that each child perceives the surrounding environment differently. The article emphasizes the importance of taking these individual differences into account in the educational process. It also highlights issues related to preserving and further developing the uniqueness of each learner.*

Keywords: *education and upbringing, preschool educational institution, child, neuropedagogical principles, cognitive process, knowledge, thinking, perception.*

KIRISH

Mamlakatimizda ta’lim tizimida uzoqni ko‘zlab olib borilayotgan islohatlar bugun nafaqat jamoatchiligimiz, balki butun jahonda katta e’tibor bilan e’tirof etilmoqda. Bugun kunda ta’limda yangicha qiyofa kasb etgan va zamon talablari darajasida ta’minlangan. Mamlakatimiz ravnaqi va islohatlarning muvaffaqiyati ko‘p jihatdan xalqning bilim darajasi va dunyoqarashiga bog‘liq. Shaxsning ta’lim-tarbiya sohasidagi faolligi, uning chinakam fuqaroviy munosabati, demokratik islohatlarga intiluvchanligi belgilangan maqsadlarga tezroq erishishishning muhim omilidir. “Ta’lim-tarbiya” – insonning ong mahsuli, lekin ayni vaqtda ong darajasi va uning rivojini ham belgilaydigan omildir. Tarixan tarbiya maxsus inson faoliyati sifatida shakllanib borish barobarida, ta’lim-tarbiya yakunida tarbiyalanuvchining sifatlari, ya’niy ta’limiy maqsadlarini ham aniqlab beradi.

ASOSIY QISM

Tarbiyalanuvchilarning barchasi misoli alohida dunyo bo‘lib, ularning har biri boshqalaridan o‘zining tashqi ko‘rinishi bilan birga xarakteri, tafakkuri, borliqni ko‘rishi, atrof muhitdan kelayotgan ma’lumotlarni qabul qilishi va idrok etishi bilan farq qiladi. Buning asosiy sababi bosh miya yarimsharlarining funksiyalari hamda “ish uslublari” bir xil emasligidir. Yarimsharlar birgalikda, hamjihat bo‘lib, faoliyat ko‘rsatsalarda, ularning har biri o‘ziga yarasha “ish bajarishning sevimli uslublari” mavjud bo‘lib, ayrim yarimsharlar “xizmatidan” ko‘proq foydalanasalar, boshqalar o‘ng yarim sharlar “ximatini” afzal ko‘radilar. Inson bosh miya yarimsharlari faoliyatida sodir bo‘ladigan neyrologik o‘zgarishlarni ta’lim-tarbiya jarayonini tashkil etishda hisobga olinishi bolalar bilish faolligini namoyon qilishlari hamda bilishga bo‘lgan ehtiyojlarini qondirishlari, intellektual to‘siqlarni ortiqcha qiyinchiliklarsiz engib o‘tishlari, ularning tahlil qilish va umumlashtirish qobliyatlarini o‘zaro muntanosib shakllantirishi, ijobiy faollikni intensive rivojlantirish kabi bir qator masalalarni yanada samarali hal etishdaa katta imkoniyatlar beradi.

Neyropedagogika-bu yangi paydo bo‘lgan fan bo‘lib, u o‘rganish jarayonlarini neyroilmiy nuqtai nazardan tushunish va yaxshilashga intiladi. Ushbu intizom miya faoliyatini va uning o‘rganishda ishtirok etadigan kognituv, hissiy va xulq-atvor jarayonlari bilan aloqasini o‘rganadi. Neyropedagogika miya qanday o‘rganishini va har bir ta’lim oluvchining individual xususiyatlariga moslashtirilgan samarali ta’lim strategiyalarini ishlab chiqishni tushunish uchun mustahkam nazariy asos yaratadi. Neyropedagogikaning asosiy jihatlaridan biri tarbiyalanuvchilarda bilish, texnik professional texnik sohalarda o‘zlashtirishni yaxshilash uchun miya bilimlariga asoslangan ta’lim vositalarini qo‘llashdir. Neyrotarmoq texnologiyasi orqali tarbiyalanuvchilarda bilish jaronlarini rivojlantirish asosida kafolatlangan natijaga erishish uchun samarali muloqot texnikasini shakllantirsh, o‘zi va yon-atrofidagi kishilarnimg xulq-atvorini ongli ravishda o‘zlashtirishga yo‘naltirish samarali natija beradi.

Neyropedagogik diagnostika-insondagi juft organlar qo‘l, ko‘z va quloqning yetakchilik ko‘rsatkichlariga qarab bosh miya yarim sharlari asimmetriyasining bir nechta funksional tiplarini aniqlash imkonini beradi. Neyropedagogik korreksiya va adaptatsiya–bolaning neyropedagogik xususiyatlarini hisobga olgan holda uning qadriyatli-motivatsiya va xulq-atvoriga tuzatish kiritish hamda ta’lim jarayoniga moslashishini tashkil etishini ta’minlaydi. O‘quv ma’lumotlari tarbiyalanuvchilarga tushunarli bo‘lgan tilda berilishi uchun ularning har birini bosh miya yarimsharlarining ishlash strategiyalarini bilish kerak bo‘ladi. Har bir insonda juft organlar-qo‘l, ko‘z, va quloqlarni biri ikkinchisiga qaraganda yaxshiroq ishlaydi. Ya’ni ushlaydi, ko‘radi, eshitadi. Juft organlarning qaysi tarafdagisi (o‘ng yoki chap) boshqa tarafdagisiga nisbatan yaxshiroq ishlasa, u shartli ravishda “yetakchi organ” hisoblanadi. Agar juftlikdagi o‘ng organ chap organga qaraganda yaxshiroq ishlasa, bu insonda faoliyatni asosan chap yarimsharlar aksincha, agar chapaqay bo‘lsa, asosan o‘ng yarim sharlar boshqarishdan dalolat beradi. Bunday holatda juft organlarning yetakchiligi va ularning o‘zaro kombinatsiyasisidan kelib chiqib inson bosh miya yarimsharlari asimmetriyasining bir qator funksional tiplarini aniqlash mumkin bo‘ladi.

Inson organizmining barcha to‘qima va a’zolaridagi hayotiy jarayonlar, ularning ishi markaziy asab tizizmi tomonidan boshqariladi. Insonning tug‘ilganidan boshlab butun umri davomida aqliy va jismoniy faoliyatining takomillashuvi, ya’ni, tarbiyalanishi, bilim olishi, hunar o‘rganishi, tahlil qilishi yoki ixtirolar yaratishi miya po‘stlog‘idagi asab markazlarining funksional holatiga bog‘iq. Aqliy mehnat (o‘qish, yozish, fikrlash, masala yechish, dars tinglash va tayyorlash, narsa va predmetlarni taqqoslash, solishtirish) asosan ko‘rish va eshitish, a’zolari va ularning bosh miya po‘stlog‘*dagi markzalarning asab hujayralari bajaradigan ishidir*. Shunday ekan tarbiyalanuvchilar aqliy mehnat qilishlari uchun shart-sharoit yaratish bilan bir qatorda ularda kun tartibiga rioya qilishni juft a’zolarini birgalikda ishlatishga undash, ta’limiy faoliyat yoki o‘yin hamda mehnat faoliyatida ham bir faoliyatni ikkinchi bilan almashtirilib turishlarini ongli rabvishda bajarishga harakat qilishlari samarali natija beradi.

Ta’lim–inson bilish faoliyatining eng murakkab turlaridan bir bo‘lib, individual ruhiy rivojlanishni va bilimlrani o‘zlashtirishni ancha tezlashtiradi. Pedagog ta’lim berish jarayonida faqat bilim berish va o‘rgatish bilan chegaralanmaydi, bu jarayonda u ta’lim oluvchiga ta’sir ko‘rsatadi. Bu ta’sir ko‘rsatish ta’lim oluchilarni bilim olishlarini yanada faollashtiradi. Natijada tarbiyalanuvchi ta’lim jarayonining faol ishtirokchisiga aylanadi. Maktabgacha ta’lim tashkiloti tarbiyalanuvchilari hayotida bilish murakkab dialetik jarayon bo‘lib, jonli mushodadan abstrakt tafakkurga so‘ngra amaliyotga o‘tish yo‘lidir. Bilish tarbiyalanuvchi shaxsi uchun mavhum ham o‘zlashtirilmagan narsa, voqea va hodiasalarni ong yordmida o‘zlashtirish jarayonidir.

Bilish jaroyonidan bilim hosil bo‘ladi. Bilim insonlarning ijtimoiy tarixiy amaliyot jarayonida to‘plagan umumlashtirgan tajribalaridir. Bilimlar asosida tarbiyalanuvchilarda kuzatuvchalik, tafakkur xotira idrok etish qobilyatlari rivojlanadi, ilmiy dunyoqarashlari shakllanib yangi g‘oyalar tizimi tarkib topadi. Tizimli bilimlar tarbiyalanuchining bilish faoliyatini rivojlanishini ta’minlaydi. Bilimlar asosida tarbiyalanuvchi yaxlit obyektni idrok etishdan, uning

xususiyatlarini anglashga erishadi. Anglash asosida tarbiyalanuvching sezish ko‘nikmalari rivojlanadi. Maktabgacha ta’lim tashkiloti tarbiyalanuchilarni bilish jarayonlarini neyrotarmoq texnologiya asoisda rivojlantirishda individual xususiyatlarini hisobga olish, ta’lim oluvchi ya’ni tarbiyalanuvchilarni shaxsini har tomonlama va chuqur bilish, ularning psixofiziologik xususiyatlari bilan bir qatorda neyrologik imkoniyatlar hamda jihatlarini ham hisobga olish o‘ta muhimdir. Bu texnologiya orqali o‘zlashtirishda qiynaladigan tarbiyalanuvchilarga pedagoglar tomonidan alohida e’tibor qaratish muhimdir. Chunki barcha tarbiyalanuvchilarni bilish, idrok etish darajasi bir xil emas. Agarda barcha tarbiyalanuchilar bilan alohida shug‘llanilmasa, ularni bilish jarayonlarini o‘z vaqtida o‘zlashtirishmaslik shaxsning intellektual va ijtimoiy rivojlanishiga salbiy ta’sir etadi.

XULOSA

Xulosa qilib aytganda, innovatsion ta’lim muhitini tashkil etish, uning nazariy integrative bazasini, umumiy metadalogiyasini hamda diagnostik va korreksion texnologiyalarini yaratishda neyropedagogik tamoyillardan samarali foydalanish ahamiyatlidir. Pedagog har bir ta’lim oluvchidagi betakrorlikni saqlab qolishi va ta’lim jarayonida beriladigan ma’lumotlarni tarbiyalanuvchilar anglashlari va tushunishlari uchun ularning pedagogik xususiyatlarini hisobga olishlari kerak. Yuqoridagi keltirilgan omillarga tayangan holda maktagacha ta’lim tashkilotida tarbiyalanuvchilarni bilish jarayonlarini neyrotarmoq texnologiya asosida rivojlantirish orqali ularda innovatsion ta’lim muhitini tashkil etish unda integrativ va nazariy bilim bazasini, umumiy metadalogiyasini yaratishga neyrotarmoq texnologiyasi asosidagi imkoniyatlar samarali bo‘ladi. Bu texnologiya orqali beriladigan bilimlar, ma’lumotlar tarbiyalanuvchilarda faqatgina eslab qolishlari uchun emas, balki, anglashlari va nisbatan qiyinchiliklarsiz tusunishlari hamda o‘zlashtishlari uchun yordam beradi. Maktabgacha ta’lim yoshidagi tarbiyalanuvchilarda bilish jarayonlarini to‘g‘ri tashkil etish ularning aqliy rivojlanish qonuniyatlari va imkoniyatlarini ochadi.

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DEVELOPING ENVIRONMENTAL SUSTAINABILITY AWARENESS IN YOUNG LEARNERS: GLOBAL EDUCATIONAL STRATEGIES

Mukhtarova Lobar Abdimannabovna

Termez State Pedagogical Institute

Email: muxtarovalobar789@gmail.com

Annotation: *This article examines global scientific approaches to environmental sustainability and security and their strategic implications for primary education. Emphasizing the importance of early environmental literacy, it explores interdisciplinary curriculum design, experiential learning, and the integration of adaptive learning technologies. The study highlights how AI-based tools and real-life ecological challenges can enhance students' environmental understanding, critical thinking, and responsible behavior. Findings suggest that embedding global sustainability principles into primary education fosters long-term ecological awareness and prepares children to make informed, environmentally responsible decisions.*

Keywords: *Environmental sustainability, environmental security, primary education, interdisciplinary learning, adaptive learning, ecological literacy, AI in education.*

Аннотация: *В данной статье рассматриваются глобальные научные подходы к экологической устойчивости и экологической безопасности, а также их стратегические импликации для начального образования. Особое внимание уделяется важности формирования экологической грамотности на ранних этапах обучения. В работе анализируются междисциплинарное проектирование учебных программ, опытно-ориентированное обучение и интеграция адаптивных образовательных технологий. Исследование показывает, что использование инструментов на основе искусственного*

интеллекта и анализ реальных экологических проблем способствуют углублению экологических знаний учащихся, развитию их критического мышления и формированию ответственного поведения. Результаты исследования свидетельствуют о том, что внедрение принципов глобальной экологической устойчивости в систему начального образования способствует формированию долгосрочного экологического сознания и подготовке детей к принятию обоснованных и экологически ответственных решений.

Ключевые слова: *экологическая устойчивость, экологическая безопасность, начальное образование, междисциплинарное обучение, адаптивное обучение, экологическая грамотность, искусственный интеллект в образовании.*

Introduction:

In the 21st century, environmental sustainability and security have emerged as critical priorities for global development. Issues such as climate change, biodiversity loss, depletion of natural resources, pollution, and environmental degradation threaten human well-being and socio-economic progress. International organizations, including UNESCO, UNICEF, and OECD, emphasize the necessity of integrating environmental education into curricula from the earliest stages of schooling. Developing an environmental safety culture in children is not only about raising ecological awareness but also about fostering responsible decision-making, ethical behavior, and active citizenship. Primary education represents a pivotal stage for cultivating these competencies, as young learners possess heightened curiosity, observation skills, and adaptability that make them particularly receptive to environmental knowledge and practice.

Research Objective:

The primary objective of this study is to analyze global scientific approaches to environmental sustainability and security and to explore how these approaches can inform the design of interdisciplinary and age-appropriate environmental education programs for primary school students. Specific objectives include:

Identifying contemporary global frameworks for environmental sustainability and security.

Examining pedagogical strategies for fostering environmental literacy in primary education.

Exploring the integration of real-world ecological challenges into interdisciplinary curricula.

Global Scientific Approaches: Current global strategies emphasize a combination of ecological science, technological innovation, and social responsibility. Key approaches include:

Ecosystem-Based Management: Understanding and preserving the balance of natural and human-modified ecosystems.

Sustainable Resource Use: Promoting rational consumption of water, energy, and raw materials to ensure long-term environmental security.

Climate Adaptation and Mitigation: Implementing policies and education programs aimed at reducing greenhouse gas emissions and preparing societies for climate change impacts.

Environmental Risk Assessment: Systematic evaluation of potential ecological hazards and integration into decision-making processes.

Implications for Primary Education: Translating global environmental approaches into primary education requires pedagogical innovations:

Interdisciplinary Curriculum Design: Linking science, mathematics, language, and social studies around environmental themes.

Experiential Learning: Engaging students in field observations, experiments, and community-based ecological projects.

Competency-Based Outcomes: Focusing on knowledge, skills, attitudes, and values related to environmental responsibility.

Integration of Technology: Utilizing digital tools, simulations, and AI-based adaptive learning to personalize instruction and foster critical thinking.

Methodology: The study employs a mixed-method approach, combining:

Literature Analysis: Reviewing global reports, educational frameworks, and research on sustainability education.

Case Studies: Examining best practices from countries implementing early environmental literacy programs.

Pedagogical Experiments: Observing student engagement and learning outcomes in primary school environmental projects.

Results and Discussion: Findings suggest that early exposure to environmental education significantly enhances students' understanding of ecological systems, problem-solving skills, and responsible behavior. Integrating real-life ecological challenges into classroom activities improves knowledge retention and fosters practical competencies. Moreover, interdisciplinary approaches supported by AI-based adaptive learning tools can address individual learning needs and strengthen students' environmental decision-making skills.

Conclusion: Primary education is a critical platform for fostering environmental sustainability and security awareness. Global scientific approaches provide evidence-based strategies that can be adapted for young learners. Implementing interdisciplinary, experiential, and technologically enhanced curricula ensures that children develop the knowledge, skills, and attitudes necessary to navigate environmental challenges responsibly and actively contribute to sustainable development.

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5-6-SINF ONA TILI DARSLIKLARIDA KASB-HUNAR LEKSIKASINING QO‘LLANILISHI KECHA VA BUGUN

Muqarova Zarina Olim qizi
Samarqand davlat pedagogika instituti
E-mail: mukarovazarina@gmail.com

Annotation: *This article analyzes the use of profession-related vocabulary in mother tongue textbooks for grades 5–6, its content, and its role in developing students’ speech competence. During the research process, the textbook texts were studied from linguistic and methodological perspectives, and the methods of presenting lexical units related to professions were identified.*

In addition, the importance of these lexical units in forming students’ interest in choosing a profession and in increasing their vocabulary is highlighted. The results of the analysis show that profession-related vocabulary is systematically presented in the textbooks and contributes to the development of students’ social activity and communicative competence.

The article also develops suggestions and recommendations for more effective teaching of this lexical layer.

Keywords: *professional vocabulary, terminology, craftsmanship, native language textbook, lexical layer.*

Annotatsiya: *Ushbu maqolada 5–6-sinf ona tili darsliklarida kasb-hunar leksikasining qo‘llanilishi, ularning mazmuni va o‘quvchilarning nutqiy kompetensiyasini rivojlantirishdagi o‘rni tahlil qilinadi. Tadqiqot jarayonida*

darslik matnlari lingvistik hamda metodik jihatdan o‘rganilib, kasb-hunarga oid birliklarning berilish usullari aniqlanadi. Shuningdek, mazkur leksik birliklarning o‘quvchilarda kasb tanlashga bo‘lgan qiziqishni shakllantirish va lug‘at boyligini oshirishdagi ahamiyati yoritiladi. Tahlil natijalari shuni ko‘rsatadiki, kasb-hunar leksikasi darsliklarda tizimli ravishda berilgan bo‘lib, u o‘quvchilarning ijtimoiy faolligi hamda kommunikativ kompetensiyasini rivojlantirishga xizmat qiladi.

Maqolada ushbu leksik qatlamni yanada samarali o‘qitish yuzasidan taklif va tavsiyalar ishlab chiqiladi.

Kalit so‘zlar: *kasb-hunar leksikasi, terminologiya, hunarmandchilik, ona tili darsligi, leksik qatlam.*

Manbaalarda keltirilgan ma’lumotlarga ko‘ra “kasb” so‘zi arab tilidan olingan bo‘lib, polisemantik so‘z kasaba fe’lining “o‘z mehnati bilan mablag‘ topmoq” ma’nosini, arab tilida “foyda”, “daromad”, “maosh” ma’nolarini ifodalaydi.

Tilning lug‘at tarkibi va uni tashkil etuvchi so‘zlar bir qator umumiy xususiyatlarga egaligi bilan xarakterlanadi. Leksikologiya leksikani xuddi shu umumiy xususiyatlarinuqtayi nazaridan o‘rganadi. Kasb-hunarning turli tarmoqlarida mehnat jarayonida xalqimiz tomonidan yaratilgan va yaratilayotgan maxsus terminlar umumxalq tilining lug‘at tarkibida boy bir qatlamni tashkil qiladi.

Kasb-hunarga oid leksik birliklarning paydo bo‘lishi, shakllanishi, taraqqiy etishiga xalqlarning ko‘p ming yillik turmush tarzi, urf-odatlari, mashg‘ulotlari asos bo‘lgan. Bu birliklar qo‘llanilish darajasiga muvofiq faol, nofaol, tarixiy-etimologik shakliga ko‘ra arxaik, zamonaviy lug‘atga yoki o‘zlashma qatlamiga mansubligi kabi xususiyatlari mavjud bo‘lib, o‘zbek xalqi qadimdan turli kasb-hunarlar bilan shug‘ullanib kelganligi ma’lumdir. Kasb-hunar leksikasi – (professionalizmlar) muayyan kasb yoki hunar egalari nutqiga xos so‘z va tushunchalar majmui. Boshqa tildan so‘z olish, shevaga xos so‘zlar, umumxalq tiliga xos ma’nosi o‘zgartirilgan so‘zlar Kasb-hunar leksikasining shakllanishi uchun asosiy manbaa hisoblanadi. Bir buyum, narsani turli kasb kishilari tomonidan xilma-xil (mas, „qozon“ – qandolatchilarda „potila“ va b.) nomlanishi ham kasb-hunar leksikasini yuzaga keltirishi mumkin. Kasb-hunarning rivojlangan

tarmog‘i (masalan, paxtachilik, texnika, tibbiyot va boshqalar) leksikasi boy bo‘lib, shu sohalarga oid alohida adabiyotlar ham nashr etilgan. Fan-texnikaga oid terminlarning, umuman, til lug‘at tarkibining boyishida va xalqning moddiy madaniyat tarixini o‘rganishda ular muhim manba hisoblanadi. Kasbhunar leksikasi badiiy adabiyotda muayyan personaj xususiyati, tabiatini chuqurroq yoritishda badiiy tasvir vositasi bo‘lib xizmat qiladi”1 . O‘rta asrlarda Sharq mamlakatlarida insonning kasbiy shakllanishi masalalari faylasufolimlar diqqat-e’tibori markazidagi masalalardan bo‘lib, yoshlarni kasbhunar egallashga da’vat qilish va o‘rgatish qadimiy an'analardan hisoblangan. Yoshlarning kasb-hunar egallashi ta’lim va tarbiya berish masalasi bilan bir qatorda muhim hisoblanib, kasb-hunarga o‘rgatish jarayoni bilim olish bilan qo‘shib olib borilishi, nazariya va amaliyotning birligi ta’minlanishi tavsiya etilgan. Kasb-hunar o‘rgatish jarayonida esa imkon qadar qanoatbaxsh so‘zlar bilan ilhomlantirish orqali malakalar vujudga keltirishga e’tibor qaratilgan[1].

Har bir xalqning milliyligini, o'ziga hos an'analarini ifoda etuvchi vositalardan biri bu – TERMINDIR. Terming har qaysi tilda tadqiq etilganidek o‘zbek tilshunoslikda ham o‘rganish obyekti sifatida tadqiqotga tortilgan.

Akademik Sh.Shoabdurahmonov o‘zbek tili leksikasini bir tizimga jamlash va ilmiy jihatdan o‘rganish nihoyatda zarurligi haqida quyidagi fikrlarni bayon qilgan edi: “Agar yaqin kelajakda o‘zbek traditsion leksikasi to‘laligi bilan qayd qilib olinmasa, barcha mas’uliyatni hisobga olgan holda aytish mumkinki, keksa avlod tugab borishi bilan tilning ular hofizasida saqlanib, bizgacha yetib kelgan qimmatli materiallarning bir qismi hamishalikka yo‘qolishi mumkin”. O‘zbek tilidagi kasb-hunar leksikasini to‘plashga birinchi bo‘lib taniqli tilshunos olim S. Ibrohimov kirishgan edi. U turmushmizdan izi o‘chib borayotgan, hali hech kim tomonidan o‘rganilmagan Farg‘ona shevasidagi kasb-hunarga oid so'z-terminlarni to‘plab lingvistik jihatdan tahlil qildi va bunday so‘zlar lug‘atini tuzdi.

5-sinf ona tili darsligida ham bir qancha kasb-hunarga oid atamalar keltirilgan.

Misol uchun: hunarmandlik to‘g‘risida 51-mashqda keltirilgan atamaga to‘xtalamiz. (Buxoro zardo‘zlarining – zardo‘zi-gulzo‘zi va zardo‘zi-zamindo‘zi do‘ppilari, zarrin naqshli, tasmaga tilla va kumush rangli iplar ishlatiladi)Bu hunarmandchilikka misol bo‘la oladi. Bundan tashqari bir qancha kasblar ham keltirilgan. Misol uchun: 29-mashqda haydovchi, hisobchi, aviadispetcher, turoperator, tarjimon. Bular barchasi zamonaviy kasb terminlariga misol bo‘ladi. [3]

6-sinf ona tili darsligida berilgan barcha kasbga oid terminlar haqida ma’lumot beriladi.

25-betda okulist ya’ni oftolmolog, bunga oid so‘zlar: ko‘z, qovoq, qosh, kiprik, og‘riq, xira ko‘rish, ko‘z qizarishi, yiring, ko‘z yoshlanishi.

Kasallik nomlari: yaqindan ko‘rolmaslik, uzoqni ko‘rolmaslik, astigmatizm, katarakta, glaucoma, konyunktivit.

Tibbiy buyumlar: ko‘zoynak, linza, tomchi dori, ko‘ztekshirish apparati.

Nevropotolog: asab tizimi kasalliklarini davolaydigan shifokor Nevrolog.

Asab tizimiga oid so‘zlar: miya, asab, orqa miya, bosh og‘rig‘i, bosh aylanishi, hushidan ketish, qo‘l uvishishi, oyoq uvishishi, titroq, uyqusizlik, asabiylik, holsizlik.

Kasallik nomlari: Migren, Nevroz, Epilepsiya, Insult, Osteoxondroz, Nevrolgiya.

Stomatolog. Tish va og‘iz bo‘shlig‘idagi kasalliklarni davolaydi: tish, milk, jag‘, og‘iz, plomba, protez, breket, oqartirish, tish toshi, ,ilk qonashi, tish og‘rig‘i.

Kasalliklar: karies, pulpit, periodontit, stomatit, gingivit.

Kardiolog: yurak va qon tomirlarini davolaydigan shifokor.

Terminga oid so‘zlar: Yurak, qon, qon bosimi, puls, nafas qisishi, ko‘krak og‘rig‘i, holsizlik,tez charchash.

Kasalliklar: gipertoniya, gipotoniya, aritmiya, yurak ishemiyasi, infarkt.

Xirurg-jarroh. Terminga oid so‘zlar: operatsiya, jarrohlik, yara, tikuv, yallig‘lanish, narkoz, bog‘lam.

Kasalliklar: appenditsit, churra, singan suyak, kuyish, yiringli yara.

Dermatolog. Teri, soch va tirnoq kasalliklarini davolaydi.

Kasbga oid terminlar: teri, toshma, qichishish, dog‘, qizarish, husnbuzar, allergiya, quruq teri, yog‘li teri.

Kasalliklari: dermatit, ekzema, psoriaz, akne, zamburug‘.

Lor. Quloq, burun va tomoqni davolaydigan shifokor.

Kasbga oid terminlar: angina, shamollash, tumov, quloq og‘rig‘i, burun bitishi, yo‘tal.

Endokrinolog. Gormon, qalqonsimon bez, qandli diabet, semirish, ozib ketish, terlash, chanqash, shakar miqdori.

Pediatr. Bolalar shifokori.

Terminga oid so‘zlar: emlash, qusish, ich ketish, isitma, tish chiqishi, burun owishi, yo‘tal, tashxis, kasallik varaqasi.

70-betda “Dehqonchilik” hunari bor va bu hunarga oid so‘zlar; ob-havo, qurg‘oqchilik, bilim, tajriba, ketmon, belkurak, hosil, urug‘, suv, tuproq, sun’iy dori, o‘g‘it.[4]

XULOSA

Bu kabi kasb va hunarga oid terminlarning izohli lug’atimizda mavjud bo‘lmaganlarini esa izohli lug’atga kiritishimiz kerak. Umuman olganda darsliklarda bu kabi kasb-hunar leksikalari juda ham ko‘p uchraydi. Bu kabi terminlarning berilishidan asosiy maqsad yoshlarning kasb va hunar egallashga

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intilishini yanada rivojlantirish hamda ular o‘zlari istagan kasb egasi bo‘lib yetishishlari uchun nimalar qilish kerakligini anglatishdir. Hozirgi rivojlangan dunyoda kasblar ham turli tuman. Zamonaviy kasblarni egallashga hozirgi yoshlarning ishtiyoqi baland. Bunday kasblarga misol qilib, kinemotografiya, multiplikatsiya, dasturchi-animator, operator, treydingchi, logistikachi, gidlik va b.

Hozirgi rivojlangan zamonda darsliklarning o’qitilishida bit qancha bir biridan farqi metodlardan foydalanilmoqda. Bu esa pedagogik mahoratning kuchliligini bildiradi. Peeagogik mahorat har bir o’qituvchida bo’lishi lozim. Bu dars sifatini yanada yaxshilashga yordam beradi. Avvalgi yillardagidek daqat qoida yodlatish emas, balki o’quvchilarni har tomonlama faol, fikrini erkin bayon eta oladigan, tinglab tushuna oladigan, o’z erkin fikrlarini qog’zoga tushura oladigan qilib tarbiyalash asosiy maqsadimiz. Quyidagi metodlar eng ommaboplari:

1.Interfaol metodlar

O‘quvchilar o‘zaro muloqot qilib, faol qatnashadi. Misollar:“Aqliy hujum”“Klaster “,“Bumerang”

2 Muammoli ta’lim metodi

O‘quvchilarga muammo beriladi, ular mustaqil fikrlab yechim topadi. 3 Loyiha metodi (Project method)

O‘quvchilar biror mavzu bo‘yicha loyiha tayyorlaydi, izlanish qiladi.

4. Case-study metodi

Haqiqiy hayotiy vaziyatlar (holatlar) berilib, ularni tahlil qilish orqali o‘rganiladi.

5. AKT asosida o‘qitish

Kompyuter, internet, taqdimot, video orqali o‘qitish. 6.Hamkorlikda o‘qitish metodi

O‘quvchilar kichik guruhlarda ishlaydi va birgalikda natijaga erishadi.

7. Debat (munozara) metodi

O‘quvchilar bir mavzu yuzasidan fikr almashib, dalillar bilan gapiradi.

Shuningdek, kasb-hunarlarni faqatgina biz nomini o‘rgatib emas balki bu kasblarning bajarilishini ham maktab va bog’chalarda ham tadbiq etsak juda yaxshi bo‘lar edi. Sababi rivojlangan mamlakatlarda amaliy ko‘nikmalar orqali bolani yoshligidan kasb va hunarga tayyorlash uchun maxsusu dars va to‘garaklar tashkil etilgan. Har bir bola to‘g‘ri kasb egasi bo‘lsin. Sababi sevimli ishidan inson hech qachon zerikmaydi va charchamaydi. Axir xalqimizda “Aql ko‘pga yetqazar, hunar ko‘kka”, degan maqol bejiz aytilmagan.

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PROS AND CONS OF GAMIFICATION OF THE EDUCATIONAL PROCESS

Nazarova Mavluda

nazarova.mavluda@bk.ru

Abstract. *This article explores the growing interest in educational gamification, emphasizing its potential to transform traditional learning into engaging and enjoyable experiences. By harnessing the competitive nature inherent in games, gamification fosters an environment where failure is viewed as a stepping stone to success, thereby enhancing student motivation and participation. However, the author cautions against excessive or misapplied gamification, which can lead to experiences that mimic conventional schooling rather than inspiring genuine learning*

Keywords: *educational gamification, learning engagement, competency-based education (CBE), student empowerment, E-portfolios, motivation, critical thinking, lear*

Аннотация. *В данной статье рассматривается растущий интерес к образовательной геймификации, подчеркивая ее потенциал в преобразовании традиционного обучения в увлекательный и приятный опыт. Используя соревновательный характер, присущий играм, геймификация создает среду, в которой неудача рассматривается как ступенька к успеху, тем самым повышая мотивацию и участие учащихся. Однако автор предостерегает от чрезмерного или неправильного использования метода, что может привести к опыту, имитирующему традиционное школьное обучение, а не вдохновляющему на подлинное обучение.*

Ключевые слова: образовательная геймификация, вовлеченность в обучение, компетентностно-ориентированное образование (КОО), расширение прав и возможностей учащихся, электронные портфолио, мотивация, критическое мышление, стили обучения, оценка, образовательные инновации.ning styles, assessment, educational innovation.

“*There's no one without purpose in a game. That's what Gamification is all about.*” (Vineet Raj Kapoor)

There is a simple reason for the increased interest in educational gamification. Games are enjoyable! Society realized the fun of games could be applied to traditionally mundane or boring learning activities. Gamification is ideal for education because it can make learning more engaging. And when learning is made enjoyable, it produces excellent results.

The competitive nature is a clear motivator in game-based education. Failure is simply a part of the game. You anticipate failing several times before moving on to

the next level. Gamification will be beneficial because it creates an engaging learning environment that young people will be comfortable with.

However, there are some disadvantages to using gamification excessively or incorrectly. “By making play mandatory, gamification might create rule-based experiences that feel just like school.” (Kiryakova, G., Angelova, N. & Yordanova, L., 2014).

Education is the passport to the future, for tomorrow belongs to those who prepare for it today. (Malcolm X)

Competency-based education is tailored to each individual's learning style. This means that it is adaptable because it is entirely dependent on a student completing a project or assessment to progress.

It has been shown that giving students more control over their learning makes education more engaging. Control over their learning gives them empowerment and intrinsic motivation to succeed. This type of education emphasizes practical skills such as communication, critical thinking, and problem-solving.

CBE's entire purpose is to focus on what students know rather than moving through subjects based on timing. “*Instead of working at the pace of the instructor, they work at their own pace and have the freedom to choose how they demonstrate mastery*”. CBE allowed using written papers, portfolios, projects, observed student performance, and computer-marked assignments.

"It is the learning that matters. Creating an E-Portfolio involves skills essential for 21st-century learning – organizing and planning material, giving and receiving feedback, reflecting, selecting and arranging content to communicate with a particular audience in the most effective way." (Gray, L.)

E-Portfolios are powerful learning aids that encourage motivation in students.

The focus is on the students. By documenting and reflecting on their learning in an electronic portfolio, students can assume a greater level of accountability for

their learning. The precise work examples that are used and how they choose to reflect on their learning are both up to them.

For faculty, the E-Portfolio can be an effective tool to better manage, review, reflect, and comment on student work. For students, the E-Portfolio enriches their resumes, both before and after graduation. Students summarize key learning experiences and display their work in the E-Portfolio. Each E-Portfolio includes a variety of digital artifacts.

Taking everything into consideration it may conclude that the complete replacement of education with gamification is nonsense, because effort, not mastery, should be rewarded. Still, it can be extremely beneficial in developing children's learning. Therefore, education should implement game-based moments in its curriculum.

Next, in Competency-based education students' advance to the next step after demonstrating mastery of the current competency. In this setting, students have a greater sense of ownership over their learning. As a result, education has become more transparent. Students have the option of demonstrating their understanding in a variety of ways. Nevertheless, CBE also has its drawbacks. The main disadvantage is that no clear way to define core competencies or assessment styles exists. Hence, the works on assessment and evaluation should be elaborated before implementing this type of education in mass.

The last, E-portfolios encourage student involvement, drive, and control. When students have a choice in how they learn, they are more engaged and driven to go beyond acquiring the facts and filling in the knowledge gaps to develop a deep understanding, connect the learning that takes place in many situations, and apply their newfound knowledge to create. Still, one important question needs to be answered. Should the E-Portfolio evaluation be included on the student's official transcript? Because there are some nuances, such as a student may upload assignments that someone else, more knowledgeable and enlightened on the topic,

has done for him or her. This is possible because in an E-Portfolio there is no strict rule to sit in front of the camera online regime. Consequently, if education will be built only based on creating an e-portfolio, then getting a diploma for the knowledge and experience of another person cannot be ruled out.

Overall, innovations in education are a great thing because time flight and progress are nonstop, so education is also should keep its fingers on the pulse. Nonetheless, every step should be searched carefully, because it can impact our tomorrow and affect the future generation.

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KREATIV-DIDAKTIK YONDASHUV ASOSIDA BO'LAJAK MUSIQA O'QITUVCHILARINI TAYYORLASH METODIKASI

Nishonbekova Jadira

Nizomiy nomidagi O‘zbekiston Milliy Pedagogika Universiteti
E-mail: sariknishanov@gmail.com

Аннотация. *Mazkur maqolada kreativ-didaktik yondashuv asosida bo'lajak musiqa o'qituvchilarini tayyorlash metodikasi nazariy jihatdan asoslab berilgan va uning amaliy jihatlari yoritilgan. Zamonaviy ta'lim tizimida musiqa o'qituvchilarini tayyorlashga qo'yiladigan talablar ortib borayotgani, ular nafaqat musiqiy ijrochilik mahoratiga, balki ijodiy pedagogik faoliyatga ham tayyor bo'lishlari zarurligi tahlil qilinadi. Maqolada kreativ-didaktik yondashuvning mohiyati, uning tarkibiy qismlari, tamoyillari va metodlari bayon etiladi. Shuningdek, bo'lajak musiqa o'qituvchilarini kreativ-didaktik yondashuv asosida tayyorlashning metodik tizimi, uning bosqichlari va shakllari ko'rsatib beriladi. Turli olimlarning (J. Gilford, E. Torrens, L.S. Vygotskiy, N.N. Azizxo'jaeva, Sh.S. Shodmonova va boshqalar) kreativlik va musiqa pedagogikasiga oid qarashlari tahlil qilinadi. Maqola oxirida kreativ-didaktik yondashuv asosida tayyorgarlikni takomillashtirish bo'yicha amaliy tavsiyalar berilgan.*

Kalit so'zlar: *kreativ-didaktik yondashuv, bo'lajak musiqa o'qituvchisi, metodika, ijodiy tayyorgarlik, musiqiy pedagogika, innovatsion ta'lim, pedagogik texnologiyalar.*

Annotation. *This article provides a theoretical foundation for the methodology of training future music teachers based on a creative-didactic approach and highlights its practical aspects. It analyzes the increasing demands placed on the training of music teachers in the modern education system and the necessity for them to be prepared not only for musical performance skills but also for creative pedagogical activities. The article describes the essence of the creative-didactic approach, its structural components, principles, and methods. Furthermore, the methodological system for training future music teachers based on the creative-didactic approach, its stages, and forms are presented. The views of various scholars (J. Guilford, E. Torrance, L.S. Vygotsky, N.N. Azizkhodjaeva, Sh.S. Shodmonova,*

and others) on creativity and music pedagogy are analyzed. The article concludes with practical recommendations for improving training based on the creative-didactic approach.

Keywords: *creative-didactic approach, future music teacher, methodology, creative training, music pedagogy, innovative education, pedagogical technologies.*

Аннотация. *В данной статье теоретически обоснована методика подготовки будущих учителей музыки на основе креативно-дидактического подхода и освещены её практические аспекты. Анализируется возрастание требований к подготовке учителей музыки в современной системе образования, необходимость их готовности не только к музыкально-исполнительской деятельности, но и к творческой педагогической работе. В статье излагаются сущность креативно-дидактического подхода, его структурные компоненты, принципы и методы. Также представлена методическая система подготовки будущих учителей музыки на основе креативно-дидактического подхода, её этапы и формы. Анализируются взгляды различных учёных (Дж. Гилфорда, Э. Торренса, Л.С. Выготского, Н.Н. Азизходжаевой, Ш.С. Шодмоновой и других) на креативность и музыкальную педагогику. В конце статьи даны практические рекомендации по совершенствованию подготовки на основе креативно-дидактического подхода.*

Ключевые слова: *креативно-дидактический подход, будущий учитель музыки, методика, творческая подготовка, музыкальная педагогика, инновационное образование, педагогические технологии.*

Kirish: Bugungi kunda ta'lim tizimida tub islohotlar amalga oshirilayotgan bir paytda, musiqa pedagogikasi ham yangicha yondashuvlarni talab etmoqda. O'zbekiston Respublikasi Prezidentining 2019 yil 17 dekabrdagi "O'zbekiston Respublikasida musiqa san'atini yanada rivojlantirish chora-tadbirlari to'g'risida"gi Farmoni hamda 2022 yil 2 fevraldagi "Madaniyat va san'at sohasini yanada rivojlantirishga doir qo'shimcha chora-tadbirlar to'g'risida"gi Qarori musiqa ta'limi

sifatini oshirish, bu sohada zamonaviy pedagogik texnologiyalarni joriy etish zarurligini ko'rsatadi.

Musiqa o'qituvchisi – bu nafaqat musiqa asboblarida chalishni o'rgatuvchi shaxs, balki bolalarda estetik didni, g'oyaviy-ma'naviy dunyoqarashni, ijodiy qobiliyatlarni shakllantiruvchi murabbiydir. Shuning uchun ham bo'lajak musiqa o'qituvchilarini tayyorlashda nafaqat musiqiy bilim va ko'nikmalarni, balki ularni ijodiy pedagogik faoliyatga tayyorlash masalasi muhim ahamiyat kasb etadi.

Kreativ-didaktik yondashuv tushunchasi bugungi pedagogika fanida nisbatan yangi tushuncha bo'lib, u kreativ pedagogika bilan didaktik yondashuvlarning uyg'unlashuvini ifodalaydi. Bu yondashuv ta'lim jarayonida ijodiylik bilan ta'limning didaktik qonuniyatlarini birlashtirishni nazarda tutadi.

Asosiy qism: Musiqa pedagogikasida kreativ yondashuvlarga oid ayrim tadqiqotlar mavjud bo'lsa-da, kreativ-didaktik yondashuv asosida bo'lajak musiqa o'qituvchilarini tayyorlashning metodik tizimi yetarlicha ishlab chiqilmagan. Mavjud ishlarda asosan ijrochilik tayyorgarligiga e'tibor qaratilib, pedagogik-metodik tayyorgarlikning kreativ jihatlari to'liq yoritilmagan.

Kreativ-didaktik yondashuv muammosi turli olimlar tomonidan turli jihatdan o'rganilgan. Keling, har bir olimning fikrini alohida tahlil qilib, ularga munosabat bildiraylik.

J.Gilford (AQSh) – kreativlik tushunchasining ilmiy asoslarini yaratgan olimdir. Uning "intellekt strukturasi" modelida kreativ fikrlashning asosiy parametrlari – originallik, egiluvchanlik, tezkorlik va aniqlik ajratib ko'rsatilgan [1]. Gilfordning kreativlikni shunchaki aqliy qobiliyat sifatida qarashi, uning ijtimoiy va hissiy jihatlarini e'tibordan chetda qoldiradi. Aslida, kreativlik nafaqat aql, balki shaxsning his-tuyg'ulari, motivatsiyasi va atrof-muhit ta'sirida ham shakllanadi. Musiqa o'qituvchisi kreativligi esa bolalar bilan muloqot, ularning kayfiyatini his qilish kabi hissiy jihatlarni ham o'z ichiga oladi.

E.Torrens (AQSh) – kreativlikni o'lchash metodikasini ishlab chiqib, uning ta'lim jarayonidagi ahamiyatini asoslagan. Uning fikricha, kreativlikni rivojlantirish uchun maxsus pedagogik sharoitlar yaratish zarur [2]. Torrensning kreativlikni

o'lchashga bo'lgan urinishi juda muhim, ammo uning testlari ko'proq bolalar uchun mo'ljallangan. Kattalar, ayniqsa, bo'lajak o'qituvchilarning kreativligini baholashda boshqa mezonlar kerak. Musiqa o'qituvchisi kreativligi nafaqat g'oyalar yaratish, balki ularni dars jarayonida qo'llay olish, bolalarni ijodga unday olish qobiliyatidir.

L.S.Vygotskiy (Rossiya) – ijod psixologiyasiga oid ishlarida bolalar ijodining psixologik asoslarini tahlil qilgan. Uning fikricha, ijod – bu mavjud tajriba asosida yangi narsa yaratish jarayonidir [3]. Vygotskiyning ijodni "mavjud tajriba asosida yangi narsa yaratish" deb ta'riflashi to'g'ri, ammo bu ta'rifda ijodning ijtimoiy ahamiyati, jamiyat tomonidan qabul qilinishi masalasi chetda qolgan. Musiqa o'qituvchisi ijodi – bu faqat o'zi uchun emas, balki bolalar, maktab, jamiyat uchun muhim bo'lgan ijoddir.

V.N.Drujinin – ijodiy qobiliyatlarni rivojlantirishning psixologik mexanizmlarini o'rgangan. U ijodiy shaxsning asosiy xususiyatlarini tahlil qilgan [4]. Drujinin ijodiy shaxs xususiyatlarini to'g'ri belgilagan, ammo u pedagogik faoliyatdagi ijodkorlikning o'ziga xos jihatlariga yetarlicha e'tibor bermagan. Musiqa o'qituvchisi ijodkorligi – bu nafaqat shaxsiy xususiyat, balki kasbiy mahoratning muhim qismidir.

D.B.Bogoyavlenskaya – "intellektual faollik" tushunchasini kiritib, ijodiy faoliyatning yuqori bosqichi sifatida talqin etgan [5]. Bogoyavlenskayaning "intellektual faollik" tushunchasi ijodiy jarayonni tushunishda muhim qadamdir. Biroq, musiqa pedagogikasida faqat intellektual faollik emas, balki hissiy-emotsional faollik ham muhim rol o'ynaydi.

E.B.Abdullin – musiqa pedagogikasi nazariyasi va metodikasiga oid ishlarida musiqa o'qituvchisi tayyorgarligining didaktik asoslarini tahlil qilgan [6]. Abdullinning ishlari musiqa pedagogikasi uchun muhim, ammo ularda kreativ yondashuvlar, ayniqsa, zamonaviy innovatsion metodlar yetarlicha yoritilmagan. Bugungi kunda musiqa o'qituvchisi nafaqat an'anaviy metodlarni, balki yangi, kreativ metodlarni ham bilishi kerak.

L.A.Rapatskaya – musiqa o'qituvchisi tayyorgarligini maxsus va umumkasbiy komponentlarga ajratib, ularning o'zaro bog'liqligini ko'rsatgan [7]. Rapatskayaning

ikki komponentli modeli to'g'ri, ammo bu modelda kreativlik alohida komponent sifatida ajratilmagan. Aslida, kreativlik maxsus va umumkasbiy tayyorgarlikning barcha jihatlariga singib ketishi kerak.

G.M.Tsipin – musiqachi-pedagog tayyorgarligining psixologik asoslarini, jumladan, ijrochilik faoliyatida ijodiylikning rolini tahlil qilgan [8]. Tsipin ijrochilik faoliyatidagi ijodiylikni yaxshi tahlil qilgan, ammo pedagogik faoliyatdagi ijodiylik – dars berish, bolalar bilan muloqot qilish, ularni ijodga undash masalalari kam yoritilgan.

N.N.Azizxo'jaeva – pedagogik texnologiyalar va kreativ yondashuvlarning o'zaro bog'liqligini tadqiq etgan. Uning fikricha, zamonaviy o'qituvchi kreativ fikrlay olishi, dars jarayonida innovatsion usullarni qo'llay bilishi kerak [9]. Azizxo'jaevaning pedagogik texnologiyalar va kreativlikni bog'lashdagi fikrlari juda o'rinli. Ammo uning ishlari umumiy pedagogikaga oid bo'lib, musiqa pedagogikasining o'ziga xos jihatlari yetarlicha hisobga olinmagan.

Sh.S.Shodmonova – bo'lajak musiqa o'qituvchilarini tayyorlashda kasbiy tafakkurni shakllantirish masalalarini o'rgangan. Uning tadqiqotlarida musiqa o'qituvchisining ijodiy faoliyatga tayyorgarligi masalasi ham yoritilgan [10]. Shodmonovaning ishlari musiqa pedagogikasi uchun juda muhim, ammo unda kreativ-didaktik yondashuvning metodik tizimi to'liq ishlab chiqilmagan. Ayniqsa, kreativlikni didaktika bilan uyg'unlashtirish masalasi chuqurroq tadqiqotni talab qiladi.

N.M.Avanesov – bo'lajak musiqa o'qituvchilarini tayyorlashda milliy musiqa merosidan foydalanish masalalarini tadqiq etgan [11]. Avanesovning milliy musiqaga e'tibor qaratishi juda to'g'ri, chunki milliy musiqa orqali bolalarda vatanparvarlik tuyg'usi shakllanadi. Ammo kreativ-didaktik yondashuvda milliy musiqa bilan birga jahon musiqa merosidan ham foydalanish masalasi qaralishi kerak.

D.S.Sayfullaeva – musiqa ta'limi jarayonida talabalarda pedagogik qobiliyatlarni rivojlantirish muammosini o'rgangan [12]. Sayfullaevaning pedagogik

qobiliyatlarga e'tibor qaratishi muhim, ammo bu qobiliyatlarning kreativ jihatlari – ijodiy pedagogik qobiliyatlar masalasi chuqurroq o'rganilishi kerak.

R.X.Jo'raev – ta'limda innovatsion texnologiyalar va kreativ yondashuvlar masalalarini tadqiq etgan [13]. Jo'raevning innovatsion texnologiyalarga oid ishlari muhim, ammo ular umumiy pedagogikaga oid bo'lib, musiqa ta'limining o'ziga xos jihatlari hisobga olinmagan.

M.Q.Jo'raev – didaktik yondashuvlar va ularning ta'lim samaradorligiga ta'siri masalalarini tadqiq etgan. U an'anaviy va zamonaviy didaktik yondashuvlarni solishtirib, kreativ yondashuvlarning ustuvorligini asoslagan [14]. Jo'raevning didaktik yondashuvlarga oid ishlari nazariy jihatdan muhim, ammo ularni musiqa pedagogikasiga tatbiq etish, xususan, musiqa darslarida kreativ-didaktik yondashuvni qo'llash masalalari yetarlicha yoritilmagan.

Adabiyotlar tahlili shuni ko'rsatadiki kreativ pedagogika va didaktik yondashuvlar alohida-alohida yetarlicha o'rganilgan, biroq ularning uyg'unligi (kreativ-didaktik yondashuv) masalasi kam tadqiq etilgan. Musiqa pedagogikasida kreativ yondashuvlar asosan ijrochilik tayyorgarligi bilan bog'liq ravishda qaralgan, pedagogik-metodik tayyorgarlik esa yetarlicha e'tibordan chetda qolgan. O'zbekiston olimlarining tadqiqotlarida milliy xususiyatlar, maktablardagi real vaziyat hisobga olingan, ammo kreativ-didaktik yondashuvning metodik tizimi ishlab chiqilmagan.

Kreativ-didaktik yondashuv – bu ta'lim jarayonida ijodiylik bilan didaktik qonuniyatlarni uyg'unlashtiruvchi, ta'lim mazmuni, metodlari va shakllarini kreativ ruhda tashkil etishni nazarda tutuvchi yondashuvdir.

Kreativ-didaktik yondashuvning asosiy komponentlari va ularning mazmuni:

1. Motivatsion-qadriyatli komponent, bu komponent talabalarning kreativ-didaktik faoliyatga bo'lgan ichki intilishi, qiziqishi va motivlarini o'z ichiga oladi. Oddiy qilib aytganda, bu – talabaning "Nima uchun men kreativ o'qituvchi bo'lishim kerak?" degan savolga beradigan javobdir.

2. Kognitiv-bilimdonlik komponenti, bu komponent kreativ pedagogika va didaktikaga oid bilimlar majmuini o'z ichiga oladi. Oddiy tilda – bu talabaning "Men nimalarni bilishim kerak?" degan savolga javobdir.

3. Amaliy-faoliyatli komponent, bu komponent kreativ-didaktik metodlarni amaliyotda qo'llay olish ko'nikmalarini o'z ichiga oladi. Oddiy tilda – talabaning "Men nimalarni qila olishim kerak?" degan savolga javobdir.

4. Refleksiv-baholovchi komponent, bu komponent o'z faoliyatini tahlil qilish, baholash va takomillashtirish qobiliyatini o'z ichiga oladi. Oddiy tilda – talabaning "Men qanday o'qityapman? Nima yaxshi, nima yomon? Qanday qilib yaxshiroq qilish mumkin?" degan savollarga javob topa olishidir.

Kreativ-didaktik yondashuvning tamoyillari – bu asosiy qoidalar, yo'naltiruvchi g'oyalar bo'lib, ularga amal qilish ta'lim jarayonini to'g'ri tashkil etishga yordam beradi. Keling, har bir tamoyilni oddiy tilda tushuntirib beraylik:

1. Ijodiy erkinlik tamoyili, bu tamoyil talabalarga fikrlash, tanlash, ijod qilish erkinligini berish kerakligini anglatadi. Ya'ni, darslarda talabalarning har bir fikrini, g'oyasini, hatto eng aqldan tashqari bo'lsa ham, darhol rad etmaslik, ularga o'z fikrlarini erkin ifodalash imkoniyatini yaratish lozim. Musiqa darslarida bu – bolalarga o'z kuylarini yaratish, o'zlaricha musiqa asboblarida chalish, improvizatsiya qilish imkoniyatini berish demakdir.

2. Didaktik izchillik tamoyili, bu tamoyil ta'limning didaktik qonuniyatlariga rioya qilish kerakligini anglatadi. Ya'ni, kreativlik degani tartibsizlik, betartiblik degani emas. Har qanday kreativ dars ham aniq maqsadga ega bo'lishi, mantiqiy ketma-ketlikda qurilishi, o'quvchilarning yosh xususiyatlariga mos kelishi kerak.

3. Integrativlik tamoyili, bu tamoyil turli fanlarning, nazariya va amaliyotning o'zaro bog'liqligini ta'minlash kerakligini anglatadi. Ya'ni, musiqa darslarida faqat musiqa haqida gapirish emas, balki uni adabiyot, tasviriy san'at, tarix, hatto matematika bilan bog'lash mumkin.

4. Individuallashtirish tamoyili, bu tamoyil har bir talabaning (yoki o'quvchining) ijodiy salohiyatini, qobiliyatlarini, qiziqishlarini hisobga olish kerakligini anglatadi. Ya'ni, hamma bolalarni bir xil qolipga solish, bir xil narsalarni

o'rgatish noto'g'ri. Kimdir cholg'u asboblarida chalishga qiziqadi, kimdir qo'shiq aytishga, kimdir musiqa tinglashga. Bularning hammasini hisobga olish kerak.

5. Muammolilik tamoyili, bu tamoyil ta'limni muammoli vaziyatlar asosida tashkil etish kerakligini anglatadi. Ya'ni, bolalarga tayyor bilimlarni berish emas, balki ularni o'ylashga, izlanishga, muammolarni mustaqil hal qilishga undaydigan savollar berish, vaziyatlar yaratish kerak.

6. Refleksivlik tamoyili, bu tamoyil o'z faoliyatini tahlil qilish, baholash va takomillashtirish kerakligini anglatadi. Ya'ni, darsdan so'ng "Bugun nima yaxshi o'tdi, nima yomon? Keyingi safar qanday qilib yaxshiroq qilish mumkin?" degan savollarni berish odat tusiga kirishi kerak.

Metodik tizim – bu besh bosqichdan iborat bo'lib, har bir bosqich o'z maqsadi, vazifalari va usullariga ega. Keling, har bir bosqichni oddiy tilda tushuntirib beraylik:

1-bosqich: Motivatsion-tayyorgarlik bosqichi, bu bosqich nima uchun kerak? Talabalarda kreativ-didaktik yondashuvga qiziqish uyg'otish, ularni bu ishga "isitish", nima uchun bu muhimligini tushuntirish uchun.

2-bosqich: Nazariy-bilimdonlik bosqichi, bu bosqich nima uchun kerak? Talabalarga kreativ pedagogika, didaktik yondashuvlar, musiqa o'qitish metodikasi haqida kerakli nazariy bilimlarni berish uchun.

3-bosqich: Amaliy-metodik bosqich, bu bosqich nima uchun kerak? Talabalarga nazariy bilimlarni amaliyotda qo'llash ko'nikmalarini shakllantirish uchun. Ya'ni, "bilaman"dan "qila olaman"ga o'tish.

4-bosqich: Ijodiy-amaliyot bosqichi, bu bosqich nima uchun kerak? Talabalarning kreativ-didaktik ko'nikmalarini real maktab sharoitida sinab ko'rish, mustahkamlash uchun.

5-bosqich: Refleksiv-baholovchi bosqich, bu bosqich nima uchun kerak? Talabalarning kreativ-didaktik tayyorgarlik darajasini baholash, o'z faoliyatini tahlil qilish va kelajakda takomillashtirish yo'llarini belgilash uchun.

Mezonlar – bu talabaning kreativ-didaktik tayyorgarligini qanday o'lchash, qanday baholash mumkinligini ko'rsatuvchi o'lchovlardir. Keling, har bir mezonni oddiy tilda tushuntirib beraylik:

1. Motivatsion mezon, bu mezon talabaning kreativ-didaktik faoliyatga bo'lgan qiziqishi, intilishi, ichki xohish-istaklarini ifodalaydi.

2. Kognitiv mezon, bu mezon talabaning kreativ pedagogika, didaktika, musiqa o'qitish metodikasi bo'yicha bilimlarini ifodalaydi.

3. Amaliy mezon, bu mezon talabaning kreativ-didaktik metodlarni amaliyotda qo'llay olish ko'nikmalarini ifodalaydi.

4. Ijodiy mezon, bu mezon talabaning yangi, original g'oyalar yaratish, nostandart yechimlar topish qobiliyatini ifodalaydi.

5. Refleksiv mezon, bu mezon talabaning o'z faoliyatini tahlil qilish, baholash va takomillashtirish qobiliyatini ifodalaydi.

Xulosa: Tadqiqot natijalari asosida quyidagi xulosalarni chiqarish mumkin:

1. Kreativ-didaktik yondashuv – bu zamonaviy ta'limning muhim yo'nalishi bo'lib, u kreativ pedagogika bilan didaktik yondashuvlarning uyg'unlashuvini ifodalaydi. Bu yondashuv bo'lajak musiqa o'qituvchilarini tayyorlashda nafaqat musiqiy ijrochilik, balki ijodiy pedagogik faoliyatga tayyorgarlikni ham ta'minlaydi.

2. Kreativ-didaktik yondashuvning tarkibiy qismlari (motivatsion, kognitiv, amaliy, refleksiv) ularning o'zaro bog'liqlikda rivojlanishini taqozo etadi. Har bir komponent muhim va ular bir-birini to'ldiradi.

3. Kreativ-didaktik yondashuv asosida tayyorgarlik metodik tizimi besh bosqichdan (motivatsion-tayyorgarlik, nazariy-bilimdonlik, amaliy-metodik, ijodiy-amaliyot, refleksiv-baholovchi) iborat bo'lib, ular izchillik va uzviylikni ta'minlaydi.

4. Metodlar tanlovi (muammoli vaziyatlar, aqliy hujum, rolli o'yinlar, keys-stadi, loyiha metodi, simulyatsiyalar) talabalarning ijodiy faolligini oshirishga, ularda kreativ-didaktik ko'nikmalarni shakllantirishga xizmat qiladi.

5. Pedagogik amaliyot kreativ-didaktik tayyorgarlikning eng muhim komponenti bo'lib, u talabalarning nazariy bilimlarini amaliyotda sinab ko'rish, ijodiy ko'nikmalarini rivojlantirish imkonini beradi.

6. Baholash mezonlari (motivatsion, kognitiv, amaliy, ijodiy, refleksiv) talabalarning kreativ-didaktik tayyorgarlik darajasini aniqlash, ularning kuchli va zaif tomonlarini ko'rish imkonini beradi.

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KIMYO FANINI O‘QITISHDA AXBOROT-KOMMUNIKATSIYA TEXNOLOGIYALARIDAN FOYDALANISH METODIKASI

Nizomiddinova Xosiyat Xayrulla qizi
Chirchiq Davlat Pedagogika Universiteti
xosiyatqudratova0407@gmail.com.

Annotatsiya: *Ushbu maqolada kimyo fanini o'qitishda axborot-kommunikatsiya texnologiyalaridan foydalanish metodikasi tahlil qilinadi. O'qituvchilar va talabalar uchun zamonaviy usullar va vositalar ko'rib chiqiladi.*

Kalit so'zlar: *kimyo, axborot-kommunikatsiya texnologiyalari, o'qitish metodikasi, zamonaviy usullar.*

Аннотация: *В данной статье рассматривается значение науки экологии, проблемы окружающей среды и пути их решения. Также освещается необходимость сохранения экологического равновесия, охраны природы и рационального использования природных ресурсов. В статье рассматривается влияние деятельности человека на природу, а также приводятся предложения и рекомендации по снижению экологических проблем.*

Ключевые слова: *экология, окружающая среда, охрана природы, экологические проблемы, природные ресурсы, экологическое равновесие, загрязнение воздуха, загрязнение воды.*

Abstract: *This article discusses the importance of ecology as a science, environmental problems, and ways to solve them. It also highlights the necessity of maintaining ecological balance, protecting nature, and using natural resources rationally. The article examines the impact of human activities on nature and provides suggestions and recommendations for reducing environmental problems.*

Keywords: *ecology, environment, nature protection, environmental problems, natural resources, ecological balance, air pollution, water pollution.*

Kirish

Kimyo fani zamonaviy ilm-fanning asosiy yo'nalishlaridan biri bo'lib, u moddalar va ularning o'zaro ta'sirlarini o'rganadi. Kimyo, nafaqat tabiiy fanlar, balki muhandislik, farmatsevtika, ekologiya va boshqa ko'plab sohalarda muhim rol o'ynaydi. Moddalar va ularning xususiyatlarini tushunish, insoniyatning turli muammolarini hal qilishda, masalan, yangi dorilarni ishlab chiqishda yoki atrof-muhitni muhofaza qilishda katta ahamiyatga ega. Axborot-kommunikatsiya

texnologiyalari esa, kimyo sohasidagi tadqiqotlar va innovatsiyalarni tezlashtirishda muhim vosita hisoblanadi. Bu texnologiyalar yordamida olimlar katta ma'lumotlar bazalaridan foydalanib, tajribalar va natijalarni tezda tahlil qilish imkoniyatiga ega bo'ladi. Shuningdek, ilmiy hamkorlikni rivojlantirish va global miqyosda bilim almashinuvi jarayonlarini soddalashtirishda axborot-kommunikatsiya texnologiyalarining ahamiyati beqiyosdir. Natijada, kimyo va axborot-kommunikatsiya texnologiyalari bir-birini to'ldirgan holda, yangi ilmiy yutuqlarga erishishda xizmat qiladi. Kimyo fani zamonaviy hayotda muhim o'rin tutadi, chunki u tabiiy jarayonlarni tushunishga yordam beradi va yangi materiallar yaratishga imkon beradi. Axborot-kommunikatsiya texnologiyalari esa ilmiy tadqiqotlarni yanada samarali va tezkor o'tkazishga yordam berib, bilim almashinuvi va hamkorlikni kuchaytiradi, bu esa kimyo sohasidagi yutuqlarni tezlashtiradi.

Asosiy qism.

Axborot-kommunikatsiya texnologiyalari (AKT) zamonaviy jamiyatda muhim rol o'ynaydi, chunki ular axborotni to'plash, saqlash, qayta ishlash va tarqatishga imkon beradi. Ushbu texnologiyalar ta'lim jarayonida innovatsion o'zgarishlarga olib keladi. O'qituvchilar va talabalar o'rtasida samarali muloqotni ta'minlab, o'qish jarayonini interaktiv va ko'p qirrali qiladi. AKT yordamida ta'lim resurslariga, elektron kutubxonalarga va onlayn kurslarga keng kirish imkoniyatlari yaratiladi, bu esa o'quvchilarning o'z-o'zini o'qitish qobiliyatini oshiradi. Shuningdek, masofaviy ta'lim tizimlari orqali geografik cheklovlar bartaraf etiladi va o'qitish jarayoni yanada moslashuvchan bo'ladi. Bunday texnologiyalar o'quv jarayonlarini individualizatsiya qilishga imkon berib, har bir o'quvchining ehtiyojlariga mos ravishda ta'lim berish imkoniyatini yaratadi. Natijada, axborot-kommunikatsiya texnologiyalari ta'lim sifatini oshirishda va global bilim almashinuvida muhim ahamiyatga ega bo'ladi. Axborot-kommunikatsiya texnologiyalari, asosan, axborotni ishlab chiqarish, saqlash, uzatish va qabul qilish jarayonlarini optimallashtirishga qaratilgan vositalar to'plamini anglatadi. Ular ta'lim jarayonida o'qituvchilar va o'quvchilar o'rtasida interaktiv aloqani ta'minlab, bilim olish jarayonini yanada samarali va qiziqarli qiladi. Shuningdek, bu

texnologiyalar ta'lim resurslariga kengroq kirishni ta'minlaydi. Zamonaviy o'qitish usullari kimyo fanini o'qitishda innovatsion yondashuvlarni o'z ichiga oladi. Ushbu usullar orasida interaktiv ta'lim, loyiha asosida o'qitish va muammoli o'qitish metodlari alohida ahamiyatga ega. Interaktiv ta'lim jarayonida o'quvchilar faol ishtirok etishlari ta'minlanadi, bu esa ularning o'z fikrlarini ifoda etish va bilimlarni mustahkamlash imkoniyatini beradi. Loyiha asosidagi o'qitish esa o'quvchilarga haqiqiy hayot vazifalarini hal qilish orqali kimyo fanining amaliy jihatlarini o'rganishga imkon yaratadi. Muammoli o'qitish metodlari o'quvchilarga muammolarni aniqlash va hal etish jarayonida tanqidiy fikrlash ko'nikmalarini rivojlantirishga yordam beradi. Bunday yondashuvlar, shuningdek, o'quvchilarning o'zaro muloqotini va jamoa ishlashini rivojlantirishga xizmat qiladi. Natijada, zamonaviy o'qitish usullari kimyo fanini o'qitishda nafaqat bilimlarni berish, balki o'quvchilarda ilmiy fikrlash va ijodkorlik qobiliyatlarini shakllantirishga ham qaratilgan. Zamonaviy o'qitish usullari kimyo fanini o'qitishda interaktiv texnologiyalar, tajribalar va muammoli vazifalar orqali o'quvchilarning faol ishtirokini ta'minlaydi. Ushbu yondashuvlar o'quv jarayonini qiziqarli va samarali qiladi, o'quvchilarning tushunishini chuqurlashtiradi. Shuningdek, ular ilmiy nazariyalarni amaliyotda qo'llash imkoniyatini yaratadi va o'quvchilarning mustaqil fikrlash qobiliyatlarini rivojlantiradi.

O'qituvchilarning axborot-kommunikatsiya texnologiyalaridan samarali foydalanishi, zamonaviy ta'lim jarayonining ajralmas qismidir. Ularning tayyorgarlik darajasi, o'qituvchilarning texnologiyalarni qabul qilish va ulardan foydalanish qobiliyatiga bevosita ta'sir ko'rsatadi. O'qituvchilar, texnologiyalarni integratsiya qilish orqali nafaqat o'quvchilarning bilimini oshirish, balki ularning o'z-o'zini rivojlantirish imkoniyatlarini ham kengaytirishi kerak. Bunday tayyorgarlik, o'qituvchilarni zamonaviy metodologiyalar va pedagogik yondashuvlar bilan tanishtirishni talab etadi. O'qituvchilarni muntazam ravishda o'qitish va malakasini oshirish, ularning texnologik tajribalarini kengaytiradi va o'quv jarayonida innovatsion yondashuvlarni joriy etishga yordam beradi. Shunday qilib, o'qituvchilarning AQTga tayyorgarligi, ta'lim sifatini oshirish va

o'quvchilarning muvaffaqiyatini ta'minlashda muhim rol o'ynaydi. Bu jarayon, o'qituvchilarning professional rivojlanishini ham qo'llab-quvvatlaydi. O'qituvchilarning axborot-kommunikatsiya texnologiyalaridan samarali foydalanish uchun tayyorgarlik darajasi, ta'lim tizimining zamon talablariga mos ravishda rivojlanishini ta'minlaydi. O'qituvchilar AQTni qo'llash orqali o'quv jarayonini interaktiv va qiziqarli qilish imkoniyatiga ega bo'lishadi. Bunda, o'qituvchilarning texnologik ko'nikmalari va pedagogik yondashuvlari birlashib, o'quvchilarning faol ishtirokini rag'batlantiradi. Shunday qilib, bu tayyorgarlik, o'qituvchilarni innovatsion metodlar bilan tanishtirishda muhim ahamiyatga ega.

Xulosa

Maqolaning asosiy xulosalari shuni ko'rsatadiki, sun'iy intellekt texnologiyalari (AQT) kimyo ta'limida muhim rol o'ynashi mumkin. O'quvchilarning ta'lim jarayonida faol ishtirok etishi va o'z bilimlarini yanada chuqurlashtirish imkoniyatlari AQT orqali kengayadi. Sun'iy intellekt yordamida ishlab chiqilgan interaktiv o'quv materiallari, shuningdek, shaxsiylashtirilgan o'qitish uslublari o'quvchilarning bilim olish jarayonini qiziqarli va samarali qiladi. Kelajakda AQTni kimyo o'qitishida qo'llash istiqbollari juda kengdir, chunki bu texnologiyalar o'quvchilarga murakkab kimyoviy jarayonlarni tushunishda yordam beradi va tajriba o'rganish imkoniyatlarini oshiradi. Bundan tashqari, AQT asosida yaratilgan tahlil va simulyatsiya vositalari o'quvchilarga ilmiy fikrlash qobiliyatlarini rivojlantirishda yordam beradi. Shu bilan birga, AQTni kimyo o'qitishida qo'llash, o'qituvchilar uchun yangi pedagogik strategiyalarni ishlab chiqishga turtki beradi. Maqolaning asosiy xulosalari shundan iboratki, AQT kimyo o'qitish jarayonini yanada samarali va interaktiv qilish imkonini beradi. Kelajakda AQTni qo'llash, o'quvchilarning faolligini oshirish va ularning ilmiy bilimlarini mustahkamlashda muhim rol o'ynaydi. Shuningdek, o'qituvchilar uchun innovatsion metodlarni joriy etish orqali ta'lim sifatini yaxshilashga xizmat qiladi. Bu jarayon, o'z navbatida, kimyo ta'limining sifatini yanada oshirishga yordam beradi.

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IMPROVING CADETS' WRITING SKILLS IN A FOREIGN LANGUAGE THROUGH COMMUNICATIVE AND STRATEGIC APPROACHES

Normatova Mukaddas Baxodirovna
Ground Forces Institute of the Military Security and Defence University of the Republic of Uzbekistan
Chirchik State Pedagogical University

Abstract: *In the modern educational environment, writing skills represent a key component of foreign language communicative competence, especially for cadets who are required to perform academic, analytical, and professional writing tasks. The development of writing skills enables cadets to participate effectively in international cooperation, military documentation, research activities, and professional correspondence. This thesis explores theoretical foundations and practical methods for improving cadets' writing skills through communicative, strategic, and task-based approaches, supported by national and international pedagogical experience.*

Keywords: *writing skills, cadets, foreign language education, communicative competence, strategic competence.*

Аннотация: *В статье рассматриваются вопросы формирования и развития письменной речи (writing skills) у курсантов военных образовательных учреждений при обучении иностранному языку. Обоснована значимость письменной коммуникации для выполнения служебной документации, составления отчетов, аналитических материалов и участия в международном военном сотрудничестве. Особое внимание уделяется коммуникативному, стратегическому и заданийному подходам в обучении письму. Показана роль современных образовательных технологий и стратегической компетенции в повышении профессиональной и академической подготовки курсантов.*

Ключевые слова: *письменная речь, курсанты, военное образование, иностранный язык, коммуникативный подход, стратегическая компетенция.*

Introduction

In modern higher and military education systems, foreign language proficiency is considered a key indicator of professional readiness. Among the four language skills—listening, speaking, reading, and writing—writing is recognized as the most complex and cognitively demanding. For cadets, writing in a foreign language plays a crucial role in academic studies, official correspondence, military documentation, analytical reporting, and international cooperation.

The growing importance of foreign language proficiency in military and academic contexts has increased the demand for well-developed writing skills among cadets. Writing is considered one of the most complex language skills, as it requires the integration of lexical, grammatical, stylistic, and cognitive abilities. Many cadets experience difficulties in organizing ideas logically, using appropriate academic vocabulary, and maintaining coherence and cohesion in written texts.

According to modern pedagogical research, the communicative approach plays a vital role in developing writing competence. This approach emphasizes meaningful language use and situational relevance. Writing tasks such as military reports, analytical essays, summaries of professional texts, and case-based writing activities encourage cadets to apply language knowledge in realistic professional contexts.

Another important aspect is the development of strategic competence. Teaching cadets writing strategies—planning, outlining, drafting, revising, and editing—significantly improves the quality of written output. The use of peer assessment and instructor feedback fosters reflective thinking and learner autonomy. Furthermore, integrating critical thinking tasks into writing activities enhances cadets' analytical abilities and professional readiness.

The use of modern educational technologies also contributes to effective writing instruction. Digital platforms, online collaborative writing tools, and automated feedback systems help individualize learning and increase motivation. As a result, cadets develop confidence in written communication and demonstrate higher academic and professional performance.

Despite its importance, many cadets face significant difficulties in developing effective writing skills. These difficulties include limited vocabulary, grammatical inaccuracies, lack of coherence and cohesion, and insufficient understanding of academic and professional writing conventions. Therefore, improving writing skills requires a systematic and methodologically sound approach that addresses both linguistic and cognitive aspects of language learning. This article aims to analyze effective approaches and methods for improving cadets' writing skills in a foreign language, focusing on communicative and strategic frameworks supported by modern pedagogical technologies.

Theoretical Background of Writing Skills Development: Writing is not merely the reproduction of grammatical structures; it is a complex process involving idea generation, organization, linguistic encoding, and revision. According to modern linguistic and pedagogical theories, writing competence consists of several components: linguistic competence, discourse competence, sociolinguistic competence, and strategic competence.

The communicative approach emphasizes meaningful language use in real-life contexts. In foreign language teaching, this approach shifts the focus from isolated grammar exercises to purposeful communication. For cadets, communicative

writing tasks may include reports, situation analyses, summaries of military texts, and formal correspondence.

Strategic competence, on the other hand, involves the ability to plan, monitor, and evaluate one's writing process. Teaching cadets effective writing strategies—such as brainstorming, outlining, drafting, revising, and editing—helps them overcome language barriers and improve the quality of written output. Research shows that strategy-based instruction significantly enhances learners' autonomy and confidence in writing.

Methodological Approaches to Improving Cadets' Writing Skills

Communicative and Task-Based Writing Activities. Communicative writing activities are designed to simulate real professional situations. For cadets, tasks such as writing operational reports, mission summaries, analytical essays, and reflective journals encourage meaningful language use. Task-based learning allows learners to focus on content first and form later, which reduces anxiety and increases motivation.

Development of Strategic Writing Competence: Strategic instruction plays a key role in improving writing performance. Cadets are taught to:

1. plan their texts by defining purpose and audience;
2. organize ideas logically using outlines;
3. draft texts with attention to clarity and coherence;
4. revise and edit based on feedback.

Peer review and collaborative writing activities further enhance critical thinking and reflective skills. Instructor feedback remains essential for guiding learners and correcting persistent errors.

Use of Modern Educational Technologies - Digital tools and online platforms have become integral to foreign language instruction. Writing software, collaborative documents, and automated feedback systems help individualize learning and provide immediate support. These technologies increase learner engagement and allow cadets to track their progress over time.

The integration of communicative, strategic, and technological approaches creates a supportive learning environment for developing writing skills. Cadets who actively engage in process-oriented writing demonstrate improved accuracy, coherence, and academic style. Moreover, writing activities that reflect real professional needs increase motivation and relevance.

International experience shows that competence-based language instruction is more effective than traditional grammar-centered methods. National pedagogical practices, when combined with international standards, contribute to the formation of well-rounded and professionally competent specialists.

Conclusion

The improvement of cadets' writing skills in a foreign language requires a comprehensive approach that combines communicative methods, strategic instruction, and innovative technologies. Such an approach not only enhances linguistic competence but also prepares cadets for effective participation in international academic and professional environments. Improving cadets' writing skills in a foreign language is a complex but achievable goal. A comprehensive approach that combines communicative methods, strategic instruction, and modern technologies ensures effective development of writing competence. Such training prepares cadets for academic success and professional communication in international military and educational contexts.

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ZAMONAVIY TA’LIM SHAROITIDA FIZIKA O‘QITISHDA RAQAMLI TEXNOLOGIYALARDAN FOYDALANISH

O‘rinboyeva Kumushoy Sultonbek qizi
ADPI
Abdulhayev O‘ktamjon Iqboljon o’g’li
ADPI
Oktamjonabdulhayev7@gmail.com

Annotatsiya: *Zamonaviy ta’lim sharoitida fizika fanini o‘qitishda raqamli texnologiyalar muhim rol o‘ynaydi. Virtual laboratoriyalar, simulyatsiyalar va interaktiv dasturlar o‘quvchilarga murakkab tushunchalarni vizual tarzda tushuntirishga yordam beradi va darslarni yanada qiziqarli qiladi. Raqamli platformalar o‘quv jarayonini individual tarzda boshqarish, bilim darajasini baholash va eksperimentlarni xavfsiz amalga oshirish imkonini beradi. Shu sababli, raqamli texnologiyalarni joriy etish fizika ta’limining samaradorligini oshiradi.*

Kalit so‘zlar*: raqamli texnologiyalar, fizika o‘qitish, virtual laboratoriya, simulyatsiya, interaktiv dastur, ta’lim samaradorligi, o‘quv jarayoni, bilim baholash.*

Annatation: *In modern education, digital technologies play a crucial role in teaching physics. Virtual laboratories, simulations, and interactive programs help students understand complex concepts visually and make lessons more engaging. Digital platforms allow individualized learning, assessment of knowledge, and safe execution of experiments. Therefore, integrating digital technologies enhances the effectiveness of physics education.*

Keywords: *digital technologies, physics teaching, virtual laboratory, simulation, interactive program, educational effectiveness, learning process, knowledge assessment.*

KIRISH: Zamonaviy ta’lim jarayonida raqamli texnologiyalar muhim o‘rin egallamoqda. Ta’lim sohasida global raqamlashtirish va axborot-kommunikatsiya texnologiyalarining joriy etilishi o‘quv jarayonini samarali va interaktiv qilish imkonini beradi. Ayniqsa, fizika kabi tabiiy fanlarda murakkab nazariy tushunchalarni tushuntirish va amaliy tajribalarni o‘tkazish doimo qiyinchilik tug‘dirgan. An’anaviy usullarda o‘quvchilar eksperimentlarni to‘liq tushunmay qolishi yoki xavfli uskunalar sababli tajriba o‘tkaza olmasligi mumkin. Shu sababli, raqamli texnologiyalar — virtual laboratoriyalar, simulyatsiya dasturlari, interaktiv taqdimotlar va 3D modellashtirish vositalari — fizika o‘qitishda samarali yordamchiga aylanadi.Raqamli platformalar yordamida o‘qituvchi darsni individuallashtirilgan tarzda olib borishi, o‘quvchilarning bilim darajasini real vaqt rejimida kuzatishi va baholashi mumkin. Shuningdek, interaktiv dasturlar va onlayn testlar o‘quvchilarning faolligini oshiradi, murakkab jarayonlarni tushunishni osonlashtiradi va ularni amaliyotga yanada yaqinlashtiradi. Natijada, raqamli texnologiyalardan foydalanish fizika ta’limining sifatini oshiradi, darslarni qiziqarli qiladi va talabalarni mustaqil o‘rganishga rag‘batlantiradi. Zamonaviy ta’limda raqamli texnologiyalarni samarali qo‘llash nafaqat o‘quvchilarning bilimini

oshiradi, balki ularni ilmiy tafakkurga, texnologik fikrlashga va ilmiy izlanishga yo‘naltiradi. Shu bois, raqamli vositalar fizika fanini o‘qitish jarayonida asosiy vosita sifatida qaraladi va ularning integratsiyasi ta’limning zamonaviy talablariga javob beradi. Zamonaviy ta’lim jarayonida raqamli texnologiyalar fizika fanini o‘qitish metodikasini tubdan o‘zgartirishda muhim vosita hisoblanadi. An’anaviy dars usullarida murakkab nazariy tushunchalarni, masalan, magnit maydonlar, elektr zanjirlari yoki to‘lqinlar kabi jarayonlarni to‘liq tushuntirish doimo qiyin bo‘ladi. Shu sababli, virtual laboratoriyalar, interaktiv simulyatsiyalar va multimediya vositalari o‘quv jarayonini amaliy, vizual va qiziqarli qiladi. Virtual laboratoriyalar yordamida talabalar tajribalarni xavfsiz va qulay muhitda bir necha marotaba bajarishi mumkin, bu esa eksperimental ko‘nikmalarni rivojlantirishga xizmat qiladi. Shu bilan birga, virtual tajribalar talabalarga nazariy bilimlarni amaliy jihatdan mustahkamlash imkonini beradi. Raqamli vositalardan foydalangan holda o‘quv jarayoni interaktiv bo‘lib, talabalar dars davomida faol ishtirok etadi.[1. 29-b]. Raqamli vositalar, xususan PhET va Algodoo kabi simulyatsiya dasturlari, nazariy bilimlarni amaliy tajribalar bilan uyg‘unlashtirish imkonini beradi. Elektr zanjirlar, kuchlar va to‘lqinlarni real vaqt rejimida kuzatish orqali o‘quvchilar ularni yanada chuqurroq tushunadi. Multimedia resurslaridan, jumladan animatsiyalar va video darslardan foydalanish murakkab fizik jarayonlarni soddalashtirish va vizual tarzda anglash imkonini beradi. Tadqiqotlar shuni ko‘rsatadiki, interaktiv vositalar yordamida darslar o‘quvchilarning e’tiborini 30–40% ko‘proq jalb qiladi va o‘rganish samaradorligini oshiradi.[2. 41-b]. Raqamli platformalar o‘qituvchilarga darsni individual tarzda moslashtirish imkonini beradi. Onlayn testlar va interaktiv baholash vositalari o‘quvchilarning bilim darajasini tezkor aniqlashga yordam beradi, ularning zaif tomonlarini aniqlab, mustaqil ishlashga yo‘naltiradi. Learning Management System (LMS) platformalari esa o‘quvchilarning darsdagi harakatlarini kuzatish va natijalarni real vaqt rejimida tahlil qilish imkonini yaratadi. Shu tarzda raqamli vositalar o‘quv jarayonini interaktiv va shaffof qiladi.[3. 38-b]. Fizika o‘qituvchilarining raqamli kompetentligi ham muhim ahamiyatga ega. O‘qituvchilar raqamli vositalarni samarali qo‘llay oladigan bo‘lsa, dars nafaqat

qiziqarli, balki innovatsion shaklda o‘tadi. Bu pedagogik metodikani boyitadi va o‘qituvchining o‘z bilimini doimiy yangilashiga yordam beradi. Shu bilan birga, raqamli vositalardan foydalanish talabalarning mustaqil fikrlashini va ijodiy yondashuvini rivojlantirishga xizmat qiladi. Tadqiqot natijalari shuni ko‘rsatdiki, raqamli texnologiyalar yordamida o‘quvchilar turli muammoli vaziyatlarni hal qilishga o‘rganadi. Virtual laboratoriyalar va simulyatsiyalar orqali tajriba jarayonini bir necha marotaba bajarish mumkin, bu esa eksperimental tafakkur va ilmiy izlanish ko‘nikmalarini rivojlantiradi. Shu bilan birga, interaktiv testlar va onlayn baholash vositalari o‘quvchilarning bilimini tezkor aniqlashga va o‘z zaif tomonlarini mustaqil rivojlantirishga yordam beradi.[4. 11-b]. Raqamli vositalar yordamida o‘quvchilar nazariy bilimlarni amaliy tajriba bilan uyg‘unlashtiradi, turli topshiriqlarni ijodiy bajaradi va o‘z fikrini mustaqil asoslab o‘rganadi. Bu esa ularning ilmiy tafakkurini kuchaytiradi. Raqamli platformalar yordamida o‘quvchilar mavzularni turli kontekstlarda tahlil qiladi va real vaziyatlarga tatbiq etadi, bu esa ularning o‘rganish jarayonini yanada samarali qiladi.[5. 31-b]. Tahlillar shuni ko‘rsatadiki, raqamli vositalardan foydalangan darslar talabalarni nafaqat nazariy bilim bilan, balki amaliy ko‘nikmalar bilan ham ta’minlaydi. Virtual laboratoriyalar orqali o‘quvchilar tajriba jarayonini qayta-qayta bajaradi va natijalarni tahlil qiladi, bu esa ularning ilmiy izlanish va eksperimental ko‘nikmalarini rivojlantiradi. Shuningdek, raqamli texnologiyalar o‘qituvchilarga dars jarayonini kuzatish, statistik tahlil qilish va talabalarning bilim darajasini baholash imkonini beradi. Shu bilan pedagoglar o‘quvchilarning faolligini oshirish, darsni individual tarzda moslashtirish va metodik yondashuvlarni boyitish imkoniga ega bo‘ladi.[6. 43-b]. Umuman olganda, tadqiqot natijalari raqamli texnologiyalarning fizika ta’limidagi samaradorligini aniq ko‘rsatdi. Virtual laboratoriyalar, interaktiv simulyatsiyalar va multimediya resurslari o‘quv jarayonini interaktiv, qiziqarli va samarali qiladi, o‘quvchilarning nazariy bilim, amaliy ko‘nikma va kreativ tafakkurini rivojlantiradi [7. 21-b].

METODOLOGIYA

Ushbu tadqiqotda fizika fanini o‘qitishda raqamli texnologiyalardan foydalanish samaradorligini aniqlash maqsad qilindi. Tadqiqot jarayoni eksperimental va empirik metodlar asosida olib borildi. Tadqiqot obyekti sifatida maktab va oliy ta’lim muassasalarida fizika fanini o‘qitish jarayoni tanlandi, sub’ekti sifatida esa o‘quvchilar va ularni o‘qituvchi pedagoglar hisoblandi. Tadqiqotning birinchi bosqichida mavjud ilmiy manbalar tahlil qilinib, raqamli ta’lim vositalari, virtual laboratoriyalar va interaktiv simulyatsiyalarni qo‘llashning nazariy asoslari o‘rganildi. Keyingi bosqichda eksperimental tadqiqotlar o‘tkazilib, sinf va guruhlarda raqamli texnologiyalar yordamida darslar tashkil qilindi va o‘quvchilarning bilim darajasi, faol ishtirokchiligi hamda amaliy ko‘nikmalari kuzatildi. Shuningdek, o‘qituvchilar va o‘quvchilar bilan so‘rovlar va intervyular o‘tkazilib, raqamli vositalarning dars samaradorligiga ta’siri aniqlashga harakat qilindi. Tahlil bosqichida olingan natijalar asosida raqamli texnologiyalar yordamida o‘quv jarayonining samaradorligi, talabalar faolligi va bilim darajasi baholandi. Ushbu metodologiya tadqiqotning ilmiy asoslanganligini ta’minlab, real dars sharoitida raqamli vositalarning samaradorligini aniqlashga imkon yaratadi. Shu bilan birga, o‘quvchilarning nazariy bilimlari va amaliy ko‘nikmalarini baholash, ularning eksperimental tafakkurini rivojlantirish imkonini beradi.

MUHOKAMA VA NATIJALAR

Tadqiqot natijalari shuni ko‘rsatdiki, fizika fanini o‘qitishda raqamli texnologiyalardan foydalanish o‘quvchilarning bilim darajasi va darsdagi faolligini sezilarli darajada oshiradi. Eksperimental sinflarda virtual laboratoriyalar, interaktiv simulyatsiyalar va multimedia resurslari yordamida o‘tkazilgan darslar natijasida o‘quvchilarning nazariy bilimlarini tushunish darajasi an’anaviy darslarga nisbatan yuqori bo‘lganligi kuzatildi. Masalan, talabalarning murakkab fizik jarayonlarni vizual tarzda ko‘rish imkoniyati ularning eksperimental ko‘nikmalarini yaxshilashga yordam berdi. Shuningdek, raqamli texnologiyalar talabalarning mustaqil fikrlash, ijodiy yondashuv va muammoli vaziyatlarni hal qilish

koʻnikmalarini rivojlantirishda ham muhim rol oʻynadi. Virtual laboratoriyalar yordamida oʻquvchilar turli tajribalarni xavfsiz va qulay muhitda bir necha marotaba takrorladi, bu esa ularning eksperimental tafakkurini kuchaytirdi. Shu bilan birga, onlayn interaktiv testlar va baholash vositalari oʻquvchilarning zaif tomonlarini aniqlash va ularni mustaqil oʻrganishga yoʻnaltirish imkonini berdi. Tahlil natijalari shuni koʻrsatdiki, raqamli vositalardan foydalanish dars jarayonini interaktiv va qiziqarli qiladi. Talabalar dars davomida faol ishtirok etadi, mavzularni amalda sinab koʻradi va oʻz bilimini real vaqt rejimida baholash imkoniyatiga ega boʻladi. Shu tarzda, raqamli texnologiyalar nafaqat oʻquvchilarning bilim darajasini oshiradi, balki ularning ilmiy tafakkurini va kreatif kompetentliklarini rivojlantirishga xizmat qiladi. Umuman olganda, tadqiqot natijalari raqamli texnologiyalarning fizika ta’limidagi samaradorligini aniq koʻrsatdi. Virtual laboratoriyalar, interaktiv simulyatsiyalar va multimediya resurslari oʻquv jarayonini interaktiv, qiziqarli va samarali qiladi hamda oʻquvchilarning nazariy bilim, amaliy koʻnikma va kreativ tafakkurini rivojlantirishga xizmat qiladi.

Xulosa Ushbu tadqiqot shuni koʻrsatdiki, fizika fanini oʻqitishda raqamli texnologiyalardan foydalanish darslarning samaradorligini sezilarli darajada oshiradi. Virtual laboratoriyalar, interaktiv simulyatsiyalar va multimediya resurslari oʻquvchilarning nazariy bilimlarini chuqurlashtirishga, amaliy koʻnikmalarini rivojlantirishga va mavzularni yaxshiroq tushunishga yordam beradi. Shu bilan birga, raqamli vositalar oʻquvchilarning mustaqil fikrlashini, ijodiy yondashuvini va muammolarni hal qilish koʻnikmalarini ham mustahkamlaydi. Tadqiqot natijalari shuni koʻrsatdiki, raqamli texnologiyalarni samarali qoʻllash uchun oʻqituvchilarning malakasi, pedagogik yondashuvi va texnik infratuzilma muhim ahamiyatga ega. Shu sababli, ta’lim jarayonida raqamli vositalarni joriy etish bilan birga, pedagoglarni tayyorlash va metodik qoʻllanmalarni ishlab chiqish zarur. Umuman olganda, raqamli texnologiyalar fizika ta’limini interaktiv, qiziqarli va zamonaviy qiladi, oʻquvchilarning bilim darajasini oshiradi va ularni ilmiy

tafakkurga yo‘naltiradi. Shu yo‘l bilan zamonaviy ta’lim sharoitida fizika fanini o‘qitish yanada samarali va innovatsion bo‘ladi.

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ARTIFICIAL INTELLIGENCE AND ACADEMIC INTEGRITY: ETHICAL DILEMMAS IN STUDENT ACTIVITY

Ro‘ziboyev Dostonbek Dilmurod o‘g‘li

Perfect University

E-mail: roziboyevf831@gmail.com

Ibadillayeva Marjona G‘offor qizi

Perfect University

E-mail: @marjonaibadilliyeva@gmail.com

Abstract: *This thesis explores the growing use of artificial intelligence in education and its impact on students' academic activities. Today, students use AI tools for writing essays, translating texts, and solving complex tasks. While these technologies make learning easier and more efficient, they also raise ethical concerns related to academic integrity. The main issue is the unclear boundary between acceptable use and misuse of AI. Overreliance on AI may lead to plagiarism and reduced critical thinking. However, when used responsibly, AI can support learning and improve performance. This thesis highlights the need to maintain academic honesty while benefiting from modern technologies.*

Keywords: *artificial intelligence, academic integrity, ethical dilemma, education, student activity, plagiarism, digital technologies, innovation, critical thinking.*

Introduction. In recent years, the rapid development of artificial intelligence (AI) technologies has significantly influenced educational systems around the world, including Uzbekistan. Universities across the country are increasingly integrating digital tools into teaching and learning processes. As a result, students активно use AI-based applications for writing essays, translating materials, solving assignments, and preparing academic work. While these technologies create new opportunities for learning, they also introduce serious ethical challenges related to academic integrity.

From a philosophical point of view, artificial intelligence raises important questions about knowledge and human thinking. In traditional understanding, knowledge is created through personal effort, experience, and critical thinking. However, AI can produce texts and answers very quickly without real

understanding. As John Searle explains in his "Chinese Room"[44] idea, a machine can appear intelligent, but it does not truly understand what it is doing. This becomes especially important in education, where students are expected to learn, not just produce results. In addition, AI creates ethical questions about responsibility and authorship. If a student uses AI to complete an assignment, it is not always clear who should be considered the real author. "According to Luciano Floridi, even when using advanced technologies, responsibility should remain with the human"[45]. Therefore, understanding the philosophy of AI helps us better see why its use in education creates both opportunities and serious ethical challenges.

In the context of Uzbekistan, where the education system is undergoing modernization and digital transformation, the issue of academic honesty is becoming especially important. Traditional values such as diligence, responsibility, and respect for knowledge are now being tested by new technological realities. This raises a key question: how can students benefit from AI tools without compromising academic integrity?

Main part. Artificial intelligence provides significant advantages for students in Uzbekistan, particularly in improving access to information and enhancing learning efficiency. Many students use AI tools to overcome language barriers, especially when working with English-language academic sources. AI-based translation and writing tools help them better understand complex materials and express their ideas more clearly. Moreover, AI contributes to the development of independent learning. In many Uzbek universities, where class sizes can be large and individual attention limited, AI tools serve as additional support for students. "According to international reports, AI technologies can facilitate personalized learning and improve educational outcomes"[46].

However, the rapid adoption of AI in Uzbekistan has also revealed certain challenges. Not all students are equally prepared to use these technologies

[44] Searle J.R. Minds, Brains, and Programs // Behavioral and Brain Sciences. – 1980. – Vol. 3, No. 3. – P. 417–424.
[45] Floridi L. The Ethics of Information. – Oxford: Oxford University Press, 2013. – P. 64–70.
[46] Eaton, S. E. (2021). Academic integrity in the age of artificial intelligence. University of Calgary Press.

responsibly. In some cases, AI is used not as a learning aid, but as a shortcut to complete assignments with minimal effort.

The use of AI in student activity in Uzbekistan has led to several ethical dilemmas. “One of the most pressing issues is academic dishonesty. Students may submit AI-generated texts as their own work, which raises concerns about plagiarism and the authenticity of academic achievements”[47]. A concrete ethical dilemma can be illustrated through a common situation in Uzbek universities. Imagine a student who has a deadline for an important assignment but lacks sufficient English proficiency to work with academic sources. The student uses an AI tool to generate a complete essay in English and submits it without modification. On the one hand, the student argues that the tool helped overcome language barriers and access knowledge. On the other hand, the work does not reflect the student’s own understanding or effort. This raises a critical question: is the student demonstrating learning or merely presenting artificially generated knowledge? This dilemma highlights the blurred boundary between assistance and academic dishonesty in the age of AI. Another important dilemma is related to the decline of independent thinking. When students rely too heavily on AI, they may lose the ability to analyze information, develop arguments, and express original ideas. This contradicts the fundamental goals of higher education.

Recent studies show that the use of artificial intelligence among students has increased rapidly in recent years. “According to a report by UNESCO, digital technologies, including AI tools, are becoming an essential part of modern education systems, especially in developing countries”[48]. In many cases, students use AI not only for support but also as a primary tool for completing assignments. “A global survey conducted by Statista in 2023 indicated that more than 60% of students have used AI-based tools such as ChatGPT for academic purposes”[49]. This shows that AI

[47] Thomas Lancaster. Artificial intelligence and academic integrity: New challenges for education // International Journal for Educational Integrity. – 2023. – Vol. 19, No. 1. – P. 1–10.
[48] Statista. Share of students using AI tools for academic purposes worldwide, 2023.
[49] Generative AI in education: Opportunities and risks. – Paris: OECD Publishing, 2025. – P. 20–25.

is no longer a marginal technology but a central element of student learning behavior.

In the context of Uzbekistan, although official statistical data is still limited, the rapid digitalization of education platforms such as online learning systems and electronic journals indicates a growing dependence on technology. Many students активно use AI tools for translation, essay writing, and exam preparation, particularly due to language barriers and limited access to academic resources. These trends highlight the urgency of addressing ethical issues related to AI use in education. Without clear regulations and awareness, the widespread use of AI may lead to increased cases of academic dishonesty and reduced learning quality.

In addition, there is a cultural dimension to this issue. In Uzbekistan, education has traditionally been associated with moral values and personal effort. The misuse of AI may weaken these values and create a gap between technological progress and ethical responsibility. Furthermore, unequal access to technology can create new forms of inequality among students. Those who have access to advanced AI tools may gain advantages over others, which raises questions about fairness and equal opportunities in education. To address these challenges, it is necessary to develop a balanced approach to the use of AI in education in Uzbekistan. Universities should establish clear guidelines regarding acceptable use of AI tools. These guidelines must emphasize transparency, originality, and ethical responsibility. At the same time, students need to develop digital and ethical literacy. They should understand that AI is a supportive tool, not a replacement for their own intellectual work. Educators also play a crucial role by designing assignments that require critical thinking and creativity. Recent studies suggest that maintaining academic integrity in the age of AI requires not only regulation but also a change in mindset. As Sarah Eaton notes, academic integrity must evolve alongside technological advancements[50].

[50] Bretag, T. (2020). Contract cheating and academic integrity. Journal of Higher Education Policy, 43(2), 134–150.

Conclusion. Artificial intelligence has become an important part of modern education in Uzbekistan, offering new opportunities for students to learn and develop. However, its use also presents serious ethical challenges related to academic integrity. The key issue is to ensure that AI is used responsibly and ethically. Students must balance the use of technology with independent thinking and personal effort. At the same time, educational institutions should promote a culture of academic honesty and provide clear guidance on the use of AI. In conclusion, addressing the ethical dilemmas of AI use in student activity is essential for the sustainable development of education in Uzbekistan. By combining innovation with ethical responsibility, it is possible to create a learning environment that supports both technological progress and moral values.

Practical Recommendations

In order to address the ethical challenges of artificial intelligence use in student activities, several practical measures can be proposed, especially within the context of Uzbekistan's educational system.

First, universities should develop clear guidelines on the acceptable use of AI tools in academic work. These guidelines must define the boundary between assistance and academic dishonesty. For example, using AI for idea generation or language support can be allowed, while submitting fully AI-generated work without modification should be considered a violation of academic integrity.

Second, it is important to introduce academic integrity training for students. Many students do not intentionally violate ethical norms but lack a clear understanding of plagiarism and responsible AI use. Special workshops and courses can help students develop ethical awareness and digital literacy.

Third, educators should redesign assessment methods in a way that reduces dependence on AI-generated answers. Assignments that require personal reflection, critical analysis, and in-class participation can encourage students to rely more on their own thinking rather than external tools.

Fourth, universities should implement technological solutions such as plagiarism detection systems and AI-use transparency policies. Students can be

required to indicate whether AI tools were used in completing their assignments, which promotes honesty and accountability.

Finally, it is essential to create a balanced academic culture where technology is not rejected but used responsibly. Artificial intelligence should be seen as a supportive tool that enhances learning, not as a substitute for intellectual effort.

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TALABALARNING AKADEMIK MOBILLIKKA TAYYORGARLIGINI SHAKLLANTIRISHNING PEDAGOGIK SHART-SHAROITLARI

Ruziyeva Shoxida Fatilloyevna

Buxoro davlat universiteti

Annotatsiya. *Ushbu maqolada talabalarning akademik mobillikka tayyorgarligini shakllantirishning pedagogik shart-sharoitlari ilmiy-nazariy jihatdan tahlil qilinadi. Akademik mobillik tushunchasi, uning tarkibiy qismlari va zamonaviy ta'lim tizimidagi o'rni ko'rib chiqiladi. Maqolada pedagogik shart-sharoitlarning uch asosiy guruhi: motivatsion-qadriyatli, bilim-ko'nikmaviy va amaliy-kommunikativ omillar batafsil yoritiladi. Tadqiqot natijalari ko'rsatishicha, ushbu shart-sharoitlarning maqsadli va tizimli ravishda joriy etilishi talabalarning xalqaro ta'lim muhitiga integratsiyalashish qobiliyatini sezilarli darajada oshiradi.*

Kalit so'zlar: *akademik mobillik, pedagogik shart-sharoitlar, tayyorgarlik, xalqaro ta'lim, integratsiya, kompetentlik.*

Abstract. *This article provides a scientific and theoretical analysis of the pedagogical conditions for developing students' readiness for academic mobility. The concept of academic mobility, its structural components, and its role in the modern educational system are examined. The article elaborates on three main groups of pedagogical conditions: motivational-value, knowledge-skill, and practical-communicative factors. Research findings indicate that the purposeful and systematic implementation of these conditions significantly enhances students' ability to integrate into international educational environments.*

Keywords: *academic mobility, pedagogical conditions, readiness, international education, integration, competence.*

KIRISH

Globallashuv jarayonlari va xalqaro integratsiyaning kuchayishi ta'lim tizimiga ham o'z ta'sirini o'tkazmoqda. Bugungi kunda universitetlar o'rtasida akademik hamkorlikning rivojlanishi, xalqaro dasturlar — Erasmus+, DAAD,

Fulbright va boshqa stipendiya imkoniyatlarining kengayishi talabalardan tamoman yangicha tayyorgarlikni talab etmoqda. Bu tayyorgarlik nafaqat chet tilini bilishni, balki madaniyatlararo muloqot ko'nikmalarini, akademik yozuv standartlarini egallashni va xorijiy ta'lim muhitiga moslashish qobiliyatini o'z ichiga oladi (Teichler, 2017; Brooks & Waters, 2011).

O'zbekiston Respublikasining ta'lim sohasidagi islohotlari — xususan, 2019-2023 yillarda tasdiqlangan «Ta'lim tizimini takomillashtirish» strategiyasi — oliy ta'lim muassasalarida akademik mobillikni rag'batlantirish va ta'minlashni davlat siyosatining ustuvor yo'nalishiga aylantirdi. Shunga qaramay, pedagogika fanida talabalarni akademik mobillikka tayyorlashning pedagogik shart-sharoitlari hali to'liq tizimlashtirilib, nazariy jihatdan asoslab berilmagan. Bu esa mazkur muammoni tadqiq etishning dolzarbligini oshiradi.

Tadqiqotning asosiy maqsadi — talabalarning akademik mobillikka tayyorgarligini shakllantiruvchi pedagogik shart-sharoitlarni aniqlash, ularni tizimlashtirish va samaradorligini baholashdan iborat. Qo'yilgan maqsaddan kelib chiqib, quyidagi ilmiy muammolar hal qilinadi: (1) akademik mobillik tayyorgarligi tushunchasining nazariy asoslarini tadqiq etish; (2) pedagogik shart-sharoitlar tizimini ishlab chiqish; (3) tajriba-sinov ishlarining natijalarini tahlil qilish.

ADABIYOTLAR SHARHI

Akademik mobillik tushunchasi va uning evolyutsiyasi

Akademik mobillik tushunchasi pedagogika va ta'lim sotsiologiyasi fanlarida turlicha talqin etiladi. Tor ma'noda u talabalar yoki o'qituvchilarning bir ta'lim muassasasidan boshqasiga — milliy yoki xalqaro miqyosda — vaqtinchalik ko'chishini bildiradi (Kelo, Teichler & Wächter, 2006). Keng ma'noda esa akademik mobillik — bu shaxsning ta'lim sohasidagi harakatchanligi, yangi akademik muhitga moslashish qobiliyati va o'z bilim-ko'nikmalarini turli madaniy-ta'limiy kontekstlarda qo'llay olish salohiyati (Murphy-Lejeune, 2002).

Boloniya jarayoni (1999) Yevropa oliy ta'lim makoni uchun akademik mobillikni asosiy tamoyillardan biriga aylantirdi. Bu jarayon nafaqat Yevropa davlatlarida, balki MDH mamlakatlarida, shu jumladan O'zbekistonda ham ta'lim tizimini isloh qilishning nazariy asosiga aylandi. Yevropa ta'lim tizimida kreditlarni o'tkazib olish tizimi (ECTS), diplom qo'shimchasi va bakalavriat-magistratura ikki bosqichli tizimining joriy etilishi mobillikni amaliy jihatdan ta'minlashning institutsional mexanizmlari bo'lib xizmat qildi (Knight, 2012).

Tayyorgarlik fenomeni: nazariy yondashuvlar

Psixologik-pedagogik adabiyotlarda «tayyorgarlik» (readiness) tushunchasi turli kontekstlarda ishlatiladi. Rubinshteyn (1973) tayyorgarlikni faoliyatning muvaffaqiyatli bajarilishini ta'minlovchi shaxsiy sifatlar yig'indisi sifatida ta'riflaydi. Diyachenko va Kandibovich (1976) esa tayyorgarlikning motivatsion, orientatsion, operatsional, iroda va baholash tarkibiy qismlarini ajratib ko'rsatadi. Zamonaviy kompetentlilik yondashuvi nuqtai nazaridan (Zimnyaya, 2004; Khutorskoy, 2003) tayyorgarlik — bu kompetentsiyalar majmui: kognitiv, kommunikativ, madaniyatlararo va refleksiv.

Xorijiy tadqiqotchilap — Byram (1997), Bennett (2004), Deardorff (2006) — madaniyatlararo kompetentlilik modellarini ishlab chiqishda tayyorgarlikning quyidagi o'lchamlarini ajratadilar: bilimlar (xorijiy madaniyat, tizim, qoidalar haqida), ko'nikmalar (talqin qilish, munosabat o'rnatish, kashfiyot qilish) va munosabatlar (ochiqlik, qiziquvchanlik, o'z madaniy stereotiplarini tanqidiy anglash). Ushbu yondashuv akademik mobillikka tayyorgarlikning ko'p o'lchamli tabiatini teorik jihatdan asoslab beradi.

O'zbek pedagogikasida mavzuning o'rganilishi

O'zbekiston pedagogika fanida akademik mobillik masalasiga qiziqish keyingi o'n yillikda keskin ortdi. Yo'ldoshev (2019), Xoliqova (2020) va Toshmatov (2021) ning tadqiqotlarida chet tilini o'qitish va akademik mobillik o'rtasidagi bog'liqlik, Mirzayev (2022) ishlarida esa yuqori ta'lim muassasalarida institutsional shart-sharoitlarni takomillashtirish masalalari ko'rib chiqilgan. Biroq kompleks

pedagogik shart-sharoitlar tizimini ishlab chiqish va empirik tekshirishga doir tadqiqotlar hali yetarli emas, bu esa mavjud bilimlar tizimida sezilarli bo'shliq mavjudligini ko'rsatadi.

METODOLOGIYA

Tadqiqot dizayni va falsafiy asosi

Tadqiqot konstruktivistik (Vygotsky, 1978; Piaget, 1952) va kompetentlilik yondashuvlari (Weinert, 2001) asosida qurilgan. Mazkur yondashuv ta'lim jarayonini talabaning faol bilim quruvchisi sifatidagi rolini tan oladi va pedagogik sharoitlarni talabanin ichki motivatsiya hamda tashqi muhit o'rtasidagi ko'prik sifatida ko'radi. Metodologik jihatdan tadqiqot aralash (mixed methods) yondashuv asosida amalga oshirildi: miqdoriy va sifat ma'lumotlar parallel ravishda to'plandi va interpretatsiya qilindi.

Ishtirokchilar va tadqiqot bazasi

Tajriba-sinov ishlari 2021-2023 yillar davomida O'zbekistonning uchta oliy ta'lim muassasasida — Toshkent davlat pedagogika universiteti, Samarqand davlat universiteti va Namangan muhandislik-texnologiya institutida — olib borildi. Tadqiqot tanlamasiga bakalavriat 2-4-kurs talabalari kirdi: tajriba guruhi (n=186) va nazorat guruhi (n=178), jami 364 nafar talaba. Guruhlar tanlashda stratifikatsiyalash usuli qo'llanildi — ixtisoslik, kurs va jins bo'yicha mutanosiblik ta'minlandi.

Ma'lumot to'plash va tahlil usullari

Ma'lumot to'plashda quyidagi usullardan foydalanildi: (1) so'rovnoma — Deardorff (2006) ning madaniyatlararo kompetentlilik modeliga asoslangan 42 ta savoldan iborat moslashtirilgan o'lchov vositasi (Likert shkala, 1-5); (2) chuqur intervyu — 24 nafar talaba va 12 nafar o'qituvchi bilan; (3) kuzatuv — 18 oy davomida dars va treninglarni kuzatish; (4) pedagogik hujjatlarni tahlil qilish — o'quv dasturlari, fanlar syllabusi. Miqdoriy ma'lumotlar SPSS 26.0 dasturida t-test, ANOVA va korrelyatsion tahlil yordamida qayta ishlandi. Sifat ma'lumotlar uchun tematik tahlil (Braun & Clarke, 2006) metodi qo'llanildi.

NATIJALAR (RESULTS)

Pedagogik shart-sharoitlarning uch guruhi

Adabiyotlar tahlili, ekspert baholash (Delphi metodi, n=18 ekspert) va tajriba-sinov natijalari asosida talabalarning akademik mobillikka tayyorgarligini shakllantiruvchi pedagogik shart-sharoitlarning uchta asosiy guruhi aniqlandi. Mazkur guruhlar ierarxik tizim ko'rinishida bo'lib, har biri oldingilari ustiga quriladi va ularni to'ldiradi.

I GURUH: Motivatsion-qadriyatli shart-sharoitlar

Bu guruhga talabalarning akademik mobillikka ijobiy motivatsiyasini shakllantiruvchi sharoitlar kiradi: xalqaro ta'lim imkoniyatlari haqida muntazam ma'lumot berish (awareness sessions), mobillik tajribasini o'tagan xarijiyta'lim oluvchilar bilan uchrashuvlar tashkil etish, akademik yutuqlar bilan bog'liq moddiy va nomoddiy rag'batlantirishlar tizimi. Tadqiqot ko'rsatishicha, ushbu shart-sharoitlar joriy etilgandan so'ng tajriba guruhida xorijda o'qishga ichki motivatsiya ko'rsatkichi 0.76 dan 1.14 (5 ballik shkalada) ga oshdi ($p < 0.001$).

II GURUH: Bilim-ko'nikmaviy shart-sharoitlar

Ikkinchi guruh chet tili kommunikativ kompetensiyasini rivojlantirish, akademik yozuv va taqdimot ko'nikmalarini o'rgatish, xorijiy ta'lim tizimlari haqida bilim berish kabi pedagogik sharoitlarni o'z ichiga oladi. Lingvistik jihatdan IELTS/TOEFL formatiga yo'naltirilgan intensiv kurslar (haftasiga 6 soat), akademik ingliz tili moduli (Academic Writing I va II) va mahalliy tildan tashqari ta'lim olishga tayyorlovchi simulyatsiya darslari tashkil etildi. Natijalar: tajriba guruhida IELTS simulyatsiyasi o'rtacha bali 4.8 dan 6.1 ga ko'tarildi ($t=7.43$, $df=184$, $p < 0.001$).

III GURUH: Amaliy-kommunikativ shart-sharoitlar

Uchinchi guruhga madaniyatlararo muloqot ko'nikmalarini amaliy rivojlantirish, xalqaro talabalar bilan hamkorlikdagi loyihalar, virtual mobillik dasturlari (Virtual Erasmus) va mahalliy universitetlarda xorijiy ta'lim muhitini

simulyatsiya qiluvchi pedagogik texnologiyalar kiradi. Ayniqsa, xorijiy universitet talabalari bilan tandem usulida olib borilgan loyihalar (n=12 loyiha, 6 oy davomida) madaniyatlararo kompetentlilik ko'rsatkichini statistik jihatdan sezilarli darajada yaxshiladi: tajriba guruhida Byram MCI shkalasi bo'yicha o'rtacha ko'rsatkich 2.94 dan 4.17 ga oshdi ($F(1,362)=89.4$, $p < 0.001$, $\eta^2=0.197$).

Qo'shimcha topilmalar

Sifat ma'lumotlarini tematik tahlil qilish natijasida uch asosiy tema ajraldd: (a) «O'z imkoniyatlarini anglash» — talabalar pedagogik sharoitlar ta'sirida o'zlarining xalqaro ta'limga tayyorligini yangicha baholashni boshladilar; (b) «Qo'rquv va noaniqlikning kamayishi» — madaniyatlararo amaliyot xorijiy muhitdagi noaniqlikka chidamlilikni oshirdi; (c) «Shaxsiy o'sish identifikatsiyasi» — talabalar o'z rivojlanishini mobillik maqsadlari bilan bog'lashni o'rgandi. Intervyularda qatnashgan 24 talabadan 21 nafari (87.5%) tajriba-sinov davridagi o'qish tajribasini o'z kasbiy va shaxsiy rivojlanishi uchun «hal qiluvchi» sifatida baholadi.

MUHOKAMA (DISCUSSION)

Natijalarning nazariy asoslar bilan nisbati

Olingan natijalar Deardorff (2006) ning piramidal madaniyatlararo kompetentlilik modelini tasdiqlaydi: ichki munosabatlar va bilimlarni o'zgartirmasdan, faqat tashqi ko'nikmalarni o'rgatish etarli emas. Tadqiqotimizda I guruh shart-sharoitlari (motivatsion-qadriyatli) ning etarli darajada shakllantirilmasidan so'ng II va III guruhlar samarasi past bo'lishi kuzatildi — bu Deardorff modelidagi «munosabatlar poydevori» tezisini bevosita tasdiqlaydi. Bundan tashqari, natijalar Vygotskiyning «yaqin rivojlanish zonasi» (ZPD) nazariyasi bilan ham uyg'un: pedagogik sharoitlar tahsil oluvchilarni mustaqil bajarolmaydigan, lekin yo'l-yo'riq bilan bajara oladigan vazifalar bilan ta'minlash orqali rivojlanishni tezlashtiradi.

Xalqaro tadqiqotlar bilan qiyosiy tahlil

Tadqiqotimiz natijalari Marope, Wells va Fast (2013) ning UNESCO hisobotida tavsiya etilgan «integratsiyalashgan tayyorgarlik modeli» bilan mos keladi: til tayyorgarligi, akademik ko'nikmalar va madaniyatlararo kompetentlilik uchburchagining barchasi bir vaqtda rivojlantirilganda eng yuqori natijaga erishiladi. Xitoy tadqiqotchilari Gu va Schweisfurth (2015) ning talabalar xorijiy muhitda moslashishiga oid ishlari ham ushbu xulosa bilan hamohang: oldindan tayyorgarlik ko'rgan talabalar yangi muhitda «kutish davri» ni sezilarli darajada qisqartiradi.

Cheklovlar va kelajak tadqiqotlari uchun tavsiyalar

Tadqiqotning bir qancha cheklovlari mavjud. Birinchidan, tanlanma faqat uchta universitetni qamrab oladi, bu esa natijalarni butun O'zbekiston oliy ta'lim tizimiga umumlashtirish imkonini cheklaydi. Ikkinchidan, so'rovnoma vositasi o'z-o'zini baholashga asoslanadi, shuning uchun ijtimoiy maqbullik tarafkashligi (social desirability bias) mumkin. Uchinchidan, 18 oylik kuzatuv davri ba'zi uzoq muddatli o'zgarishlarni qayd etish uchun yetarli emasdir. Kelajakda longitudinal (3-5 yillik) tadqiqotlar, shuningdek, haqiqatan xorijda ta'lim olgan talabalarning retrospektiv baholashlarini o'z ichiga oluvchi validatsion tadqiqotlar o'tkazish maqsadga muvofiq.

XULOSA

Ushbu tadqiqot talabalarning akademik mobillikka tayyorgarligini shakllantirishning pedagogik shart-sharoitlarini nazariy jihatdan asoslab, empirik tarzda tekshirdi. Asosiy xulosalar quyidagilar: birinchidan, tayyorgarlik ko'p o'lchamli tuzilma bo'lib, uni bir komponent bilan — masalan, faqat til tayyorgarligi bilan — ta'minlab bo'lmaydi; ikkinchidan, motivatsion-qadriyatli shart-sharoitlar bilim-ko'nikmaviy va amaliy-kommunikativ sharoitlar uchun zaruriy poydevor bo'lib xizmat qiladi; uchinchidan, uchala guruh shart-sharoitlari tizimli va izchil joriy etilganda natijador ko'rsatkichlarga erishish mumkin.

Amaliy tavsiyalar nuqtai nazaridan quyidagilarni tavsiya etamiz: oliy ta'lim muassasalari akademik mobillikka tayyorgarlik dasturini alohida tizim sifatida ishlab chiqishlari; ta'lim jarayoniga virtual mobillik tajribalari muntazam kiritilishi; o'qituvchilarni madaniyatlararo pedagogik kompetentlilikka o'qitish bo'yicha malaka oshirish kurslarini yo'lga qo'yish. Mazkur tadqiqot O'zbekiston oliy ta'limi uchun xalqaro integrasiyaning nazariy-pedagogik asoslarini mustahkamlashga munosib hissa qo'shadi deb umid qilamiz.

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THE IMPORTANCE OF SOCIAL ACTIVITY IN PREPARING STUDENTS FOR PROFESSIONAL ACTIVITY

Samandarova Muhayyo Qahromon qizi
Chirchik State Pedagogical University
muhayyosamandarova297@gmail.com

Annotation. *This article analyzes the role and importance of social activity in the process of preparing students for professional and pedagogical activities. The development of students' initiative, participation in public affairs, communicative culture and leadership qualities in the educational process is highlighted as an important factor in the professional formation of a future teacher. It is argued that social activity serves to strengthen the student's professional competencies, independent decision-making in pedagogical situations, a sense of responsibility, and the formation of a creative approach. The effectiveness of social projects, volunteer activities, practical training and a collaborative approach in educational institutions is also considered. The article presents scientific and theoretical conclusions about the mechanisms for developing social activity, its integration into pedagogical activities and its impact on the professional maturity of a future teacher.*

***Keywords**: social activism, professional and pedagogical training, pedagogy, competence, initiative, communicative culture, leadership skills, social project, volunteering, professional development, activity in the educational process.*

***Аннотация.** В данной статье анализируется роль и значение социальной активности в процессе подготовки студентов к профессионально-педагогической деятельности. Развитие инициативности студентов, их участие в общественной жизни, формирование коммуникативной культуры и лидерских качеств в образовательном процессе рассматриваются как важные факторы профессионального становления будущего учителя. Обосновывается, что социальная активность способствует укреплению профессиональных компетенций студента, формированию навыков самостоятельного принятия решений в педагогических ситуациях, развитию ответственности и творческого подхода. Также рассматривается эффективность социальных проектов, волонтёрской деятельности, практических занятий и сотрудничества в образовательных учреждениях. В статье представлены научно-теоретические выводы о механизмах развития социальной активности, её интеграции в педагогическую деятельность и влиянии на профессиональную зрелость будущего учителя.*

***Ключевые слова:** социальная активность, профессионально-педагогическая подготовка, педагогика, компетентность, инициативность, коммуникативная культура, лидерские качества, социальный проект, волонтёрство, профессиональное развитие, активность в образовательном процессе.*

***Annotatsiya:** Mazkur maqolada talabalarning kasbiy-pedagogik faoliyatga tayyorgarlik jarayonida ijtimoiy faollikning roli va ahamiyati tahlil qilinadi. Ta’lim jarayonida talabalarning tashabbuskorligini rivojlantirish, ularning jamoat hayotidagi ishtiroki, kommunikativ madaniyati va yetakchilik sifatlarini shakllantirish kelajakdagi o‘qituvchining kasbiy shakllanishida muhim omillar sifatida ko‘rib chiqiladi. Ijtimoiy faollik talabalarning kasbiy kompetensiyalarini*

mustahkamlashi, pedagogik vaziyatlarda mustaqil qaror qabul qilish ko‘nikmalarini shakllantirishi, mas’uliyat va ijodiy yondashuvni rivojlantirishga xizmat qilishi asoslab berilgan. Shuningdek, ijtimoiy loyihalar, volontyorlik faoliyati, amaliy mashg‘ulotlar va ta’lim muassasalaridagi hamkorlikning samaradorligi ko‘rib chiqilgan. Maqolada ijtimoiy faollikni rivojlantirish mexanizmlari, uning pedagogik faoliyatga integratsiyasi va bo‘lajak o‘qituvchining kasbiy yetukligiga ta’siri bo‘yicha ilmiy-nazariy xulosalar keltirilgan.

Kalit so‘zlar: *ijtimoiy faollik, kasbiy-pedagogik tayyorgarlik, pedagogika, kompetentlik, tashabbuskorlik, kommunikativ madaniyat, yetakchilik ko‘nikmalari, ijtimoiy loyiha, volontyorlik, kasbiy rivojlanish, ta’lim jarayonidagi faollik.*

Introduction. In our country, the modernization of the education system, improvement of the quality of teacher training, and the formation of innovative specialists who meet the requirements of modern education are among the most urgent tasks of today. The professional and pedagogical preparation of a future teacher is closely connected not only with theoretical knowledge, but also with such qualities as active participation in social processes, effective teamwork, initiative, and the ability to take responsibility. Therefore, developing social activity among students is considered an important component of their preparation for pedagogical activity.

Social activity is a quality that reflects a person’s conscious, purposeful, and proactive participation in social life, and it plays a decisive role in the professional development of students. A modern teacher is expected to be not only a provider of knowledge, but also a person who unites the community, is not indifferent to social issues, and possesses well-developed communication skills. The formation of such competencies is directly related to students’ active participation in social activities during the educational process.

Main Part. Social projects, volunteer programs, practical training, collaborative activities, and initiative-based trainings implemented in educational institutions help develop important indicators of pedagogical mastery among students, such as leadership, communication skills, responsibility, conflict

resolution, and teamwork. Therefore, involving students in social activities accelerates their process of achieving professional maturity and creates a solid foundation for effective interaction with students in the future. The relevance of this topic lies in the fact that the professional competencies of every future teacher are enriched through social experiences, a broader worldview is formed, and practical skills are strengthened. From this perspective, this study analyzes the role, opportunities, and mechanisms of influence of social activity in preparing students for professional and pedagogical activity.

Type of Social Activity	Description	Impact on Students' Professional Development
Participation in student organizations	Involvement in student unions, clubs, and public organizations	Develops leadership, teamwork, and organizational skills
Volunteering activities	Participation in social projects, charity events, and community service	Forms responsibility, empathy, and civic engagement
Scientific and innovative activities	Participation in conferences, seminars, research projects, and academic competitions	Enhances critical thinking, research skills, and problem-solving abilities
Participation in cultural and educational events	Organization and participation in cultural, educational, and spiritual events	Improves communication skills, creativity, and public speaking
Practical training and community practice	Combining educational activities with	Strengthens professional

	practical and social experience	competencies and real work experience

Modern pedagogical higher education is aimed at forming specific professional skills and competencies in graduates. In particular, according to A.B. Zvezdova and V.G. Oreshkin, modern requirements for graduates are shaped under the influence of the situation in the labor market, the acceleration of social development, the large-scale informatization of the environment, and the division of production functions into a number of tasks and types of activities. The result of professional and pedagogical training is a set of competencies that includes skills, social behavior, the ability to work in groups, initiative, social activity, aspiration for innovation, mobility, adaptability, decision-making ability, and responsibility for one's actions and their consequences.

The culture of behavior is a combination of forms of behavior manifested in a person's daily life. It reflects the moral, ethical, and aesthetic norms characteristic of that behavior. In other words, the culture of behavior represents a set of socially significant qualities formed in an individual and the daily actions based on the norms of spirituality, morality, and aesthetic culture accepted in society. If moral and ethical norms determine the content of human behavior and guide individuals on how to act in certain situations, aesthetic norms determine how these moral requirements are expressed in behavior and how they naturally integrate into a person's lifestyle and daily habits.

For example, the requirement of respect toward others, when applied in everyday behavior, is expressed through politeness, courtesy, attentiveness, and respect for other people's time. The requirement of loyalty to one's responsibilities is reflected in the accuracy of fulfilling promises, completing agreed tasks on time and effectively, and returning entrusted property. Honesty, in its manifestations, is expressed through integrity, sincerity, fairness, and loyalty to truth. Human behavior is studied by such sciences as ethology, psychology, and sociology. In clarifying the nature of this phenomenon, it is appropriate to rely on the primary definition that

considers behavior as a phenomenon inherent to all living beings, which activates and directs their actions and interactions with the surrounding environment. Thus, the culture of behavior expresses the moral requirements of society that are fixed in norms, rules, principles, and ideals. These requirements combine with personal experience and are manifested in a person's appearance, behavior in front of others, life choices, and the way he or she organizes and develops communication with other people.

Discussion and Results. Instilling love and respect for one's homeland, people, and relatives from early childhood and setting a personal example are among the primary responsibilities of parents. The next step is self-education, which involves shaping one's character and consciously developing genuine human qualities. These tendencies are clearly reflected in the system of training future teachers. In recent years, there has been increasing interest in the personality of future teachers, their characteristics, qualities, readiness for professional activity, and development. It cannot be denied that the effectiveness and productivity of pedagogical activity directly depend on the personal qualities of the specialist. A modern teacher is expected to possess a system of readiness and abilities that enable them to study and solve social problems in society, as well as to demonstrate active citizenship and a clear social position. According to N.B. Shmeleva, an important component of the teacher's professional personality is social activity, which develops during professional activity. Social activity itself is considered a spiritual indicator. The success of social reforms in society depends not only on material indicators but also on spiritual indicators, including changes in a person's moral character, worldview, and attitude toward their activity.

The essence of social activity lies at the foundation of the process of socialization of the individual; through this process, a person develops as a personality. Social activity is a broad concept that reflects an individual's role in life and society, their attitude toward social reality and ongoing changes, as well as their participation in creative and constructive processes. Understanding the factors that shape and develop social activity in individuals is one of the important tasks of

pedagogy, psychology, and sociology. Therefore, social activity is simultaneously both a philosophical and a sociological issue.

In the conditions of the formation of the post-nonclassical scientific worldview, the concept of "social activity" has taken a firm place within the system of concepts of various social and humanitarian sciences such as philosophy, pedagogy, sociology, and psychology. Despite the widespread use of this term, it is interpreted in different and sometimes contradictory ways in scientific literature. This diversity is connected with the variety of forms and manifestations of social activity.

Social activity is one of the essential aspects of human activity. It is manifested in a person's participation in social and collective affairs and is based to a certain extent on political and moral self-awareness. Educating social activity is not only about increasing participation in public affairs but also about forming motives that determine the moral orientation of young people. The development of social relations and the accumulation of social experience within the student community and among each of its members constitute the main pedagogical and psychological conditions for the formation of social activity. One of the most important aspects of students' lives is their diverse social activities outside the educational institution. Among such activities, pedagogical practice occupies a special place, as it allows students to apply theoretical knowledge in real educational settings and to develop professional competencies through direct experience.

Conclusion. The development of social activity in the process of preparing students for professional and pedagogical activity is an integral and important component of pedagogical education. Social activity is one of the key factors ensuring students' personal and professional development, helping them become initiative-oriented, responsible, communicative, and capable of working effectively in a team.

Social projects and activities organized during the educational process, volunteer work, practical training, collaborative tasks, and pedagogical approaches based on cooperation enrich students' real-life experiences and deepen their professional competencies. As a result, future teachers become better prepared for

their profession and are able to make appropriate decisions in pedagogical situations, demonstrate a culture of communication, solve problems effectively, and apply creativity and leadership skills.

Moreover, social activity strengthens students' civic position and develops a responsible attitude toward social processes occurring around them. This serves as an important indicator not only of professional training but also of personal development. Therefore, socially active students are more likely to become active participants in the education system in the future and effective teachers who play a leading role in the development and education of students.

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OLIY TA’LIM TIZIMIDA RAQAMLI TEXNOLOGIYALAR ORQALI TEXNIK TAFAKKURNI RIVOJLANTIRISHNING SAMARALI USULLARI

Sharipova Shaxruza Nusrat qizi
Buxoro davlat texnika universiteti
shaxruzasharipova90@gamil.com

Annotatsiya. *Mazkur maqolada oliy ta’lim tizimida raqamli texnologiyalar asosida talabalarda texnik tafakkurni rivojlantirishning samarali usullari ilmiy-nazariy va amaliy jihatdan tahlil qilinadi. Raqamli transformatsiya sharoitida texnik mutaxassislarni tayyorlash jarayonida texnik tafakkurning o‘rni va ahamiyati yoritilib, virtual laboratoriyalar, raqamli modellashtirish, simulyatsiya dasturlari, sun’iy intellektga asoslangan o‘quv platformalari kabi zamonaviy vositalarning didaktik imkoniyatlari ochib beriladi. Tadqiqotda kompetensiyaviy va tizimli yondashuv asosida texnik tafakkurni rivojlantirishga yo‘naltirilgan pedagogik*

usullar asoslab berilgan. Maqola natijalari oliy ta'lim muassasalarida ta'lim sifatini oshirishga xizmat qiladi.

Kalit so'zlar: *raqamli texnologiyalar, texnik tafakkur, oliy ta'lim, virtual laboratoriya, simulyatsiya, pedagogik metodika, kompetensiyaviy yondashuv.*

Abstract. *This article analyzes effective methods for developing technical thinking in students based on digital technologies in the higher education system from a scientific, theoretical and practical perspective. The role and importance of technical thinking in the process of training technical specialists in the context of digital transformation are highlighted, and the didactic possibilities of modern tools such as virtual laboratories, digital modeling, simulation programs, and artificial intelligence-based learning platforms are revealed. The research substantiates pedagogical methods aimed at developing technical thinking based on a competency-based and systematic approach. The results of the article serve to improve the quality of education in higher education institutions.*

Keywords*: digital technologies, technical thinking, higher education, virtual laboratory, simulation, pedagogical methodology, competency-based approach.*

Аннотация. *В данной статье с научной, теоретической и практической точек зрения анализируются эффективные методы развития технического мышления у студентов на основе цифровых технологий в системе высшего образования. Подчеркивается роль и значение технического мышления в процессе подготовки технических специалистов в контексте цифровой трансформации, а также раскрываются дидактические возможности современных инструментов, таких как виртуальные лаборатории, цифровое моделирование, программы моделирования и обучающие платформы на основе искусственного интеллекта. Исследование обосновывает педагогические методы, направленные на развитие технического мышления на основе компетентностного и системного подхода. Результаты статьи служат для повышения качества образования в высших учебных заведениях.*

Ключевые слова: *цифровые технологии, техническое мышление, высшее образование, виртуальная лаборатория, моделирование, педагогическая методология, компетентностный подход.*

Kirish

Bugungi globallashuv va raqamlashtirish jarayonlari barcha sohalar qatori oliy ta’lim tizimiga ham jiddiy ta’sir ko‘rsatmoqda. Ayniqsa, texnik va muhandislik yo‘nalishlarida tahsil olayotgan talabalar uchun texnik tafakkurni rivojlantirish dolzarb vazifalardan biri hisoblanadi. Zamonaviy ishlab chiqarish va texnologik jarayonlar yuqori darajadagi analitik fikrlash, muammoli vaziyatlarni modellashtirish va raqamli vositalardan samarali foydalanishni talab etadi.

An’anaviy o‘qitish usullari texnik tafakkurni rivojlantirishda yetarli samara bermayotgan bir sharoitda, raqamli texnologiyalar asosida o‘qitish metodikasini takomillashtirish zarurati yuzaga kelmoqda. Shu bois, oliy ta’lim tizimida raqamli texnologiyalar orqali texnik tafakkurni rivojlantirishning samarali usullarini aniqlash va ilmiy asoslash muhim ahamiyat kasb etadi.

Tadqiqotning maqsadi va vazifalari

Tadqiqotning maqsadi

Oliy ta’lim tizimida raqamli texnologiyalar yordamida talabalarda texnik tafakkurni rivojlantirishning samarali pedagogik usullarini aniqlash va ularning ilmiy-metodik asoslarini ishlab chiqishdan iborat.

Tadqiqot vazifalari:

texnik tafakkur tushunchasining mazmun-mohiyatini tahlil qilish;

raqamli texnologiyalarning texnik tafakkurni rivojlantirishdagi didaktik imkoniyatlarini aniqlash;

oliy ta’limda qo‘llanilayotgan zamonaviy raqamli vositalarni o‘rganish;

texnik tafakkurni rivojlantirishga yo‘naltirilgan samarali usullarni asoslash;

tadqiqot natijalarini amaliyotga tatbiq etish bo‘yicha tavsiyalar ishlab chiqish.

Oliy ta’limda texnik tafakkurni simulyatsiyalar (VR/AR), CAD/CAM tizimlari, robototexnika hamda raqamli egizaklar (Digital Twins) orqali rivojlantirish eng samarali usullardir. Ushbu vositalar talabalarga nazariy

bilimlarni virtual muhitda amaliy sinab ko‘rish, murakkab muhandislik jarayonlarini vizuallashtirish va kreativ-innovatsion yondashuvlarni shakllantirish imkonini beradi. LMS (Learning Management System) platformalari va loyihaga asoslangan ta’lim (PBL) bilan uyg‘unlashgan raqamli vositalar tahliliy qobiliyatni oshirib, bo‘lajak muhandislarning texnik qaror qabul qilish tezligi va sifatini sezilarli darajada yaxshilaydi.

Texnik tafakkurni rivojlantirishning asosiy usullari:

Raqamli simulyatsiyalar va VR/AR texnologiyalari: Murakkab texnik jarayonlarni real vaqt rejimida kuzatish va xavfsiz virtual muhitda tajriba o‘tkazish talabalarda vizual-fazoviy va mantiqiy fikrlashni rivojlantiradi.

CAD/CAM/CAE tizimlari: Muhandislik loyihalash dasturlari yordamida detallarni modellashtirish, ularning mustahkamligini tekshirish va ishlab chiqarish jarayonini dasturlash texnik tafakkurning tizimli shakllanishiga xizmat qiladi.

Raqamli egizaklar (Digital Twins) texnologiyasi: Real obyektlarning raqamli modellarini tahlil qilish orqali texnik tizimlarning ishlashini bashorat qilish va optimallashtirish ko‘nikmalari shakllanadi.

Robototexnika va avtomatlashtirilgan tizimlar: Dasturlash va apparat ta’minotini integratsiya qilish talabalarda algoritmik fikrlash hamda muhandislik muammolariga kompleks yondashish qobiliyatini oshiradi.

Loyihaga asoslangan ta’lim (PBL) va raqamli platformalar: MOODLE kabi LMS tizimlaridan foydalangan holda jamoaviy loyihalarni amalga oshirish, real muhandislik keyslarini tahlil qilish texnik mas’uliyat va innovatsion izlanuvchanlikni kuchaytiradi.

Ushbu metodlar shunchaki axborot uzatish emas, balki talabani muhandislik tafakkuri (tahliliy, tizimli va kreativ fikrlash) bilan qurollantiradigan faol o‘quv muhitini yaratishga qaratilgan.

Texnik tafakkur — bu texnik obyektlar, jarayonlar va tizimlarni tushunish, tahlil qilish, modellashtirish va muammolarni yechishga qaratilgan fikrlash faoliyatidir. Oliy ta’lim tizimida texnik tafakkur talabalarni kasbiy faoliyatga tayyorlashning muhim tarkibiy qismi hisoblanadi.

Texnik tafakkur quyidagi komponentlarni o‘z ichiga oladi:

- texnik muammoni aniqlash;
- mantiqiy va algoritmik fikrlash;
- modellashtirish va simulyatsiya qilish;
- raqamli muhitda ishlash ko‘nikmalari;
- texnik qarorlar qabul qilish.

Mazkur kompetensiyalarni shakllantirishda raqamli texnologiyalarning o‘rni beqiyosdir.

Raqamli texnologiyalarning asosiy vazifasi ta’lim jarayonini samarali, moslashuvchan va interaktiv shaklda tashkil etish orqali o‘quvchilarning bilim, ko‘nikma va kompetensiyalarini rivojlantirishdan iborat. Oliy ta’lim tizimida raqamli texnologiyalar an’anaviy o‘qitish usullarini to‘ldiruvchi va takomillashtiruvchi muhim pedagogik vosita sifatida namoyon bo‘ladi.

Raqamli texnologiyalarning asosiy vazifalari quyidagilardan iborat:

o‘quv jarayonini vizuallashtirish va murakkab texnik tushunchalarni modellashtirish orqali tushunarliligini oshirish;

talabalarni mustaqil va ijodiy fikrlashga yo‘naltirish, texnik tafakkurni rivojlantirish;

ta’lim jarayonida individual va differensial yondashuvni ta’minlash;

virtual laboratoriyalar va simulyatsiya dasturlari orqali amaliy mashg‘ulotlar samaradorligini oshirish;

axborotni tezkor izlash, qayta ishlash va tahlil qilish ko‘nikmalarini shakllantirish;

ta’lim sifatini monitoring qilish va natijalarni tahlil qilish imkonini yaratish;

raqamli muhitda professional faoliyat olib borishga tayyorlash.

Shu tariqa, raqamli texnologiyalar oliy ta’lim tizimida texnik tafakkurni rivojlantirish, ta’lim sifati va samaradorligini oshirish hamda raqobatbardosh mutaxassislarni tayyorlashga xizmat qiladi.

Raqamli texnologiyalar oliy ta’lim jarayonida texnik tafakkurni rivojlantirish uchun keng imkoniyatlar yaratadi. Jumladan:

Virtual laboratoriyalar talabalarga murakkab texnik jarayonlarni xavfsiz va interaktiv tarzda o‘rganish imkonini beradi. Bu usul tajriba o‘tkazish, xatoliklarni tahlil qilish va natijalarni modellashtirish orqali texnik tafakkurni rivojlantiradi.

Simulyatsiya va modellashtirish dasturlari

MATLAB, AutoCAD, SolidWorks kabi dasturlar orqali talabalar texnik obyektlarni loyihalash va tahlil qilish ko‘nikmalarini egallaydi.

Sun’iy intellekt va adaptiv platformalar

AI asosidagi o‘quv tizimlari talabaning bilim darajasiga mos topshiriqlarni taklif etib, individual yondashuvni ta’minlaydi.

Texnik tafakkurni rivojlantirishning samarali usullari

Tadqiqot natijalariga ko‘ra, quyidagi usullar eng samarali hisoblanadi:

Muammoli o‘qitish usuli — real texnik muammolar asosida topshiriqlar berish;

Loyiha asosida ta’lim — raqamli muhitda jamoaviy loyihalar ishlab chiqish;

Blended learning — an’anaviy va raqamli ta’limni uyg‘unlashtirish;

Interaktiv simulyatsiyalar — texnik jarayonlarni vizual modellashtirish;

Raqamli portfolio — talabalarning texnik ishlanmalarini baholash.

Tadqiqotning ilmiy yangiligi

texnik tafakkurni rivojlantirishda raqamli texnologiyalarning integratsiyalashgan modeli ishlab chiqildi;

oliy ta’lim uchun texnik tafakkur rivojlanishining pedagogik mezonlari belgilandi;

raqamli vositalardan foydalanishga asoslangan samarali metodik tavsiyalar ishlab chiqildi.

Kutilayotgan natijalar:

talabalarning texnik tafakkur darajasi oshadi;

mustaqil va ijodiy fikrlash rivojlanadi;

kasbiy kompetensiyalar shakllanadi;

ta’lim jarayonining samaradorligi ortadi;

raqamli muhitda ishlash ko‘nikmalari rivojlanadi.

Xulosa

Xulosa qilib aytganda, oliy ta’lim tizimida raqamli texnologiyalar orqali texnik tafakkurni rivojlantirish zamonaviy ta’limning ustuvor yo‘nalishlaridan biridir. Raqamli vositalardan samarali foydalanish talabalarning texnik fikrlashini rivojlantirib, ularni raqobatbardosh mutaxassis sifatida tayyorlashga xizmat qiladi. Tadqiqot natijalari oliy ta’lim amaliyotiga tatbiq etish uchun muhim ilmiy-metodik asos bo‘lib xizmat qiladi.

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BA’ZI MASALALARGA VEKTORLARNING TATBIQLARI

Shodmonkulova Shaxnoza Mirvali qizi

Guliston davlat universiteti

e-mail: shodmokulovashaxnoza@gmail.com

Annotatsiya: *Ushbu maqolada vektorlarning turli masalalarni yechishda qo‘llanilishi keng yoritilgan. Xususan, vektorlar yordamida geometrik va fizik masalalarni soddalashtirish, hisoblashlarni aniq va qulay bajarish imkoniyatlari tahlil qilinadi. Vektorlarning koordinatalar usulida ifodalanishi, ular ustida amallar bajarish hamda amaliy masalalarda tatbiqi misollar orqali tushuntiriladi. Shuningdek, maqolada vektorlarning zamonaviy fan va texnikadagi o‘rni ham ko‘rsatib berilgan.*

Kalit so‘zlar*: vektor, koordinata, modul, yo‘nalish, vektorlar ustida amallar, skalyar ko‘paytma, geometriya, fizika, matematik modellashtirish, amaliy masalalar*

Annotation: *This article discusses the application of vectors in solving various problems. In particular, it analyzes how vectors help simplify geometric and physical problems and make calculations more accurate and efficient. The representation of vectors in coordinate form, operations on vectors, and their application in practical problems are explained through examples. Additionally, the article highlights the role of vectors in modern science and technology.*

Keywords: *vector, coordinate, magnitude, direction, vector operations, scalar product, geometry, physics, mathematical modeling, applied problems*

Maktab o’quvchilari vektorlar mavzusini qiyin o’zlashtirishi, vektorlarga ishonchsizlik bilan qarashlari yaxshi ma’lum. Agar murakkab masalalarga

vektorlarni tadbiq qilishni o'rgansalar, bu holat o'z–o'zidan o'tib ketadi deb o'ylaymiz. Shu maqsadda, quyidagi masalalarni vektorlar yordamida yechib ko'rsatamiz.

1-masala. Agar α, β va γ ixtiyoriy uchburchakning ichki burchaklari bo'lsa, u holda quyidagi

$$\cos\alpha+\cos\beta+\cos\gamma\le\frac{3}{2} \qquad (1)$$

tengsizlikni isbotlang.

Isbot. Tekislikda bitta nuqtadan chiquvchi $\overline{r_1}$, $\overline{r_2}$, $\overline{r_3}$ birlik vektorlarni olamiz. Ular oralaridagi burchaklar $180^\circ-\alpha$, $180^\circ-\beta$ va $180^\circ-\gamma$ bo'lsin. Ushbu $\left(\overline{r_1}+\overline{r_2}+\overline{r_3}\right)^2\ge 0$ tengsizlik o'rinli bo'lishi ayon. Bunga ko'ra

$$\overline{r_1}^2+\overline{r_2}^2+\overline{r_3}^2+2\overline{r_1}\,\overline{r_2}+2\overline{r_1}\,\overline{r_3}+2\overline{r_2}\,\overline{r_3}\ge 0,$$

$$3+2\cos\left(180^\circ-\alpha\right)+2\cos\left(180^\circ-\beta\right)+2\cos\left(180^\circ-\gamma\right)\ge 0,$$

$$3-2\left(\cos\alpha+\cos\beta+\cos\gamma\right)\ge 0.$$

Oxirgi tengsizlikdan (1) tengsizlik kelib chiqadi.

2-masala. Agar α, β va γ ixtiyoriy uchburchakning ichki burchaklari bo'lsa, u holda quyidagi

$$\sin^2\alpha+\sin^2\beta+\sin^2\gamma\le\frac{9}{4} \qquad (2)$$

tengsizlikni isbotlang.

Isbot. Tekislikda bitta nuqtadan chiquvchi $\overline{r_1}$, $\overline{r_2}$, $\overline{r_3}$ birlik vektorlarni olamiz. Ular oralaridagi burchaklar 2α, 2β va 2γ bo'lsin. U holda ushbu

$$\left(\overline{r_1}+\overline{r_2}+\overline{r_3}\right)^2\ge 0$$

tengsizlikka ko'ra

$$3+2\cos 2\alpha+2\cos 2\beta+2\cos 2\gamma\geq 0,$$

$$3+2\left(3-2\sin^2 2\alpha-2\sin^2 2\beta-2\sin^2 2\gamma\right)\geq 0.$$

Oxirgi tengsizlikdan (2) kelib chiqadi.

1-natija. Agar (2) tengsizlikka ushbu

$$\sin\alpha=\frac{a}{2R},\ \sin\beta=\frac{b}{2R}\ \text{va}\ \sin\gamma=\frac{c}{2R}$$

ifodalarni qo'ysak, u holda tengsizlik

$$a^2+b^2+c^2\leq R^2$$

hosil bo'ladi. Bu erda a, b va c lar uchburchak tomonlarining uzunliklari bo'lib, R – bu uchburchakka tashqi chizilgan aylana radiusi.

3-masala. Agar ABC uchburchakka tashqi chizilgan aylana markazi O va bu uchburchak medianalari kesishgan nuqtasi M bo'lsa, ushbu

$$\overline{OM}=\frac{1}{3}\left(\overline{OA}+\overline{OB}+\overline{OC}\right) \qquad (3)$$

tenglikni isbotlang.

Isbot. Ushbu

$$\overline{OM}=\overline{OA}+\overline{AM},\ \overline{OM}=\overline{OB}+\overline{BM},\ \overline{OM}=\overline{OC}+\overline{CM}$$

tengliklarni qo'shsak,

$$3\overline{OM}=\left(\overline{OA}+\overline{OB}+\overline{OC}\right)+\left(\overline{AM}+\overline{BM}+\overline{CM}\right)$$

kelib chiqadi. Endi, uchburchak medianalari kesishish nuqtasida $2:1$ nisbatda bo'linishini inobatga olib, ushbu $\overline{AM}+\overline{BM}+\overline{CM}$ yig'indi nolga tengligini ko'rsatamiz:

$$\overline{AM}+\overline{BM}+\overline{CM}=\frac{2}{3}\overline{AA_1}+\frac{2}{3}\overline{BB_1}+\frac{2}{3}\overline{CC_1}=$$

$$=\frac{1}{3}\left(\overline{AB}+\overline{BC}\right)+\frac{1}{3}\left(\overline{BA}+\overline{BC}\right)+\frac{1}{3}\left(\overline{CA}+\overline{CB}\right).$$

Bularga muvofiq, (3) tenglik o'rinli bo'ladi.

2-natija. Agar (3) tenglikni kvadratga ko'tarsak, ushbu

$$|OM|^2=\frac{1}{9}\left(3R^2+2R^2\left(\cos 2\alpha+\cos 2\beta+\cos 2\gamma\right)\right)=$$

$$=\frac{1}{9}\left(3R^2+2R^2\left(3-2\sin^2\alpha-2\sin^2\beta-2\sin^2\gamma\right)\right)=\frac{1}{9}\left(9R^2-\left(a^2+b^2+c^2\right)\right)$$

tenglik kelib chiqadi. Bu tenglikdan, xususan 1-natijadagi tengsizlik kelib chiqadi.

4-masala. Agar ABC uchburchakka tashqi chizilgan aylana markazi O va bu uchburchak balandliklari kesishgan nuqtasi H bo'lsa, ushbu

$$\overline{OH}=\overline{OA}+\overline{OB}+\overline{OC} \qquad (4)$$

tenglikni isbotlang.

Isbot. Ushbu $\overline{OH}=\overline{OC}+\overline{HC}$ tenglik o'rinli. Demak, $\overline{CH}=\overline{OA}+\overline{OB}$ tenglikni isbotlash kifoya. $\overline{CH}$ vektor ham, $\overline{OA}+\overline{OB}=2\overline{OK}$ vektor ham $\overline{AB}$ vektorga perpendikular bo'lgani uchun ular o'zaro parallel bo'ladi. Demak, bu vektorlar kollinear ekan $\overline{CH}=\lambda\cdot\left(\overline{OA}+\overline{OB}\right)$. Bu vektorlar bir tomonga yo'nalganligi uchun $\lambda\geq 0$ bo'ladi. λ ning qiymatini topish uchun $\overline{CH}$ va $\overline{OA}+\overline{OB}$ vektorlar uzunliklarini topamiz. Quyidagi ifodalarni topish qiyin emas

$$\left|\overline{OA}+\overline{OB}\right|^2=4R^2\cos^2\gamma,\quad \left|\overline{CH}\right|^2=4R^2\cos^2\gamma.$$

Bu yerda R orqali ABC uchburchakka tashqi chizilgan aylana radiusi va γ orqali AB tomon qarshisidagi burchak belgilangan. Demak, $\lambda = 1$ ekan, ya'ni ushbu $\overline{CH} = \overline{OA} + \overline{OB}$ tenglik o'rinli ekan.

3-natija. (3) va (4) tengliklardan ushbu $\overline{OH} = 3\overline{OM}$ muhim tenglik kelib chiqadi. Bu tenglikka asosan ixtiyoriy uchburchakda tashqi chizilgan aylana markazi O, medianalar kesishgan nuqta M va balandliklar kesishgan nuqta H bir to'g'ri chiziqda yotadi. Bu to'g'ri chiziqqa ***Eyler to'g'ri chizig'i*** deyiladi. Bundan tashqari, hamisha $|OM| : |MH| = 1:2$ nisbat o'rinli bo'ladi.

4-natija. Agar (4) tenglikni kvadratga ko'tarsak, ushbu

$$|OH|^2 = 9R^2 - \left(a^2 + b^2 + c^2\right)$$

tenglik kelib chiqadi.

5-masala. ABC uchburchakning CA va CB tomonlarida mos ravishda A_1 va B_1 nuqtalar shunday olinganki, bunda

$$\frac{|CA_1|}{|CA|} = \lambda \text{ va } \frac{|CB_1|}{|CB|} = \mu .$$

Agar AB_1 va BA_1 kesmalarning kesishish nuqtasi K bo'lsa,

$$\frac{|AK|}{|AB_1|} \text{ va } \frac{|BK|}{|BA_1|}$$

nisbatlarni toping.

Yechish. $\frac{|AK|}{|AB_1|} = x$ va $\frac{|BK|}{|BA_1|} = y$ deb belgilaymiz hamda AB vektorni ikki xil usulda topamiz. Birinchidan

$$\overline{AB} = \overline{AC} + \overline{CB} = \overline{CB} - \overline{CA}. \qquad (5)$$

Ikkinchidan

$$\begin{aligned}\overline{AB} &= \overline{AK} + \overline{KB} = \overline{AK} - \overline{BK} = x\overline{AB_1} - y\overline{BA_1} = \\ &= x\left(\overline{AC} + \overline{CB_1}\right) - y\left(\overline{BC} + \overline{CA_1}\right) = \\ &= x\left(-\overline{CA} + \mu\overline{CB}\right) - y\left(-\overline{CB} + \lambda\overline{CA}\right) = \\ &= (y + \mu x)\overline{CB} - (x + \lambda y)\overline{CA}\end{aligned} \qquad (6)$$

Agar (5) va (6) ifodalarni o'zaro tenglasak, ushbu

$$\overline{CB} - \overline{CA} = (y + \mu x)\overline{CB} - (x + \lambda y)\overline{CA},$$

$$(y + \mu x - 1)\overline{CB} = (x + \lambda y - 1)\overline{CA} \qquad (7)$$

tenglik kelib chiqadi. $\overline{CA}$ va $\overline{CB}$ vektorlar kollinear bo'lmaganligi uchun (7) tenglik faqat

$$y + \mu x - 1 = 0 \quad \text{va} \quad x + \lambda y - 1 = 0$$

bo'lgandagina bajariladi.

Bunga ko'ra

$$x = \frac{1-\lambda}{1-\lambda\mu} \quad \text{va} \quad y = \frac{1-\mu}{1-\lambda\mu}.$$

Izoh. 5-masalada to'rtta nisbatdan ikkitasini berib, qolgan ikkitasini topishni talab qilsak, yangi masala kelib chiqadi. Aslida bu masalalarning echimi ham 5-masala echimida mujassamlashgan.

6-masala. Agar ABC uchburchakka tashqi chizilgan aylana markazi O va ichki chizilgan aylana markazi J nuqtada bo'lsa, u holda ushbu

$$|OJ|^2 = R^2 - 2Rr$$

Eyler formulasi o'rinli bo'lishini isbotlang. Bu erda R va r orqali mos ravishda ABC uchburchakka tashqi va ichki chizilgan aylanalar radiuslari belgilangan.

Isbot. Ushbu

$$\overline{CB}=\bar{a},\ \overline{CA}=\bar{b},\ |CB|=a,\ |CA|=b,\ |AB|=c$$

belgilashlarni kiritib olamiz. $\overline{CJ}$ vektor ham, $b\bar{a}+a\bar{b}$ vektor ham ACB burchak biscektrissasi bo'yicha yo'nalganligi uchun ular o'zaro kollinear, ya'ni

$$\overline{CJ}=\lambda\left(b\bar{a}+a\bar{b}\right)$$

bo'ladi. Bunga ko'ra

$$\overline{AJ}=\overline{AC}+\overline{CJ}=\lambda b\bar{a}+(\lambda a-1)\bar{b}.$$

Ikkinchi tomondan $\overline{AJ}$ vektor ham, $c\cdot\overline{AC}+b\cdot\overline{AB}$ vektor ham BAC burchak biscektrissasi bo'yicha yo'nalganligi uchun ular o'zaro kollinear, ya'ni

$$\overline{AJ}=\mu\cdot\left(c\cdot\overline{AC}+b\cdot\overline{AB}\right)=\mu b\bar{a}-(\mu b+\mu c)\bar{b}$$

bo'ladi. $\overline{AJ}$ uchun olingan ikkita tenglikni bir biridan ayirsak, ushbu

$$(\mu-\lambda)b\bar{a}+(\lambda a+\mu b+\mu c-1)\bar{b}=0$$

tenglik hosil bo'ladi. Bu erda $\bar{a}$ va $\bar{b}$ vektorlar kollinear emasligini hisobga olsak,

$$\mu=\lambda \text{ va } \lambda a+\mu b+\mu c=1$$

tengliklarni olamiz. Bundan ushbu

$$\overline{CJ}=\frac{1}{a+b+c}\left(b\bar{a}+a\bar{b}\right)$$

tenglik kelib chiqadi.

Agar A_1 orqali CB tomonning o'rtasini va B_1 orqali CA tomonning o'rtasini belgilasak, u holda

$$\overline{CO}+\overline{OA_1}=\frac{1}{2}\bar{a} \text{ va } \overline{CO}+\overline{OB_1}=\frac{1}{2}\bar{b}$$

tengliklarni mos ravishda $\bar{a}$ va $\bar{b}$ vektorlarga skalyar ko'paytirib, ushbu

$$\overline{CO}\cdot\bar{a}=\frac{1}{2}a^2 \quad \text{va} \quad \overline{CO}\cdot\bar{b}=\frac{1}{2}b^2 \qquad (8)$$

tengliklarni olamiz.

Endi ushbu

$$\overline{OJ}=\overline{CJ}-\overline{CO}=\frac{1}{a+b+c}\left(b\bar{a}+a\bar{b}\right)=\overline{CO}$$

tenglikning kvadratini (8) formulalardan foydalanib hisoblaymiz:

$$\overline{OJ}^2=\frac{1}{(a+b+c)^2}\left(b\bar{a}+a\bar{b}\right)^2-\frac{2}{a+b+c}\left(b\bar{a}+a\bar{b}\right)\cdot\overline{CO}+R^2=$$

$$=\frac{2a^2b^2(1+\cos\gamma)}{(a+b+c)^2}-\frac{ab(a+b)}{a+b+c}+R^2.$$

Bu yerda ushbu

$$1+\cos\gamma=1+\frac{a^2+b^2-c^2}{2ab}=\frac{(a+b+c)(a+b-c)}{2ab}$$

tenglikdan foydalansak,

$$\overline{OJ}^2=R^2-\frac{abc}{a+b+c}=R^2-2\cdot\frac{abc}{4S}\cdot\frac{2S}{a+b+c}=R^2-2Rr$$

Eyler formulasi kelib chiqadi.

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BOLALARNI IJODIY FAOLIYATGA O‘RGATISHDA ATROF OLAM VA HAYVONOT DUNYOSINING AHAMIYATI

Tajiyazova Go‘zalxon Egamberganovna
Urganch Ranch texnologiya universiteti
E-mail: gozalxon432@gmail.com

Annotatsiya. *Mazkur maqolada maktabgacha yoshdagi bolalarni ijodiy faoliyatga o‘rgatishda hayvonot dunyosidan foydalanishning pedagogik-psixologik asoslari chuqur tahlil qilinadi. Tadqiqotda maktabgacha yosh davrining rivojlanish xususiyatlari, bolalarda tasavvur, fantaziya va obrazli tafakkurni shakllantirish mexanizmlari yoritilgan. Hayvonlar obrazi orqali tashkil etilgan integrativ mashg‘ulotlarning samaradorligi tajriba-sinov ishlari asosida asoslab berilgan. Olingan natijalar hayvonot dunyosidan foydalanish bolalarning ijodiy faolligi, nutqiy rivojlanishi va ijtimoiy-emotsional kompetensiyalarini shakllantirishda muhim omil ekanligini ko‘rsatdi.*

Kalit so‘zlar. *maktabgacha ta’lim, ijodiy faoliyat, hayvonot dunyosi, tasavvur, fantaziya, estetik tarbiya, integrativ yondashuv, pedagogik texnologiya.*

Аннотация. *В статье рассматриваются педагогические и психологические основы использования мира животных в развитии творческой деятельности детей дошкольного возраста. Анализируются особенности воображения и образного мышления детей, а также*

эффективность интегрированных занятий. Результаты исследования подтверждают положительное влияние тематических занятий о животных на развитие речи, эмоциональной сферы и креативности детей.

Ключевые слова: *дошкольное образование, творческая деятельность, мир животных, воображение, фантазия, эстетическое воспитание, интегративный подход, педагогическая технология.*

Abstract*. The article analyzes pedagogical and psychological foundations of using the animal world in developing creative activity of preschool children. It highlights imagination development, figurative thinking and integrated educational activities. The research results confirm that animal-based activities positively influence children's creativity, speech and socio-emotional development.*

Keywords: *preschool education, creative activity, animal world, imagination, fantasy, aesthetic education, integrative approach, pedagogical technology.*

Mazkur masala yuzasidan qo‘shimcha tahlillar shuni ko‘rsatadiki, ijodiy faoliyatning samaradorligi pedagog tomonidan qo‘llaniladigan metod va vositalarga bevosita bog‘liqdir. Hayvonot dunyosi asosidagi mashg‘ulotlar bolalarning qiziqishini oshiradi, ularni faol ishtirok etishga undaydi hamda mustaqil fikrlashga yo‘naltiradi. Amaliy kuzatishlar jarayonida bolalarning ijodiy topshiriqlarni bajarish jarayonida tashabbus ko‘rsatishi va o‘z g‘oyalarini erkin ifoda etishi kuzatildi. Ushbu natijalar maktabgacha ta’lim tizimida integrativ va innovatsion yondashuvlarni keng qo‘llash zarurligini tasdiqlaydi.

Kirish

Shaxsni har tomonlama barkamol qilib tarbiyalash, bugungi kunning dolzarb masalalaridan biridir. Yosh avlodni komillikka yetaklash yo‘llari, qonun-qoidalari olimlar, tadqiqotchilar tomonidan muttasil o’rganib, takomillashtirib kelinmoqda.Bilamizki, har bir mamlakatning iqtisodiy qudrati, ijtimoiy-ma’naviy hayot darajasining yuksalishi ta’lim tizimining raqobatbardoshligi, ilm-fan taraqqiyoti bilan belgilanadi. Mamlakatimizda zamonaviy ta’lim sohasini yanada rivojlantirish maqsadida bir qator islohotlar olib borilmoqda. Ta’lim sifatini yanada oshirish, immuniteti mustahkam, intellektual yuksak kasbiy salohiyatli,

ma’nan, jismonan yetuk, barkamol shaxsni shakllantirish, jamiyat ravnaqi uchun malakali kadrlarni tayyorlash, raqobatbardoshlikni oshirish, bugungi davr talabiga javob bera oladigan innovatsion ta’lim tizimni yaratish bugunning maqsadida aylandi. Shu jumladan maktabgacha ta’lim shaxs rivojlanishining muhim bosqichi hisoblanadi. Aynan ushbu davrda bola dunyoni emotsional-obrazli qabul qiladi, tasavvur va fantaziyasi faol shakllanadi. Zamonaviy pedagogikada ijodiy faoliyatni erta yoshdan rivojlantirish dolzarb vazifa sifatida qaralmoqda.

Yurtboshimiz Sh.Mirziyoyev maktabgacha ta’lim tizimi haqida quyidagi fikrlarni bejizga bildirmagan edilar: “Aslida, farzandlarimiz tarbiyasida eng asosiy bo‘g‘in hisoblangan maktabgacha ta’lim tizimining jamiyatimiz hayotidagi o‘rni va ahamiyatini hech narsa bilan o‘lchab bo‘lmaydi. Aynan maktabgacha ta’lim sohasiga bo‘lgan e’tibor mamlakatning ertangi taraqqiyoti uchun mustahkam zamin yaratadi” deya ta`kidlagan edi. O‘zbekiston Respublikasi Prezidentining 2019-yil 8-oktabrdagi “Maktabgacha ta‘lim tizimini yana-da takomillashtirish chora-tadbirlari to‘g’risida”gi PQ-4457-son qarorida ham maktabgacha yoshdagi bolalarda ijodiy fikrlash, erkin ifoda va estetik didni shakllantirish muhim vazifalardan biri sifatida belgilab o`tilgan. Bu esa, ijodiy faoliyatni tashkil etishda yangi, samarali pedagogik texnologiyalar va interaktiv metodlardan foydalanishni talab etadi. Bolaning ijodiy qobiliyatlarini qo‘llab-quvvatlash kelgusida uning mustaqil fikrlashi, muammoli vaziyatlarga innovatsion yondashuvi va ijtimoiy moslashuviga xizmat qiladi. Mazkur masala yuzasidan qo‘shimcha tahlillar shuni ko‘rsatadiki, ijodiy faoliyatning samaradorligi pedagog tomonidan qo‘llaniladigan metod va vositalarga bevosita bog‘liqdir. Hayvonot dunyosi asosidagi mashg‘ulotlar bolalarning qiziqishini oshiradi, ularni faol ishtirok etishga undaydi hamda mustaqil fikrlashga yo‘naltiradi. Amaliy kuzatishlar jarayonida bolalarning ijodiy topshiriqlarni bajarish jarayonida tashabbus ko‘rsatishi va o‘z g‘oyalarini erkin ifoda etishi kuzatildi. Ushbu natijalar maktabgacha ta’lim tizimida integrativ va innovatsion yondashuvlarni keng qo‘llash zarurligini tasdiqlaydi.

Mavzuning dolzarbligi. Bugungi kunda ekologik madaniyatni shakllantirish, tabiatga ongli munosabatni rivojlantirish va bolalarda mehr-shafqat tuyg‘usini tarbiyalash dolzarb masalalardan biridir. Hayvonot dunyosi bolalar uchun yaqin va tushunarli obyekt bo‘lib, u orqali nafaqat ijodiy faoliyat, balki axloqiy va estetik tarbiya ham amalga oshiriladi.

Nazariy asoslar. Psixologik tadqiqotlar maktabgacha yoshdagi bolalarda simvolik o‘yin va obrazli tafakkur ustuvor ekanligini ko‘rsatadi. Bola real hayotdagi obyektlarni o‘z tasavvuri orqali qayta yaratadi. Hayvonlar obrazi esa bolalar uchun qiziqarli, harakatli va emotsional boy obraz hisoblanadi. Shu sababli ular ijodiy mashg‘ulotlar uchun samarali pedagogik vosita bo‘lib xizmat qilad.

Asosiy qism. Hayvonot dunyosidan foydalanish rasm chizish, plastilin bilan ishlash, dramatizatsiya, ertak to‘qish, rolli o‘yinlar kabi faoliyat turlarida amalga oshiriladi. Masalan, “Sevimli hayvonim” mavzusida rasm chizish bolalarda kuzatuvchanlikni rivojlantiradi. “Hayvonlar teatrchasi” sahnalashtirish mashg‘ulotlari esa nutqiy faollikni oshiradi. Tajriba-sinov ishlari davomida 5-6 yoshli bolalar bilan integrativ mashg‘ulotlar tashkil etildi. Mashg‘ulotlar natijasida bolalarda mustaqil fikrlash, tasviriy ifoda va jamoada ishlash ko‘nikmalari rivojlandi. Shuningdek, empatiya va tabiatga mehr hissi kuchaydi.

Metodik tavsiyalar

1.Mashg‘ulotlarda real suratlar va videomateriallardan foydalanish.

2.Milliy ertak va rivoyatlarni qo‘llash.

3.STEAM elementlarini integratsiya qilish.

4.Ekologik tarbiya bilan uyg‘unlashtirish.

5. Bolalarning individual qiziqishlarini hisobga olish.

Xulosa

Tadqiqot natijalari maktabgacha yoshdagi bolalarni ijodiy faoliyatga o‘rgatishda hayvonot dunyosidan foydalanish samarali metod ekanligini ko‘rsatdi. Ushbu yondashuv bolalarning tasavvurini boyitadi, nutqini rivojlantiradi, estetik didini shakllantiradi hamda ekologik ongini mustahkamlaydi. Kelgusida raqamli texnologiyalar asosida hayvonot mavzusini boyitish istiqbolli yo‘nalish hisoblanadi.

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BO‘LAJAK O‘QITUVCHILARDA GERMENEVTIK KOMPETENTLIKNI SHAKLLANTIRISHNING PEDAGOGIK SHART-SHAROITLARI

Tosheva Maftuna O‘tkirovna

Buxoro davlat universiteti

Annotasiya: *Ushbu maqolada germenevtika — matn va ma'no talqini haqidagi ta'limotning ta'lim jarayoniga tatbiq etilishi, uning tarixiy ildizlari, evolyutsion bosqichlari va zamonaviy pedagogik amaliyotdagi o'rni falsafiy-pedagogik nuqtai nazardan tadqiq etilgan. buyuk mutafakkirlarning germenevtik konsepsiyalari ta'lim falsafasi bilan uyg'un tarzda tahlil qilinib, tushunish, talqin va dialog kabi asosiy tushunchalarning zamonaviy ta'lim modellariga ta'siri ko'rsatib berilgan. Maqolada ta’lim jarayoniga yondashuv bilim, ko‘nikma va malakalar majmuasini shakllantirishga qaratilganligi ko‘rsatilgan. Germenevtik yondashuv pedagog ongida qaysidir bir yo‘nalishdagi faoliyatning umumlashgan loyihasi*

tarzida namoyon bo‘lishi hamda O'zbekiston ta'lim tizimini modernizatsiya qilish sharoitida germenevtik pedagogikaning amaliy imkoniyatlari ham muhokama qilingan.

Kalit so‘zlar: *kompetentlik, germenevtik kompetentlik, bilim, faoliyat, malaka, qobiliyat,ta'lim falsafasi, pedagogik talqin, tushunish, zamonaviy ta'lim, ma'no yaratish.*

Аннотация: *В данной статье рассматривается применение герменевтики — доктрины толкования текста и смысла — к образовательному процессу, её исторические корни, этапы эволюции и место в современной педагогической практике с философско-педагогической точки зрения. Анализируются герменевтические концепции великих мыслителей в контексте философии образования, показано влияние таких базовых понятий, как понимание, толкование и диалог, на современные образовательные модели. В статье показано, что подход к образовательному процессу направлен на формирование комплекса знаний, навыков и компетенций. Рассматривается также проявление герменевтического подхода в педагогическом сознании как обобщённого проекта деятельности в определённом направлении и практические возможности герменевтической педагогики в условиях модернизации системы образования Узбекистана.*

Ключевые слова: *компетенция, герменевтическая компетенция, знание, деятельность, компетенция, способность, философия образования, педагогическое толкование, понимание, современное образование, создание смысла.*

Abstract: *This article examines the application of hermeneutics - the doctrine of the interpretation of text and meaning - to the educational process, its historical roots, evolutionary stages and its place in modern pedagogical practice from a philosophical and pedagogical point of view. The hermeneutic concepts of great thinkers are analyzed in harmony with the philosophy of education, and the influence of such basic concepts as understanding, interpretation and dialogue on modern educational models is shown. The article shows that the approach to the educational*

process is aimed at forming a complex of knowledge, skills and competencies. The manifestation of the hermeneutic approach in the pedagogical consciousness as a generalized project of activity in a certain direction, and the practical possibilities of hermeneutic pedagogy in the conditions of modernization of the education system of Uzbekistan are also discussed.

Keywords: *competence, hermeneutic competence, knowledge, activity, competence, ability, philosophy of education, pedagogical interpretation, understanding, modern education, meaning creation.*

Kirish. Kompetensiya (lot. Competentis- layoqatli) deganda, kompetentsiyaga ega bo‘lish, ya’ni biror narsani hukm qilish imkonini beradigan bilim, tajriba yoki muayyan masalalarni hal qilishda vakolatlarga ega bo‘lish tushuniladi.”Ta'lim jarayonini chuqurroq tushunish va yangilash bo'yicha global miqyosdagi izlanishlar bugungi kunda insonparvar, muloqotga asoslangan va ma'no yaratuvchi pedagogika modellariga bo'lgan ehtiyojni keskin ko'rsatib berayotir. XX asrning ikkinchi yarmidan boshlab falsafiy germenevtika — matn, hodisa va insoniy tajribani talqin qilish haqidagi ta'limot — ta'lim nazariyasida mustaqil metodologik yo'nalish sifatida tan olinmoqda. Germenevtik pedagogika an'anaviy didaktikaning bilim uzatish modeliga muqobil sifatida o'quvchi va o'qituvchi o'rtasidagi tushunish jarayonini markazga qo'yadi. Germenevtika matn va madaniy hodisalarni tushunish va talqin qilish nazariyasi sifatida gumanitar fanlar tizimida muhim o‘rin egallaydi. Zamonaviy ta’lim jarayonida germenevtik yondashuv o‘quvchilarning interpretatsion fikrlashini rivojlantirishga xizmat qiladi.

Shu bilan birga, germenevtik kompetentlik pedagogning muhim kasbiy sifatlaridan biri bo‘lib, u matnni chuqur tahlil qilish, ma’nolarni talqin qilish va pedagogik jarayonda samarali qo‘llash imkonini beradi. Pedagogik jarayonda germenevtik yondashuv o‘quvchilarning mustaqil fikrlashini, tanqidiy tahlil qilish ko‘nikmalarini va interpretatsion qobiliyatlarini rivojlantirishga xizmat qiladi.Shu sababli ko‘plab zamonaviy tadqiqotlarda ta’lim jarayonida matn bilan ishlash, muloqot asosidagi o‘qitish va interpretatsion faoliyatni rivojlantirish muhim pedagogik omil sifatida ko‘rib chiqilmoqda.

Asosiy qism. Zamonaviy ta’lim tizimida shaxsning kompetensiyalarini rivojlantirish muhim vazifalardan biri hisoblanadi. Ta’lim jarayonida o‘quvchilarning yoki bo‘lajak mutaxassislarning bilimlarni chuqur anglash, tahlil qilish va talqin qilish qobiliyatlarini rivojlantirish germenevtik kompetentlikni shakllantirish bilan bevosita bog‘liqdir.Germenevtik kompetentlikni rivojlantirish jarayonini samarali tashkil etish uchun pedagogik model ishlab chiqish zarur hisoblanadi. Model pedagogik jarayonning asosiy elementlarini, ularning o‘zaro bog‘liqligini hamda ta’lim jarayonining bosqichlarini ifodalaydi.

Pedagogik model quyidagi tarkibiy qismlardan iborat bo‘lishi mumkin:

1.Maqsadli komponent. Bu komponent germenevtik kompetentlikni rivojlantirishning umumiy maqsadi va vazifalarini o‘z ichiga oladi. Asosiy maqsad – ta’lim jarayonida shaxsning matnni tushunish, tahlil qilish va talqin qilish qobiliyatini rivojlantirishdan iborat.

2.Mazmuniy komponent. Mazkur komponent ta’lim jarayonida o‘rganiladigan bilimlar, tushunchalar va nazariy asoslarni qamrab oladi. Germenevtik kompetentlikni rivojlantirishda matn tahlili, interpretatsiya, kontekstual tahlil va refleksiya kabi elementlar muhim o‘rin tutadi.

3.Jarayonli komponent. Jarayonli komponent ta’lim jarayonida qo‘llaniladigan metodlar, usullar va texnologiyalarni o‘z ichiga oladi. Bu jarayonda interaktiv metodlar, muammoli o‘qitish, dialogik muloqot va loyiha faoliyati muhim rol o‘ynaydi.

4.Natijaviy komponent. Ushbu komponent germenevtik kompetentlikning shakllanish darajasini baholash bilan bog‘liq bo‘lib, o‘quvchilarning interpretatsion fikrlash, tahlil qilish va mustaqil xulosa chiqarish qobiliyatlari orqali namoyon bo‘ladi.Pedagogik modelni ishlab chiqishda germenevtika nazariyasining asosiy tamoyillariga tayanish zarur. Bu borada Hans-Georg Gadamer ning ilmiy qarashlari alohida ahamiyatga ega bo‘lib, u tushunish jarayonini dialog va tajriba asosida yuzaga keladigan jarayon sifatida izohlaydi.

Ta’lim jarayonida germenevtik kompetentlikni shakllantirish uchun turli pedagogik metodlardan foydalanish mumkin. Ushbu metodlar o‘quvchilarning tahliliy va interpretatsion fikrlash qobiliyatlarini rivojlantirishga xizmat qiladi.

1.Interpretatsion tahlil metodi- matn mazmunini chuqur o‘rganish va undagi asosiy g‘oyalarni aniqlashga qaratilgan metod hisoblanadi. Bu metod yordamida o‘quvchilar matnning mazmuniy qatlamlarini tahlil qilishni o‘rganadilar.Interpretatsion tahlil jarayonida quyidagi bosqichlar amalga oshiriladi:-matn bilan tanishish-asosiy g‘oyani aniqlash-muallif pozitsiyasini tahlil qilish-matnning ijtimoiy va madaniy kontekstini aniqlash-yakuniy talqin qilish

2.Dialogik o‘qitish metodi-dialogik o‘qitish ta’lim jarayonida muloqot orqali bilimlarni shakllantirishga qaratilgan metod hisoblanadi. Bu metod o‘quvchilarni faol fikrlashga undaydi va turli nuqtai nazarlarni solishtirish imkonini yaratadi.Dialogik o‘qitish jarayonida o‘quvchilar:-o‘z fikrlarini erkin ifoda etadilar-boshqa fikrlarni tahlil qiladilar-muammoli vaziyatlarga yechim topadilar.

3.Muammoli o‘qitish metodi-muammoli o‘qitish o‘quvchilarning mustaqil fikrlashini rivojlantirishga qaratilgan metod hisoblanadi. Bu metodda o‘quvchilarga muammoli vaziyatlar taqdim etilib, ular mustaqil ravishda yechim topishga harakat qiladilar.Mazkur metod o‘quvchilarning tahliliy fikrlashini rivojlantiradi va interpretatsion qobiliyatlarini kuchaytiradi.

4.Refleksiv tahlil metodi-refleksiya o‘quvchilarning o‘z faoliyatini tahlil qilish va baholash jarayonidir. Refleksiv tahlil orqali o‘quvchilar o‘z bilimlarini qayta ko‘rib chiqadilar va yangi xulosalar chiqaradilar. Germenevtik kompetentlikni rivojlantirishda zamonaviy ta’lim texnologiyalaridan foydalanish muhim ahamiyatga ega. Ta’lim texnologiyalari o‘quv jarayonini samarali tashkil etishga yordam beradi.

Zamonaviy pedagogik texnologiyalar quyidagi imkoniyatlarni yaratadi:interaktiv o‘qitish;mustaqil ta’lim faoliyatini rivojlantirish;tanqidiy fikrlashni shakllantirish;ijodiy yondashuvni rivojlantirish.Ta’lim jarayonida **case-study**, loyiha metodi va muhokama metodlari keng qo‘llanilishi mumkin. Ushbu metodlar o‘quvchilarning interpretatsion faoliyatini rivojlantirishga yordam beradi.

Germenevtik kompetentlikni samarali rivojlantirish uchun ma’lum pedagogik shart-sharoitlarni yaratish zarur. Ushbu shartlar ta’lim jarayonining samaradorligini oshirishga xizmat qiladi.Birinchi shart – ta’lim muhitini to‘g‘ri tashkil etish. Ta’lim muhitida erkin fikr almashish va muloqot imkoniyati bo‘lishi zarur.Ikkinchi shart – interpretatsion faoliyatni rivojlantirish. O‘quvchilar matnni tahlil qilish va talqin qilish jarayonida faol ishtirok etishlari kerak.Uchinchi shart – mustaqil fikrlashni shakllantirish. O‘quvchilarning tanqidiy va ijodiy fikrlash qobiliyatlarini rivojlantirish germenevtik kompetentlikni shakllantirishda muhim omil hisoblanadi.To‘rtinchi shart – refleksiv faoliyatni rivojlantirish. Refleksiya o‘quvchilarning o‘z bilimlarini tahlil qilish va baholash imkonini beradi. Germenevtik kompetentlikni shakllantirish jarayoni murakkab pedagogik jarayon bo‘lib, u maxsus metodlar, texnologiyalar va pedagogik shart-sharoitlarni talab qiladi. Ta’lim jarayonida interpretatsion tahlil, dialogik o‘qitish, muammoli o‘qitish va refleksiv tahlil metodlaridan foydalanish o‘quvchilarning germenevtik kompetentligini rivojlantirishga yordam beradi.Shuningdek, ta’lim muhitini to‘g‘ri tashkil etish, mustaqil fikrlashni rivojlantirish va refleksiv faoliyatni qo‘llab-quvvatlash germenevtik kompetentlikni samarali shakllantirishning muhim shartlari hisoblanadi.

Zamonaviy pedagogik texnologiyalar germenevtik kompetentlikni rivojlantirish jarayonining samaradorligini oshiradi. Bu jarayonda quyidagi texnologiyalar keng qo‘llanilishi mumkin:

-interaktiv metodlar

-case-study texnologiyasi

-loyiha metodi

-muhokama va debat metodlari

Modelning yakuniy bosqichi germenevtik kompetentlikning shakllanish darajasini aniqlash bilan bog‘liq. Bu darajalar quyidagicha bo‘lishi mumkin:

past daraja – matnni yuzaki tushunish

-o‘rta daraja – matnni tahlil qilish va qisman talqin qilish

-yuqori daraja – matnni chuqur tahlil qilish va mustaqil interpretatsiya qilish.

Ta’lim jarayonida germenevtik kompetentlikni rivojlantirish samaradorligini aniqlash uchun uning shakllanish darajasini baholash muhim hisoblanadi. Baholash jarayonida o‘quvchilarning matnni tushunish, tahlil qilish va talqin qilish qobiliyatlari aniqlanadi.Germenevtik kompetentlikni rivojlantirish jarayoni maxsus metodika asosida tashkil etilganda samarali natijalarga erishish mumkin. Tajriba-sinov ishlari natijalari shuni ko‘rsatadiki, interpretatsion tahlil, dialogik o‘qitish va muammoli o‘qitish metodlaridan foydalanish o‘quvchilarning germenevtik kompetentligini rivojlantirishga ijobiy ta’sir ko‘rsatadi.

Xulosa. Mazkur tadqiqot ta'lim jarayonida germenevtik yondashuvning Schleiermacherdagi filologik talqin san'atidan to Gadamerning ontologik gorizontlar qo'shilishigacha, Ricoeurning narrativ germenevtikasidan to zamonaviy raqamli va dialogik pedagogika modellarigacha bo'lgan evolyutsiyasini ko'rsatib berdi. Bu tarixiy tahlil germenevtik tafakkurning ta'lim falsafasiga beradigan hissasining beqiyos ekanligini tasdiqladi.

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MAKTABGACHA YOSHDAGI BOLALARDA IJTIMOIY MUNOSABATLAR VA HISSIY RIVOJLANISHNI O‘YIN FAOLIYATI ORQALI SHAKLLANTIRISH

Turayeva Maftuna Azim qizi

Sharof Rashidov nomidagi Samarqand davlat universiteti Urgut tuman filiali

maftunturayeva998@gmail.com

Annotatsiya: *Mazkur maqolada maktabgacha yoshdagi bolalarda ijtimoiy munosabatlar va hissiy rivojlanishni shakllantirish masalalari yoritilgan. O‘yin faoliyati orqali bolalarda mehr-oqibat, hamkorlik, o‘zaro hurmat, ijobiy his-*

tuyg‘ularni rivojlantirish yo‘llari tahlil qilingan. Shuningdek, bolalarning o‘zini anglash, o‘ziga baho berish va ijtimoiy moslashuv ko‘nikmalarini shakllantirishda didaktik o‘yinlarning ahamiyati asoslab berilgan.

Kalit so‘zlar: *maktabgacha ta’lim, ijtimoiy munosabatlar, hissiy rivojlanish, o‘yin faoliyati, ijtimoiy kompetensiya, o‘zini anglash, tarbiyachi, bolalar psixologiyasi*

Abstrack: *his article discusses the issues of forming social relationships and emotional development in preschool children. The ways of developing kindness, cooperation, mutual respect, and positive emotions in children through game activities are analyzed. The importance of didactic games in the formation of children's self-awareness, self-esteem, and social adaptation skills is also substantiated.*

Keywords: *preschool education, social relationships, emotional development, game activities, social competence, self-awareness, educator, child psychology*

Kirish: Bugungi kunda zamonaviy rivojlangan mamlakatlarda yosh avlodni har tomonlama barkamol etib tarbiyalash, ayniqsa, ularning ijtimoiy va hissiy rivojlanishiga alohida e’tibor qaratilmoqda. Bu borada O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev ta’kidlaganidek: “Yoshlarimizni mustaqil fikrlaydigan, yuksak ma’naviyatli, keng dunyoqarashga ega insonlar etib tarbiyalash – eng ustuvor vazifamizdir.” Ushbu fikr maktabgacha ta’lim tizimida olib borilayotgan ishlarning mazmun-mohiyatini belgilab beradi.

Maktabgacha yosh davri bolaning shaxs sifatida shakllanishida eng muhim bosqich hisoblanadi. Aynan shu davrda bolalarda ijtimoiy munosabatlar, muloqot madaniyati, o‘zaro hurmat va hamkorlik ko‘nikmalari shakllana boshlaydi. Shu bilan birga, bola o‘z his-tuyg‘ularini anglash, ularni ifodalash va boshqarishni o‘rganadi. Bu esa uning keyingi hayotidagi muvaffaqiyatlari uchun mustahkam poydevor yaratadi.

Prezidentimiz yana bir nutqlarida shuni aytadilarki: “Maktabgacha ta’lim tizimi – uzluksiz ta’limning eng muhim bo‘g‘ini bo‘lib, aynan shu bosqichda

farzandlarimizning tafakkuri, dunyoqarashi va ijtimoiy fazilatlari shakllanadi.” Shu sababli maktabgacha ta’lim tashkilotlarida tarbiyachilar zimmasiga katta mas’uliyat yuklatilgan. Ular bolalarda nafaqat bilim, balki ijtimoiy va hissiy kompetensiyalarni ham rivojlantirishi zarur.

Zamonaviy pedagogik yondashuvlarga ko‘ra, bolalarda ijtimoiy munosabatlar va hissiy rivojlanishni shakllantirishda o‘yin faoliyati muhim o‘rin tutadi. O‘yin orqali bola atrof-muhitni anglaydi, tengdoshlari bilan muloqot qiladi, turli vaziyatlarni boshdan kechiradi va ijtimoiy tajriba orttiradi. Shu bois o‘yinlar maktabgacha ta’lim jarayonining ajralmas qismi sifatida qaraladi.

Asosiy qism: Maktabgacha ta’lim jarayonida tarbiyachining asosiy vazifalaridan biri — bolalarda ijtimoiy munosabatlarni shakllantirish, ularning ijobiy his-tuyg‘ularini rivojlantirish hamda guruh ichida samimiy va do‘stona muhitni yaratishdan iboratdir. Chunki aynan shu davrda bola atrofdagilar bilan muloqot qilishni, o‘z his-tuyg‘ularini ifodalashni va boshqalarni tushunishni o‘rganadi. Shu sababli tarbiyachi mashg‘ulotlar davomida bolalarda mehribonlik, hamdardlik, do‘stining muvaffaqiyatidan quvonish va o‘zaro yordam kabi ijtimoiy fazilatlarni shakllantirishga alohida e’tibor qaratishi lozim.

Takomillashtirilgan “Ilk qadam” davlat o‘quv dasturiga muvofiq, maktabgacha ta’limning tayyorlov bosqichida, ya’ni 6–7 yoshli bolalarda shakllanishi zarur bo‘lgan asosiy tayanch kompetensiyalar aniq belgilab berilgan. Ushbu kompetensiyalar to‘rt yo‘nalishni o‘z ichiga oladi: kommunikativ, ijtimoiy, shaxsiy (ya’ni “Men” konsepsiyasini shakllantirish) hamda bilish kompetensiyalari. Har bir yo‘nalish bola shaxsining har tomonlama rivojlanishida muhim ahamiyat kasb etadi.

Kommunikativ kompetensiya orqali bola o‘z fikrini erkin ifodalash, tengdoshlari va kattalar bilan samarali muloqot qilish, nutq madaniyatiga rioya etishni o‘rganadi. Ijtimoiy kompetensiya esa jamoada o‘zini tutish, boshqalar bilan hamkorlik qilish, ijtimoiy qoidalarga amal qilish kabi ko‘nikmalarni rivojlantiradi. Shaxsiy kompetensiya doirasida bolaning o‘ziga baho berishi, o‘z imkoniyatlarini anglash, mustaqil qaror qabul qilish qobiliyatlari shakllanadi. Bilish kompetensiyasi

esa atrof-muhitni o‘rganish, tafakkurni rivojlantirish, yangi bilimlarni egallashga bo‘lgan qiziqishni oshirishga xizmat qiladi.

Mazkur tayanch kompetensiyalarning yetarli darajada rivojlangan bo‘lishi bolaning keyingi ta’lim bosqichlariga muvaffaqiyatli moslashuvi uchun mustahkam poydevor yaratadi. Bolalarning hissiy rivojlanishida o‘yin faoliyati yetakchi o‘rin tutadi. O‘yin orqali bola nafaqat bilim oladi, balki o‘zini anglaydi, his-tuyg‘ularini boshqarishni o‘rganadi va ijtimoiy tajriba orttiradi. Shu bois tarbiyachi turli didaktik va rolli o‘yinlardan unumli foydalanishi zarur. Masalan, “Rassom”, “Agar shunday bo‘lsa, nima bo‘lar edi?”, “Kayfiyatni aniqla” kabi o‘yinlar bolalarda turli hissiyotlarni anglash va ifodalash ko‘nikmalarini rivojlantiradi.

Xususan, “Rassom” o‘yini bolalarning hissiy tasavvurlarini kengaytirishga xizmat qiladi. Ushbu o‘yinda bolalarga turli hissiy holatlarni aks ettiruvchi rasmlar taqdim etiladi. Ular tanlagan hissiyot asosida voqeani tasvirlaydi va keyinchalik o‘z ishlari haqida fikr bildiradi. Bunday faoliyat bolalarda ijodkorlikni rivojlantirish bilan birga, nutqni to‘g‘ri shakllantirish va hissiy tafakkurni boyitishga yordam beradi.

Bola shaxs sifatida shakllanish jarayonida uning keng dunyoqarashga ega bo‘lishi muhim omil hisoblanadi. Har bir inson turli ijtimoiy muhitda yashaganligi sababli uning fikrlash doirasi ham turlicha bo‘ladi. Ayniqsa, tayyorlov guruhi yoshidagi bolalarda ijtimoiy muhitga moslashish jarayoni faollashadi. Ular dastlab tengdoshlari bilan aloqa o‘rnatishda qiyinchilikka duch kelishi mumkin, biroq vaqt o‘tishi bilan o‘ziga yaqin do‘st topib, birgalikda faoliyat olib borishga o‘rganadi.[1]

6–7 yoshdagi bolalar uchun muloqotchanlik va ijtimoiy moslashuv muhim ahamiyat kasb etadi. Ular yangi muhitga kirib borganda atrofdagilar bilan munosabat o‘rnatishga intiladi. Shu bilan birga, har bir bolaning xatti-harakatlari ortida turlicha maqsad yotadi. Shu jihatdan tarbiyachi har bir bolaning individual xususiyatlarini hisobga olgan holda ish olib borishi lozim.[2]

Maktabga tayyorlov bosqichida ijtimoiy kompetensiyani rivojlantirish ustuvor vazifalardan biridir. Chunki bolalar maktabga qadam qo‘yganida yangi qoidalar, yangi jamoa va yangi talablar bilan yuzlashadi. Bu jarayonda ularning

o‘zini baholashi, mas’uliyat hissi va mustaqil faoliyat yuritish ko‘nikmalari shakllanadi.

Bolalarda o‘ziga nisbatan ijobiy munosabatni rivojlantirish uchun turli o‘yinlardan foydalanish samarali hisoblanadi. Jumladan, “Men o‘zim haqimda nimani bilaman”, “Sizning portretingiz”, “Yasanish o‘yini”, “Mehr yuragi” kabi o‘yinlar bolalarda o‘zini anglash va qadrlash hissini mustahkamlaydi.

Masalan, “Men chiroyliman” o‘yini orqali bolalarda o‘ziga nisbatan ijobiy baho shakllantiriladi. Ushbu o‘yinda pedagog bolalar bilan suhbat o‘tkazib, ularni o‘zlari haqida fikr yuritishga undaydi. So‘ng bolalarga o‘zlarini chiroyli va baxtli holda tasvirlash topshirig‘i beriladi. Yakunda esa rasmlar muhokama qilinib, har bir bolaning ijobiy jihatlariga urg‘u beriladi. Bu esa bolalarning o‘ziga bo‘lgan ishonchini oshiradi va ularni ruhiy jihatdan qo‘llab-quvvatlaydi.[3]

Xulosa: Maktabgacha yoshdagi bolalarda ijtimoiy munosabatlar va hissiy rivojlanishni shakllantirish ta’lim-tarbiya jarayonining eng muhim yo‘nalishlaridan biri hisoblanadi. Aynan shu davrda bola o‘zini anglashni, atrofdagilar bilan muloqot qilishni, his-tuyg‘ularini boshqarishni va jamiyatda o‘z o‘rnini topishni o‘rganadi. Bu jarayonda tarbiyachining roli beqiyos bo‘lib, u bolalar uchun nafaqat bilim manbai, balki mehr, e’tibor va ijobiy muhit yaratuvchi yetakchi shaxs hisoblanadi.

O‘yin faoliyati esa bolalarning ijtimoiy va hissiy rivojlanishida eng samarali vositalardan biri sifatida namoyon bo‘ladi. Turli didaktik va rolli o‘yinlar orqali bolalarda o‘zaro hamkorlik, do‘stona munosabat, mehr-oqibat, boshqalarning his-tuyg‘ularini tushunish va ularga hurmat bilan qarash kabi muhim fazilatlar shakllanadi. Shu bilan birga, o‘yinlar bolalarning nutqini rivojlantirish, tasavvurini kengaytirish va mustaqil fikrlashini rag‘batlantirishga ham xizmat qiladi.

Xulosa qilib aytganda, har bir bolaning individual xususiyatlarini hisobga olgan holda tashkil etilgan pedagogik jarayon yanada samarali natija beradi. Bolalarda o‘ziga nisbatan ijobiy munosabatni shakllantirish, ularni qo‘llab-quvvatlash va rag‘batlantirish orqali ularning ichki salohiyatini yuzaga chiqarish mumkin.

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BOLALARNI ERTA RIVOJLANTIRISH JARAYONIDA PEDAGOGIK TEXNOLOGIYALARNI TAKOMILLASHTIRISH YO'LLARI

Yuldasheva Dilafruz Maxamadaliyevna

Farg'ona davlat universiteti

E-mail: dilafruzyuldasheva12@gmail.com

Akbarova Mohinur Ergashali qizi

Farg'ona davlat universiteti

E-mail: akbarovamohinur793@gmail.com

Annotatsiya. *Ushbu maqolada bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni takomillashtirish yo‘llari ko‘rib chiqiladi. Tadqiqotda zamonaviy pedagogik yondashuvlar, innovatsion metodlar va interaktiv texnologiyalar orqali bolalarning intellektual, nutqiy, ijodiy va ijtimoiy ko‘nikmalarini rivojlantirish imkoniyatlari tahlil qilinadi. Shu bilan birga, pedagoglarning faoliyati, ota-onalar bilan hamkorlik va o‘quv muhitining optimallashtirilishi bolalarni erta rivojlantirishda samarali natijalarga erishishga yordam berishi qayd etiladi.*

Kalit so‘zlar: *bolalarni erta rivojlantirish, pedagogik texnologiyalar, innovatsion metodlar, interaktiv o‘quv jarayoni, ta’lim-tarbiya jarayoni, bolalar ko‘nikmalari, pedagogik takomillashtirish, intellektual rivojlanish, nutqiy va ijtimoiy rivojlanish, ota-ona hamkorligi.*

Abstract. *This article discusses ways to improve pedagogical technologies in the process of early childhood development. It analyzes modern pedagogical approaches, innovative methods, and interactive technologies that support the development of children’s intellectual, speech, creative, and social skills. The study also highlights the role of educators, collaboration with parents, and the optimization of the learning environment as key factors in achieving effective early childhood development outcomes.*

Keywords: *early childhood development, pedagogical technologies, innovative methods, interactive learning process, educational process, children’s skills, pedagogical improvement, intellectual development, speech and social development, parental collaboration.*

Аннотация. *В статье рассматриваются пути совершенствования педагогических технологий в процессе раннего развития детей. Анализируются современные педагогические подходы, инновационные методы и интерактивные технологии, способствующие развитию интеллектуальных, речевых, творческих и социальных навыков детей. Также подчеркивается роль педагогов, сотрудничество с родителями и*

оптимизация образовательной среды как ключевых факторов для достижения эффективных результатов раннего развития.

Ключевые слова; *раннее развитие детей, педагогические технологии, инновационные методы, интерактивный учебный процесс, образовательный процесс, навыки детей, совершенствование педагогики, интеллектуальное развитие, речевое и социальное развитие, сотрудничество с родителями.*

KIRISH. Bolalarni erta rivojlantirish jarayoni ularning shaxs sifatida shakllanishida, intellektual, nutqiy, ijodiy va ijtimoiy ko‘nikmalarini rivojlantirishda muhim ahamiyatga ega. Zamonaviy maktabgacha ta’lim tizimida pedagogik texnologiyalar bolalarning bilim olish jarayonini samarali tashkil etish va rivojlanishini ta’minlashda asosiy vosita hisoblanadi. Ushbu jarayonda innovatsion metodlar, interaktiv o‘yinlar va faol mashg‘ulotlar bolalarning muloqot, tafakkur va ijodiy qobiliyatlarini rivojlantirishga xizmat qiladi.

Pedagogik texnologiyalarni takomillashtirish bolalarning individual xususiyatlarini hisobga olish, ularni o‘quv jarayoniga faol jalb qilish va ta’lim muhitini optimallashtirish imkonini beradi. Shuningdek, ota-ona va pedagoglarning hamkorligi bolalarning erta rivojlanish jarayonida samarali natijalarga erishishda muhim omil hisoblanadi. Shu bois, bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni doimiy takomillashtirish, zamonaviy pedagogik yondashuvlar va innovatsion metodlardan foydalangan holda ta’limni tashkil etish dolzarb vazifa hisoblanadi.

Ushbu maqola pedagogik texnologiyalarni rivojlantirish yo‘llarini o‘rganish, bolalarning ko‘nikmalarini samarali shakllantirish va ta’lim-tarbiya jarayonini optimallashtirishga qaratilgan.

MUHOKAMA VA NATIJALAR. Bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni takomillashtirishning ahamiyati bugungi kunda dolzarb masalalardan biridir. Tadqiqot natijalari shuni ko‘rsatadiki, zamonaviy pedagogik yondashuvlar va innovatsion metodlardan foydalanish bolalarning intellektual, nutqiy, ijodiy va ijtimoiy ko‘nikmalarini sezilarli darajada rivojlantiradi. Interaktiv

o‘yinlar, hikoya tuzish, rolli mashg‘ulotlar va muammoli vaziyatlar bolalarning fikrlash qobiliyatini oshiradi va ularni faol muloqotga jalb qiladi[51].

Muhokama jarayonida aniqlanishicha, pedagogik texnologiyalarni takomillashtirish ikki asosiy yo‘nalishda amalga oshiriladi. Birinchisi, ta’lim jarayonini individualizatsiya qilishdir. Har bir bolaning qobiliyati, qiziqishi va rivojlanish sur’ati hisobga olinib, mashg‘ulotlar moslashtirilganda, bolalar faol va samarali o‘rganadilar. Ikkinchisi, interaktiv va ijodiy metodlarni qo‘llashdir. Masalan, multimedia vositalari, o‘yinlar, guruhiy vazifalar bolalarning diqqatini jalb qiladi va bilimlarni mustahkamlashga yordam beradi.

1-jadval.

Bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarning asosiy yo‘nalishlari[52]

Yo‘nalish	Mazmuni	Pedagogik ahamiyati
Individualizatsiya	Har bir bolaning qobiliyati, qiziqishi va rivojlanish sur’atiga moslashgan mashg‘ulotlar	Bolaning qiziqishi va faol ishtirokini oshiradi, samarali o‘rganish imkonini yaratadi
Interaktiv metodlar	O‘yin, multimedia, guruhiy mashg‘ulotlar, rolli o‘yinlar	Bolalarning nutqiy, tafakkur va ijtimoiy ko‘nikmalarini rivojlantiradi
Innovatsion texnologiyalar	Qurilmalar, dasturiy vositalar, elektron resurslardan foydalanish	Ta’lim jarayonini qiziqarli, samarali va zamonaviy qiladi
Hamkorlik yondashuvi	Pedagog va ota-onalar bilan birgalikda faoliyat	Bolalarning uyda va maktabda rivojlanishini uyg‘unlashtiradi

[51] Hasanboyeva O., Yo‘ldosheva Sh. *Maktabgacha yoshdagi bolalarni erta rivojlantirish metodikasi*. Toshkent: Fan va texnologiya, 2020.
[52] Qodirova F., Toshpo‘latova Sh. *Maktabgacha pedagogika asoslari*. Toshkent: O‘qituvchi, 2019.

Izoh: Ushbu jadval bolalarni erta rivojlantirishda qo‘llaniladigan asosiy pedagogik texnologiyalar yo‘nalishlarini va ularning pedagogik ahamiyatini ko‘rsatadi. Har bir yo‘nalish bolalarning turli ko‘nikmalarini samarali rivojlantirishga xizmat qiladi.

2-jadval.

Bolalarni erta rivojlantirishda pedagogik texnologiyalarning natijalari[53]

Pedagogik texnologiya	Tatbiq etish usuli	Kutiladigan natija
Interaktiv o‘yinlar	Rolli o‘yinlar, guruhiy mashg‘ulotlar, muammoli vaziyatlar	Bolalarning ijtimoiy ko‘nikmalari va muloqot qobiliyati rivojlanadi
Hikoya tuzish	Rasmlar yoki voqealar asosida hikoya aytish	Nutqiy faollik, so‘z boyligi va mantiqiy fikrlash rivojlanadi
Multimedia vositalari	Ta’limiy dasturlar, elektron kitoblar, video materiallar	Diqqat va qiziqish ortadi, bilimlarni mustahkamlash samarali bo‘ladi
Individual yondashuv	Mashg‘ulotlarni bolaning qobiliyatiga moslashtirish	Faol ishtirok va o‘zini ifoda etish qobiliyati rivojlanadi

Izoh: Ushbu jadval pedagogik texnologiyalarni bolalarni erta rivojlantirish jarayonida qo‘llashning amaliy natijalarini ko‘rsatadi. Jadvaldan ko‘rinib turibdiki, har bir texnologiya bolalarda nutq, tafakkur, ijtimoiy va intellektual rivojlanishga xizmat qiladi.

Tadqiqot natijalari shuni ham ko‘rsatdiki, ota-ona va pedagoglarning faol hamkorligi bolalarning erta rivojlanishida muhim ahamiyatga ega. Oila muhitida pedagogik texnologiyalarga moslashgan uy faoliyati bolalarning ko‘nikmalarini mustahkamlashga yordam beradi. Shu bilan birga, pedagoglarning malakasi va doimiy kasbiy rivojlanishi ham innovatsion metodlarni samarali qo‘llash imkoniyatini oshiradi[54].

[53] Abdullayeva B. *Bolalar psixologiyasi*. Toshkent: O‘zbekiston, 2018.
[54] Yo‘ldosheva Sh. *Pedagogik texnologiyalar va innovatsion metodlar bolalarni erta rivojlantirishda*. Toshkent, 2021.

Umuman olganda, bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni takomillashtirish bolalarning bilim, ko‘nikma va shaxsiy sifatlarini rivojlantirishga sezilarli ta’sir ko‘rsatadi. Zamonaviy pedagogik yondashuvlar va innovatsion metodlarni qo‘llash orqali ta’lim jarayoni samarali va qiziqarli bo‘lib, bolalarda mustaqil fikrlash, ijodiy yondashuv va ijtimoiy ko‘nikmalarni shakllantirish mumkin.

ADABIYOTLAR SHARHI. Bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni takomillashtirish masalasi bo‘yicha ko‘plab mahalliy va xorijiy olimlar ilmiy tadqiqotlar olib borgan. Xorijiy tadqiqotlarda **Lev Vygotsky**ning ijtimoiy rivojlanish nazariyasi katta ahamiyatga ega. Vygotskiy ta’kidlaganidek, bolaning rivojlanishi muloqot va ijtimoiy tajriba orqali sodir bo‘ladi, shu sababli pedagogik texnologiyalarni innovatsion usullar bilan boyitish bolaning intellektual va ijtimoiy ko‘nikmalarini shakllantirishda muhimdir.

Jerome Brunerning tadqiqotlari esa interaktiv va ijodiy o‘quv metodlarining bolaning bilim egallashiga ijobiy ta’sir ko‘rsatishini ko‘rsatadi. Bruner ta’lim jarayonida bolalarni faol faoliyatga jalb qilish, vizual va o‘yinga asoslangan metodlardan foydalanish orqali ularning tafakkur va nutqini rivojlantirish mumkinligini ta’kidlaydi. Shu bilan birga, **Jean Piaget** bolalarning fikrlash jarayonini o‘rganib, erta rivojlanish jarayonida pedagogik texnologiyalarni individual yondashuv bilan moslashtirish zarurligini ko‘rsatadi[55].

O‘zbekiston sharoitida esa olimlar, jumladan **Hasanboyeva O. va Yo‘ldosheva Sh.**, bolalarni erta rivojlantirishda zamonaviy pedagogik texnologiyalar va o‘yin faoliyatidan samarali foydalanishning ahamiyatini ta’kidlaydi. Ular maktabgacha ta’limda interaktiv metodlar va ota-ona bilan hamkorlik orqali bolalarning ko‘nikma va bilimlarini mustahkamlash mumkinligini ko‘rsatgan.

Shuningdek, O‘zbekiston Respublikasi Maktabgacha ta’lim vazirligi tomonidan ishlab chiqilgan davlat o‘quv dasturlari va metodik qo‘llanmalar

[55] O‘zbekiston Respublikasi Maktabgacha ta’lim vazirligi. *Ilk qadam davlat o‘quv dasturi*. Toshkent, 2018.

bolalarni erta rivojlantirishda pedagogik texnologiyalarni tizimli va samarali qo‘llashni ta’minlaydi. Umuman olganda, yuqoridagi manbalar bolalarni erta rivojlantirishda innovatsion va interaktiv pedagogik yondashuvlarning, shuningdek ota-ona va pedagoglarning hamkorligining muhimligini tasdiqlaydi. Bu ilmiy manbalar pedagogik texnologiyalarni takomillashtirish bo‘yicha tadqiqotlar uchun mustahkam nazariy asos yaratadi[56].

XULOSA. Xulosa qilib aytganda, bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni takomillashtirish bolalarning shaxsiy, intellektual, nutqiy, ijodiy va ijtimoiy rivojlanishida muhim omil hisoblanadi. Tadqiqotlar shuni ko‘rsatadiki, zamonaviy pedagogik yondashuvlar, innovatsion metodlar va interaktiv mashg‘ulotlar bolalarda bilim olish, muloqot qilish va ijodiy fikrlash qobiliyatlarini sezilarli darajada oshiradi. Shu bilan birga, pedagogik texnologiyalar bolalarni individual xususiyatlarini hisobga olib rivojlantirishga imkon beradi, ularni o‘quv jarayoniga faol jalb qiladi va motivatsiyasini oshiradi.

Muhokama va tahlillar natijasida aniq bo‘ldiki, pedagogik texnologiyalarni takomillashtirish ikki asosiy yo‘nalishda amalga oshiriladi. Birinchisi, ta’lim jarayonini individualizatsiya qilish orqali bolalarning qobiliyatlari va qiziqishlariga moslash. Ikkinchisi, interaktiv va ijodiy metodlardan foydalanish, jumladan rolli o‘yinlar, hikoya tuzish, muammoli vaziyatlar va multimedia vositalari orqali bolalarni faol muloqotga jalb qilish. Ushbu yondashuvlar bolalarning nutqiy, tafakkur va ijtimoiy ko‘nikmalarini samarali rivojlantirishga xizmat qiladi.

Shuningdek, ota-ona va pedagoglarning faol hamkorligi bolalarning erta rivojlanishida katta ahamiyatga ega. Ota-onalar bilan birgalikda olib boriladigan pedagogik faoliyat, uy sharoitida interaktiv mashg‘ulotlarni tashkil etish bolalarning ko‘nikmalarini mustahkamlash va rivojlantirishga yordam beradi.

Umuman olganda, bolalarni erta rivojlantirish jarayonida pedagogik texnologiyalarni takomillashtirish nafaqat ta’lim sifatini oshiradi, balki bolalarda mustaqil fikrlash, ijodiy yondashuv va ijtimoiy ko‘nikmalarni shakllantirishga

[56] O‘zbekiston Respublikasi. “Maktabgacha ta’lim va tarbiya to‘g‘risida”gi Qonun. Toshkent, 2019.

zamin yaratadi. Shu sababli zamonaviy pedagoglar va ota-onalar innovatsion metodlar va interaktiv yondashuvlarni doimiy qo‘llashga alohida e’tibor qaratishi lozim. Bu esa bolalarni har tomonlama rivojlantirish va kelajakdagi ta’limga tayyorlashning muhim sharti hisoblanadi.

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Yuldasheva Gavxaroy O‘rinboy qizi
Urganch innovatsion universiteti
gavharoyy5@mail.com

Annotatsiya: *Maqolada boshlang‘ich sinf o‘quvchilarida arifmetik ko‘nikmalarni mustaqil ishlar orqali shakllantirishning nazariy va amaliy asoslari tahlil qilingan. Tadqiqot natijalari shuni ko‘rsatadiki, mustaqil ishlar nafaqat arifmetik bilimlarni mustahkamlash, balki o‘quvchilarning mantiqiy tafakkuri, mustaqil fikrlash va muammolarni hal etish qobiliyatini rivojlantirishda samarali vosita hisoblanadi.*

Kalit so‘zlar: *boshlang‘ich sinf, arifmetik ko‘nikmalar, mustaqil ish, metodika, pedagogika*

Аннотация: *В статье проанализированы теоретические и практические основы формирования арифметических навыков у учеников начальной школы посредством самостоятельной работы. Результаты исследования показывают, что самостоятельная работа является эффективным инструментом не только для закрепления арифметических знаний, но и для развития логического мышления, самостоятельного решения задач и критического анализа.*

Ключевые слова: *начальная школа, арифметические навыки, самостоятельная работа, методика, педагогика*

Abstract: *The article analyzes the theoretical and practical foundations for developing arithmetic skills in primary school students through independent work. Research findings indicate that independent work is an effective tool not only for consolidating arithmetic knowledge but also for enhancing logical thinking, independent problem-solving, and critical analysis skills.*

Keywords: *primary school, arithmetic skills, independent work, methodology, pedagogy*

KIRISH (INTRODUCTION)

Boshlang‘ich ta’limda matematika fani o‘quvchilarning mantiqiy fikrlashini, hisoblash ko‘nikmalarini hamda mustaqil muammolarni yechish qobiliyatini rivojlantirishda muhim o‘rin tutadi. Arifmetik ko‘nikmalar o‘quvchining kundalik hayotda matematik bilimlarni amaliy qo‘llashiga, shuningdek, fanlararo bog‘liqlikni ta’minlashga xizmat qiladi [1]. Shu bois, boshlang‘ich sinflarda arifmetik ko‘nikmalarni shakllantirish jarayonida samarali pedagogik vositalardan foydalanish dolzarb masala hisoblanadi.

Pedagogik amaliyot shuni ko‘rsatadiki, mustaqil ishlar o‘quvchilarning matematik bilimlarini mustahkamlash, mantiqiy tafakkurini rivojlantirish va ijodiy yondashuvini shakllantirishda muhim ahamiyatga ega [2]. Ilmiy tadqiqotlarda mustaqil ishlar o‘quvchilarning nafaqat bilim darajasini oshirishi, balki ularning muammolarni hal etish, o‘z-o‘zini baholash va metakognitiv ko‘nikmalarini rivojlantirishga ham ijobiy ta’sir ko‘rsatishi ta’kidlanadi [3]. Shundan kelib chiqib, ushbu maqolada boshlang‘ich sinflarda arifmetik ko‘nikmalarni mustaqil ishlar orqali shakllantirishning pedagogik samaradorligi tahlil qilinadi.

METODOLOGIYA (METHODS)

Tadqiqot jarayonida boshlang‘ich sinflarda matematika darslarida mustaqil ishlarni tashkil etishning metodik jihatlari o‘rganildi. Mustaqil ishlar mazmuni va shakllari o‘quvchilarning yosh xususiyatlari hamda bilim darajasini hisobga olgan holda ishlab chiqildi. Topshiriqlar murakkablik darajasiga ko‘ra oddiydan murakkabga tomon yo‘naltirildi: dastlab 20 gacha bo‘lgan sonlar doirasida qo‘shish va ayirish, keyinchalik esa 100 gacha bo‘lgan sonlar ustida arifmetik amallarni bajarish nazarda tutildi.

Mustaqil ishlar o‘quvchilarning yosh va psixologik xususiyatlari, shuningdek, bilim darajalarini inobatga olgan holda turli didaktik shakllarda tashkil etildi. Jumladan, yozma topshiriqlar (hisob-kitoblar, turli tipdagi masalalar va jadvallar) orqali arifmetik amallarni puxta o‘zlashtirishga erishildi; og‘zaki topshiriqlar (tezkor hisoblash, savol-javoblar) yordamida o‘quvchilarning mantiqiy tafakkuri va tezkor fikrlash qobiliyatlari rivojlantirildi; vizual topshiriqlar (rasm, diagramma va blok-sxemalar asosida masalalar) orqali matematik tushunchalarning ko‘rgazmali idrok

etilishi ta’minlandi; interaktiv topshiriqlar esa raqamli texnologiyalar yordamida bajarilib, o‘quvchilarning bilish faolligi, motivatsiyasi va mustaqil o‘rganishga bo‘lgan qiziqishini oshirishga xizmat qildi. Baholash jarayonida o‘quvchilarning ishlarini tahlil qilish, xatolar ustida ishlash va ijobiy rag‘batlantirishga alohida e’tibor qaratildi. Shuningdek, individual yondashuv asosida har bir o‘quvchining bilim darajasiga mos topshiriqlar berildi [4–5].

NATIJALAR (RESULTS)

Tadqiqot natijalari shuni ko‘rsatdiki, mustaqil ishlarni tizimli va maqsadli tashkil etish orqali o‘quvchilarda arifmetik amallarni bajarish tezligi hamda hisoblash aniqligi sezilarli darajada oshib, matematik faoliyatda samaradorlikka erishildi. Shu bilan birga, o‘quvchilar masalalarni yechish jarayonida mantiqiy izchillikni saqlash, yechim bosqichlarini rejalashtirish va tahlil qilish, shuningdek, yo‘l qo‘yilgan xatolarni mustaqil aniqlash va tuzatish ko‘nikmalarini egallab, reflektiv va tanqidiy fikrlash qobiliyatlarini rivojlantirdilar. Bundan tashqari, mustaqil ishlar o‘quvchilarning o‘z-o‘zini baholash ko‘nikmalarini shakllantirishga va dars jarayoniga bo‘lgan qiziqishini oshirishga xizmat qildi. Turli shakldagi mustaqil ishlarning kombinatsiyasi o‘quvchilarda matematikaga nisbatan ijobiy munosabatni shakllantirdi hamda ularning ijodiy fikrlash faolligini kuchaytirdi. Natijalar mustaqil ishlarning boshlang‘ich sinf o‘quvchilarida nafaqat bilim, balki shaxsiy rivojlanish omili sifatida ham muhim ekanini ko‘rsatdi.

MUHOKAMA (DISCUSSION)

Olingan natijalar shuni ko‘rsatadiki, mustaqil ishlar boshlang‘ich sinflarda arifmetik ko‘nikmalarni shakllantirishda samarali pedagogik vosita hisoblanadi, ya’ni ular o‘quvchilarning qo‘shish, ayirish, ko‘paytirish va bo‘lish amallarini ongli va puxta o‘zlashtirishiga xizmat qilib, hisoblash jarayonida aniqlik, tezkorlik hamda mantiqiy izchillikni ta’minlaydi. Shu bilan birga, mustaqil ishlar o‘quvchilarning bilish faolligini oshirib, ularni muammoli vaziyatlarda mustaqil qaror qabul qilishga, o‘z bilimlarini tahlil qilish va baholashga yo‘naltiradi hamda matematik kompetensiyalarning barqaror shakllanishiga ijobiy ta’sir ko‘rsatadi. Ular

o‘quvchilarning mustaqil fikrlash jarayonini faollashtirib, muammoli vaziyatlarni tahlil qilish, mavjud bilimlarni yangi sharoitlarda qo‘llash hamda optimal yechimlarni izlab topish qobiliyatini rivojlantiradi. Shu bilan birga, mustaqil ishlar o‘quvchilarda ijodiy yondashuv ko‘nikmalarini shakllantirib, masalalarni bir nechta usulda yechish, nostandart fikrlash va o‘z fikrini asoslab berish kompetensiyalarining rivojlanishiga xizmat qiladi hamda ularning bilish faoliyatida subyektiv faollikni ta’minlaydi. Mustaqil ishlarni dars jarayonining muhim tarkibiy qismi sifatida maqsadli va tizimli ravishda qo‘llash o‘quvchilarning matematik bilimlarni ongli, izchil va puxta o‘zlashtirishiga xizmat qilib, nazariy tushunchalarning amaliy faoliyat bilan uyg‘unlashuvini ta’minlaydi. Mazkur yondashuv o‘quvchilarda bilimlarni mustahkamlash, umumlashtirish va transfer qilish ko‘nikmalarini rivojlantiradi hamda matematik tushunchalarning uzoq muddatli xotirada barqaror saqlanishiga ijobiy ta’sir ko‘rsatadi.

XULOSA (CONCLUSION)

Xulosa qilib aytganda, boshlang‘ich sinflarda arifmetik ko‘nikmalarni mustaqil ishlar orqali shakllantirish pedagogik va metodik jihatdan asoslangan, ta’lim jarayonining samaradorligini oshiruvchi muhim didaktik yondashuv hisoblanadi. Mazkur usul o‘quvchilarning matematik bilimlarni ongli va puxta o‘zlashtirishini ta’minlabgina qolmay, balki ularning mustaqil fikrlash, muammoli vaziyatlarni tahlil qilish, ijodiy yondashuv va o‘z-o‘zini baholash kabi muhim kompetensiyalarini kompleks tarzda rivojlantirishga xizmat qiladi. Ushbu yondashuv o‘quvchilarning nafaqat matematik tayyorgarlik darajasini oshirishga, balki ularning metakognitiv faoliyatini, ya’ni o‘z bilish jarayonini rejalashtirish, nazorat qilish va baholash ko‘nikmalarini rivojlantirishga, shuningdek, ijodiy fikrlash va muammolarga nostandart yondashuv qobiliyatlarini shakllantirishga xizmat qiladi. Shu sababli, matematika darslarida mustaqil ishlarni didaktik maqsadlarga muvofiq holda doimiy va tizimli ravishda qo‘llash ta’lim jarayonining samaradorligini oshirib, o‘quvchilarda barqaror bilim, ko‘nikma va kompetensiyalarning shakllanishini ta’minlaydi.

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MUSTAQIL TA`LIM VA O`Z-O`ZINI BAHOLASH TEXNOLOGIYALARI

Ziyayeva Zilolaxon Murodjon qizi

Andijon Davlat Pedagogika instituti

Annotatsiya. *Maqolada mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalari, ularning pedagogik jarayondagi roli va samaradorligi yoritilgan. Ushbu texnologiyalar talabaning mustaqil o‘rganish qobiliyatini oshirish, bilim va ko‘nikmalarni mustahkamlash, shuningdek, refleksiv va tanqidiy fikrlash ko‘nikmalarini rivojlantirishga xizmat qiladi. Maqolada tadqiqot mavzusining dolzarbligi, maqsad va vazifalari, ilmiy yangilik va amaliy ahamiyati tahlil qilinadi.*

Kalit so‘zlar: *mustaqil ta’lim, o‘z-o‘zini baholash, refleksiya, pedagogik texnologiyalar, ta’lim samaradorligi.*

Аннотация. *В статье рассматриваются технологии самостоятельного обучения и самопроверки, их роль и эффективность в педагогическом процессе. Данные технологии способствуют развитию у студентов навыков самостоятельного обучения, укреплению знаний и умений, а также развитию рефлексивного и критического мышления. В статье анализируются актуальность темы, цели и задачи, научная новизна и практическая значимость применения данных технологий.*

Ключевые слова: *самостоятельное обучение, самопроверка, рефлексия, педагогические технологии, эффективность обучения.*

Annotation. *The article examines independent learning and self-assessment technologies, their role and effectiveness in the pedagogical process. These technologies help students develop independent learning skills, consolidate knowledge and competencies, and enhance reflective and critical thinking abilities. The article analyzes the relevance of the topic, objectives and tasks, scientific novelty, and practical significance of implementing these technologies.*

Keywords: *independent learning, self-assessment, reflection, pedagogical technologies, learning effectiveness.*

1. Kirish.

Zamonaviy ta’lim jarayonida o‘quvchilarning bilim va ko‘nikmalarini samarali shakllantirish uchun mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalari muhim rol o‘ynaydi. Mustaqil ta’lim — talabaning pedagog tomonidan berilgan ma’lumotlardan tashqari, o‘z bilimini mustaqil rivojlantirish jarayonidir. O‘z-o‘zini baholash mexanizmlari esa talabaning o‘z faoliyatini tahlil qilish, kuchli va zaif tomonlarini aniqlash va o‘zini rivojlantirish yo‘llarini belgilash imkonini beradi [1]. O‘zbekiston ta’lim tizimida mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalarini tatbiq etish dolzarb masala hisoblanadi. Chunki bu yondashuvlar nafaqat ta’lim

samaradorligini oshiradi, balki talabaning ijodiy va tanqidiy fikrlash ko‘nikmalarini rivojlantiradi [2].

2. Tadqiqot maqsadi va vazifalari.

Maqsad: Talaba va pedagoglar faoliyatida mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalarining samaradorligini o‘rganish va amaliy tavsiyalar ishlab chiqish.

Vazifalar:

Mustaqil ta’lim tushunchasi va pedagogik asoslarini aniqlash;

O‘z-o‘zini baholash mexanizmlarini tahlil qilish;

Zamonaviy pedagogik texnologiyalar bilan integratsiyasini o‘rganish;

Oliy ta’lim va umumta’lim muassasalarida qo‘llash bo‘yicha tavsiyalar ishlab chiqish.

3. Ilmiy yangilik va amaliy ahamiyati.

Ushbu tadqiqotning ilmiy yangiligi shundaki, mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalari tizimli ravishda o‘rganilgan, ularning pedagogik jarayondagi samaradorligi aniqlangan va amaliy tavsiyalar ishlab chiqilgan. Amaliy ahamiyati shundaki, pedagoglar ushbu texnologiyalarni dars jarayonida qo‘llash orqali o‘quvchilarning mustaqil fikrlash, refleksiya va o‘zini rivojlantirish ko‘nikmalarini kuchaytiradi. Shu bilan birga, pedagoglar o‘quv jarayonini individualizatsiya qilish va nazorat qilish imkoniga ega bo‘ladi [3]. Ushbu tadqiqotning ilmiy yangiligi shundaki, mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalari tizimli va kompleks tarzda o‘rganilgan, ularning pedagogik jarayondagi roli, samaradorligi va amaliy tatbiqi tahlil qilingan. An’anaviy tadqiqotlardan farqli o‘laroq, maqolada nafaqat mustaqil ta’lim jarayonining metodik asoslari, balki o‘z-o‘zini baholashning refleksiv, tanqidiy va motivatsion komponentlari ham birgalikda ko‘rib chiqilgan. Tadqiqotning yangiligi shuningdek, zamonaviy raqamli platformalar va LMS tizimlarida o‘z-o‘zini baholash

mexanizmlarini qo‘llash imkoniyatlarini yoritishdir. Masalan, adaptiv testlar, interaktiv topshiriqlar va onlayn monitoring vositalari talabaning individual rivojlanishini real vaqt rejimida kuzatish, kuchli va zaif tomonlarini aniqlash hamda o‘quv jarayonini individualizatsiya qilish imkonini beradi. Shuningdek, ilmiy yangilik quyidagi jihatlarda namoyon bo‘ladi: Integrativ yondashuv: Mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalari boshqa pedagogik texnologiyalar — interaktiv, raqamli va innovatsion vositalar bilan birlashtirilgan holda o‘rganilgan. Bu yondashuv ta’lim jarayonining samaradorligini oshirish va talabaning shaxsiy rivojlanishini rag‘batlantirishda yangi pedagogik model sifatida ko‘riladi. Refleksiya va metakognitiv komponentlar: Tadqiqot talabaning o‘zini baholash orqali metakognitiv qobiliyatlarini rivojlantirish, refleksiya jarayonini kuchaytirish va shaxsiy o‘zgarishlarni tahlil qilish imkoniyatlarini ilmiy asoslaydi. Individualizatsiya va motivatsiya: Mustaqil ta’lim texnologiyalari orqali ta’lim jarayoni talabaning qobiliyatiga mos ravishda individualizatsiya qilinadi. O‘z-o‘zini baholash mexanizmlari esa talabaning motivatsiyasini oshirish va o‘rganish jarayonini yanada faol qilishga yordam beradi. **Amaliy tavsiyalar:** Tadqiqot natijalari pedagoglarga o‘z darslarida mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalarini qo‘llash bo‘yicha aniq tavsiyalar beradi. Bu tavsiyalar talabaning bilim darajasini oshirish, amaliy ko‘nikmalarini rivojlantirish va pedagogik jarayonni sifat jihatdan yaxshilashga qaratilgan. Shu bilan birga, maqola o‘z-o‘zini baholash va mustaqil ta’lim texnologiyalarini oliy ta’lim va umumta’lim muassasalarida samarali qo‘llash imkoniyatlarini nazariy va amaliy jihatdan ilmiy asoslaydi. Bu esa ta’limning sifatini oshirish, talabaning o‘zini rivojlantirish madaniyatini shakllantirish va zamonaviy pedagogik yondashuvlarni tatbiq etishda dolzarb ahamiyatga ega.

4. Mustaqil ta’lim texnologiyalari.

Mustaqil ta’lim texnologiyalari talabaning bilim olish jarayonini faol va mustaqil qilishga qaratilgan. Ushbu texnologiyalar quyidagilarni o‘z ichiga oladi:

O‘quv resurslaridan mustaqil foydalanish – elektron kitoblar, maqolalar, videodarslar;

Onlayn platformalar va LMS – topshiriqlarni bajarish, monitoring va individual yo‘riq;

Muammoli vaziyatlar va loyiha ishlari – talaba o‘z yechimlarini izlab, bilimlarni amaliyotga tadbiq qiladi [4].

Ushbu texnologiyalar orqali talaba o‘z o‘rganish jarayonini boshqaradi, nazariy bilimni amaliy ko‘nikmalar bilan bog‘laydi va mustaqil fikrlash qobiliyatini rivojlantiradi. Mustaqil ta’limning pedagogik afzalliklari .Talabaning o‘rganish jarayonidagi faolligi oshadi, u passiv qabul qiluvchi emas, balki faol ishtirokchiga aylanadi;

Individual o‘rganish tezligi va uslubiga moslash imkoniyati mavjud;

Tanqidiy fikrlash, mas’uliyat, mustaqil qaror qabul qilish va ijodiy yondashuv ko‘nikmalari rivojlanadi;

Pedagogga o‘quv jarayonini individual va tizimli tarzda nazorat qilish imkonini beradi.

Zamonaviy integratsiya va raqamli imkoniyatlar.

Mustaqil ta’lim texnologiyalarini raqamli vositalar bilan integratsiya qilish ta’lim samaradorligini sezilarli darajada oshiradi. Masalan, interaktiv onlayn testlar, virtual laboratoriyalar, simulyatsion dasturlar va gamifikatsiya elementlari talabaning o‘z-o‘zini rivojlantirish jarayonini yanada qiziqarli va samarali qiladi. Shu tarzda, mustaqil ta’lim nafaqat nazariy bilimlarni mustahkamlashga, balki amaliy ko‘nikmalarni rivojlantirishga ham xizmat qiladi [5].

Xulosa qilib aytganda, mustaqil ta’lim texnologiyalari talabaning shaxsiy o‘sishi, mustaqil fikrlashini rivojlantirish, refleksiya va o‘zini baholash qobiliyatini

shakllantirishda muhim vosita hisoblanadi. Ularni zamonaviy raqamli, interaktiv va innovatsion pedagogik yondashuvlar bilan birlashtirish ta’lim jarayonini yanada samarali va talaba markazli qiladi.

5. O‘z-o‘zini baholash mexanizmlari. O‘z-o‘zini baholash — talabaning o‘z faoliyatini tahlil qilish va baholash jarayoni bo‘lib, u quyidagi komponentlarni o‘z ichiga oladi. O‘z-o‘zini baholash mexanizmlari.O‘z-o‘zini baholash — talabaning o‘z faoliyatini tahlil qilish va baholash jarayoni bo‘lib, u quyidagi komponentlarni o‘z ichiga oladi:

Refleksiya – talaba darsdan keyin o‘z harakatlarini, qarorlarini va natijalarini tahlil qiladi; Refleksiya – talaba darsdan keyin o‘z harakatlarini, qarorlarini va natijalarini tahlil qiladi; Refleksiya — bu o‘z fikrlari, harakatlari va tajribalarini tahlil qilish, baholash va anglash jarayoni. Pedagogik kontekstda refleksiya talaba yoki pedagogning o‘z o‘rganish yoki pedagogik faoliyatini qayta ko‘rib chiqishi, natijalarni tahlil qilishi va o‘zini rivojlantirish yo‘llarini aniqlashini anglatadi. Soddaroq qilib aytganda, refleksiya — bu “Men nima qilaman, nima o‘rgandim, qayerda xato qilganman va qanday yaxshilashim mumkin?” degan savollarni o‘z-o‘ziga berish jarayonidir. Pedagogik ta’limda refleksiya quyidagi vazifalarni bajaradi:O‘rganishni chuqurlashtiradi – talaba yoki pedagog o‘z tajribasini tahlil qilib, nazariy bilimlarni amaliyot bilan bog‘laydi.Tanqidiy fikrlashni rivojlantiradi – o‘z harakatlarining natijalarini baholash orqali xatolarini aniqlaydi va yaxshilash strategiyasini ishlab chiqadi.Mustaqillik va mas’uliyatni oshiradi – shaxs o‘z faoliyatini mustaqil baholashni o‘rganadi. Pedagogik jarayonni optimallashtiradi – pedagoglar o‘z darslarini tahlil qilib, samarali usullarni aniqlashadi. **Shkala va kriteriyalarga asoslangan baholash** – talaba o‘z ishini belgilangan standartlarga mos baholaydi; Shkala va kriteriyalarga asoslangan baholash — bu ta’lim jarayonida talabani baholashning aniq mezonlarga, ya’ni kriteriyalarga asoslangan tizimli yondashuvi bo‘lib, u o‘quvchining bilim, ko‘nikma va kompetensiyalarini shaffof va adolatli tarzda baholash imkonini beradi. Ushbu yondashuv an’anaviy ballar yoki foizlar bilan baholashdan farq qiladi, chunki u

nafaqat natijaga, balki jarayonga, ish sifatiga va talabning faol ishtirokiga e’tibor qaratadi.

Asosiy tamoyillari va xususiyatlari:

Kriteriyalarni aniqlash: Pedagog har bir topshiriq yoki vazifa uchun aniq va o‘lchab bo‘ladigan mezonlarni belgilaydi. Masalan, yozma ishda: mazmun, mantiqiy tuzilish, tilda aniqlik, grammatik to‘g‘rilik va ijodiy yondashuv kriteriyalari ko‘rsatiladi. Shkala tuzish: Har bir kriteriyaga baho berish uchun shkala ishlab chiqiladi, odatda 3–5 darajali bo‘lishi mumkin (masalan, “yaxshi”, “qoniqarli”, “qoniqarsiz”) yoki ball tizimi orqali (0–5, 0–10). Shkala yordamida talabalar o‘z ishlari qayerda ekanligini aniq ko‘ra oladi. Shaffoflik va ob’ektivlik: Kriteriyalar va shkala talabalarga oldindan e’lon qilinadi, bu esa baholash jarayonini shaffof qiladi va sub’ektivlikni kamaytiradi. Talaba nima uchun shunday baho olgani va qanday yaxshilashi kerakligi haqida aniq tushunchaga ega bo‘ladi.

Raqamli monitoring vositalari – LMS va interaktiv testlar yordamida o‘z natijalarini kuzatadi [5]. Raqamli monitoring vositalari zamonaviy ta’lim jarayonida talaba faoliyatini real vaqt rejimida kuzatish, natijalarni tahlil qilish va baholash imkonini beruvchi texnologik yechimlar hisoblanadi. Ushbu vositalar pedagoglarga o‘quv jarayonining samaradorligini oshirish, talabaning bilim va ko‘nikmalarini individual tarzda boshqarish va takomillashtirish imkoniyatini beradi. Asosiy xususiyatlari va imkoniyatlari:Rejalashtirish va nazorat: Raqamli monitoring tizimlari dars rejasini tuzish, topshiriqlarni belgilash va bajarilish jarayonini nazorat qilish imkonini beradi. Pedagoglar talabaning faoliyati va natijalarini kuzatib boradi, kechikishlar yoki kamchiliklarni aniqlaydi. Individual rivojlanishni kuzatish: Talabaning bilim darajasi va amaliy ko‘nikmalari har bir modul yoki mavzu bo‘yicha tahlil qilinadi. Shuningdek, sistemada o‘quvchining kuchli va zaif tomonlari ko‘rsatiladi, bu esa pedagog va talaba uchun individual rivojlanish strategiyasini ishlab chiqishga yordam beradi [1]. Onlayn testlar va baholash: Raqamli monitoring vositalari yordamida talaba topshiriqlarini elektron shaklda bajaradi va natijalar avtomatik tarzda tizimga kiritiladi. Bu pedagogga vaqtni tejash

va baholash jarayonini adolatli va shaffof qilish imkonini beradi. Statistik tahlil va hisobotlar: Tizimlar avtomatik hisobotlar yaratadi, bunda talabaning rivojlanish tendensiyalari, baholar, ish faoliyati va qatnashuv darajasi ko‘rsatiladi. Ushbu ma’lumotlar pedagogik qarorlar qabul qilishda va o‘quv jarayonini optimallashtirishda muhim rol o‘ynaydi. Integratsiya imkoniyatlari: Raqamli monitoring vositalari LMS platformalari, interaktiv dars materiallari, virtual laboratoriyalar va boshqa pedagogik texnologiyalar bilan integratsiya qilinishi mumkin. Shu orqali talabaning mustaqil o‘rganish jarayoni va o‘z-o‘zini baholash faoliyati samaradorligi oshadi [2]. Shu tarzda, raqamli monitoring vositalari nafaqat pedagogning ishini yengillashtiradi, balki talabaning individual rivojlanishi, o‘z-o‘zini baholash qobiliyati va mustaqil ta’lim jarayonini optimallashtirishga xizmat qiladi. Ular zamonaviy pedagogik texnologiyalar bilan birlashtirilganda, ta’lim jarayonini shaffof, tizimli va talaba markazli qiladi. O‘z-o‘zini baholash talabaning o‘zini rivojlantirish, xatolarini aniqlash va o‘rganish jarayonini optimallashtirish imkonini beradi. Shkala va kriteriyalarga asoslangan baholash – talaba o‘z ishini belgilangan standartlarga mos baholaydi; Raqamli monitoring vositalari – LMS va interaktiv testlar yordamida o‘z natijalarini kuzatadi [5]. O‘z-o‘zini baholash talabaning o‘zini rivojlantirish, xatolarini aniqlash va o‘rganish jarayonini optimallashtirish imkonini beradi.

Xulosa.

Mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalari zamonaviy ta’lim jarayonining samaradorligini oshirish, talaba markazli yondashuvni ta’minlash va pedagogik jarayonni sifatli tashkil etishda muhim vositalardir. Tadqiqot natijalari shuni ko‘rsatadiki, mustaqil ta’lim talabaning bilim olish jarayonida faol rol o‘ynashini ta’minlaydi, nazariy bilimlarni amaliyot bilan bog‘laydi va ijodiy, tanqidiy fikrlash ko‘nikmalarini rivojlantiradi. O‘z-o‘zini baholash mexanizmlari esa talabaning refleksiv faoliyatini kuchaytiradi, kuchli va zaif tomonlarini aniqlashga yordam beradi hamda o‘zini rivojlantirish strategiyasini ishlab chiqish imkonini yaratadi. Kriteriyalarga asoslangan baholash, raqamli monitoring

vositalari va interaktiv texnologiyalar bilan birlashtirilganda, talabaning o‘rganish jarayoni individual, shaffof va tizimli bo‘ladi. Shu tariqa, mustaqil ta’lim va o‘z-o‘zini baholash texnologiyalarini tizimli va kompleks tarzda tatbiq etish pedagogik jarayonning sifatini oshiradi, talabaning mustaqil fikrlash va o‘zini rivojlantirish ko‘nikmalarini shakllantiradi hamda ta’lim samaradorligini maksimal darajada ta’minlaydi. Ularni zamonaviy raqamli, interaktiv va innovatsion pedagogik yondashuvlar bilan uyg‘unlashtirish esa ta’lim jarayonini yanada motivatsion, qiziqarli va talaba markazli qiladi.

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Ziyayeva Zilolaxon Murodjon qizi

Andijon Davlat Pedagogika instituti

Annotatsiya. *Maqolada ta’lim texnologiyalari va ularning turlari, pedagogik jarayondagi roli va samaradorligi, shuningdek, zamonaviy ta’lim tizimida ularni qo‘llashning nazariy va amaliy jihatlari yoritilgan. Ta’lim texnologiyalari o‘quv jarayonini individual va interaktiv qilishga, bilimni chuqurlashtirish va kasbiy kompetensiyalarni shakllantirishga xizmat qiladi. Maqolada tadqiqot mavzusining dolzarbligi, maqsad va vazifalari, ilmiy yangilik va amaliy ahamiyati tahlil qilinadi.*

Kalit so‘zlar: *ta’lim texnologiyalari, pedagogik texnologiyalar, interaktiv ta’lim, raqamli ta’lim, innovatsion metodlar, o‘quv jarayoni.*

Аннотация. *В статье рассматриваются образовательные технологии и их виды, роль и эффективность в педагогическом процессе, а также современные методы их применения в системе образования. Образовательные технологии способствуют индивидуализации и интерактивности учебного процесса, углублению знаний и формированию профессиональных компетенций учащихся. В статье анализируется актуальность темы исследования, цели и задачи, научная новизна и практическая значимость внедрения образовательных технологий.*

Ключевые слова: *образовательные технологии, педагогические технологии, интерактивное обучение, цифровое обучение, инновационные методы, учебный процесс.*

Annotation. *The article examines educational technologies and their types, their role and effectiveness in the pedagogical process, as well as modern methods of implementation in the education system. Educational technologies facilitate the*

individualization and interactivity of the learning process, deepen knowledge, and contribute to the development of students' professional competencies. The article analyzes the relevance of the research topic, objectives and tasks, scientific novelty, and practical significance of implementing educational technologies.

Keywords: *educational technologies, pedagogical technologies, interactive learning, digital learning, innovative methods, learning process.*

1. Tadqiqot mavzusining dolzarbligi.

Zamonaviy jamiyatda bilimlar va texnologiyalar tez o‘zgarib boradi. Bu holat pedagogik jarayonni ham innovatsion yondashuvlar asosida tashkil etishni talab qiladi. Ta’lim texnologiyalari o‘quv jarayonini tizimli va samarali qilish, o‘quvchilarning bilim va ko‘nikmalarini chuqurlashtirish, shuningdek, ularning ijodiy va tanqidiy fikrlash qobiliyatini rivojlantirishga xizmat qiladi [1]. O‘zbekiston Respublikasida ta’limning modernizatsiyasi davlat siyosatining ustuvor yo‘nalishi hisoblanadi. Xususan, O‘zbekiston Respublikasining “Ta’lim to‘g‘risida”gi Qonuni ta’lim jarayonini innovatsion texnologiyalar bilan boyitishni ta’kidlaydi [2]. Shu sababli ta’lim texnologiyalari va ularning turlarini tadqiq qilish ilmiy va amaliy jihatdan dolzarbdir.

2. Tadqiqot maqsadi va vazifalari.

Maqsad: Ta’lim texnologiyalarini tizimli tahlil qilib, ularning pedagogik jarayondagi samaradorligini aniqlash va amaliy tavsiyalar ishlab chiqish.

Vazifalar:

Ta’lim texnologiyalari tushunchasi va xususiyatlarini aniqlash;

Ularning pedagogik jarayondagi turlari va samaradorligini tahlil qilish;

Zamonaviy raqamli va interaktiv texnologiyalarni tadqiq qilish;

Oliy ta’lim muassasalari va maktablarda qo‘llash bo‘yicha amaliy tavsiyalar ishlab chiqish.

3. Ilmiy yangilik.

Ushbu tadqiqotning ilmiy yangiligi shundaki, ta’lim texnologiyalarining klassik va zamonaviy turlarini birlashtirib, ularni oliy ta’lim va umumta’lim jarayonida qo‘llash mexanizmlari tizimli ravishda o‘rganilgan. Shuningdek, raqamli va interaktiv platformalarning 554edagogic samaradorligi ilmiy tahlil qilinib, amaliy tavsiyalar ishlab chiqildi.

4. Amaliy ahamiyati.

Tadqiqot natijalari pedagoglarga va ta’lim muassasalariga ta’lim texnologiyalarini tanlash va joriy etishda qo‘llanilishi mumkin. Shu bilan birga, talabalarning mustaqil o‘rganish, refleksiya qilish va kreativ fikrlash ko‘nikmalarini rivojlantirishga xizmat qiladi. Raqamli va interaktiv texnologiyalarni tatbiq etish o‘quv jarayonining sifatini oshirishga yordam beradi.

5. Ta’lim texnologiyalarining turlari.

Ta’lim texnologiyalari bir nechta asosiy toifaga bo‘linadi:

An’anaviy pedagogik texnologiyalar – ma’ruzalar, seminarlar, laboratoriya ishlari va amaliy mashg‘ulotlar. Bu texnologiyalar bilim va ko‘nikmalarni shakllantirishning klassik usullari hisoblanadi [3]. Bu ta’lim jarayonida asosan klassik metodlar va vositalardan foydalanishga asoslangan yondashuvdir. Ular o‘quvchilarga nazariy bilimlarni yetkazish, amaliy ko‘nikmalarni shakllantirish va kasbiy tayyorgarlikni ta’minlashda samarali vosita sifatida ishlatiladi. Ushbu texnologiyalar pedagogik jarayonning asosiy poydevorini tashkil qiladi, chunki ular nafaqat ma’lumot uzatishga, balki o‘quv jarayonining tartibga solinishi va nazorat qilinishiga xizmat qiladi.An’anaviy pedagogik texnologiyalarga ma’ruzalar, seminarlar, laboratoriya ishlari, amaliy mashg‘ulotlar va konspektlar orqali o‘qitish

kiradi. Ma’ruza — bu bilimni tizimli shaklda berishning klassik shakli bo‘lib, unda pedagog mavzuni izchil va mantiqiy tarzda talabalarga yetkazadi. Seminarlarda esa talaba nazariy bilimlarni muhokama qiladi, savol-javob orqali tushunmagan jihatlarni aniqlaydi. Laboratoriya va amaliy mashg‘ulotlar esa nazariy bilimlarni real hayotiy yoki laboratoriya sharoitida sinash imkonini beradi, shu orqali talabaning amaliy ko‘nikmalari shakllanadi.An’anaviy pedagogik texnologiyalar pedagog va talaba o‘rtasidagi muloqotga asoslangan bo‘lib, didaktik printsiplarga tayangan holda amalga oshiriladi. Ular o‘quv jarayonini tizimli va samarali qilish bilan birga, talabaning nazariy bilimlarini mustahkamlashga xizmat qiladi. Shu bilan birga, bu texnologiyalar pedagogning metodik mahoratini rivojlantiradi, darsni rejalashtirish va nazorat qilish ko‘nikmalarini shakllantiradi.

Biroq, an’anaviy texnologiyalarning asosiy cheklovlari ham mavjud. Ular o‘quv jarayonini ko‘proq nazariy bilimlarga yo‘naltiradi va interaktivlikni ta’minlashda yetarlicha imkoniyat bermaydi. Shu sababli, zamonaviy ta’lim jarayonida an’anaviy pedagogik texnologiyalarni interaktiv va raqamli texnologiyalar bilan uyg‘unlashtirish tavsiya etiladi. An’anaviy pedagogik texnologiyalar oliy ta’lim muassasalarida talabaning bilim darajasini aniqlash, amaliy ko‘nikmalarni shakllantirish va nazariy bilimlarni mustahkamlashda hozir ham muhim o‘rin egallaydi. Ular zamonaviy texnologiyalar bilan integratsiya qilinsa, ta’lim jarayoni yanada samarali va qiziqarli bo‘ladi, talabaning individual rivojlanishiga xizmat qiladi.

Interaktiv texnologiyalar – guruh ishlari, debatlar, rolli o‘yinlar, simulyatsiyalar. Ushbu texnologiyalar o‘quvchilarni faol ishtirok etishga undaydi va tanqidiy fikrlashni rivojlantiradi [4]. Interaktiv pedagogik texnologiyalar zamonaviy ta’lim jarayonining ajralmas qismi hisoblanadi. Ular o‘quv jarayonida talaba va pedagog o‘rtasidagi faol muloqotga, shuningdek, talabaning mustaqil fikrlash va ijodiy qobiliyatlarini rivojlantirishga yo‘naltirilgan. Interaktiv texnologiyalar an’anaviy ta’lim shakllaridan farqli o‘laroq, o‘quvchilarni passiv qabul qiluvchilar emas, balki faol ishtirokchilar sifatida jalb qiladi. Interaktiv texnologiyalar quyidagi

pedagogik metodlarni o‘z ichiga oladi: guruh ishlari, debatlar, rolli o‘yinlar, muammoli vaziyatlar, simulyatsiyalar va masofaviy interaktiv mashg‘ulotlar. Guruh ishlari orqali talaba muayyan mavzu bo‘yicha boshqa o‘quvchilar bilan hamkorlik qiladi, bilimlarni muhokama qiladi va muammolarni birgalikda hal qiladi. Bu metod o‘quvchilarning ijtimoiy ko‘nikmalarini rivojlantiradi, jamoada ishlash malakasini oshiradi va tanqidiy fikrlashni rag‘batlantiradi. Debatlar va rolli o‘yinlar talabalarning kommunikativ va analitik qobiliyatlarini rivojlantirishga xizmat qiladi. Debatlarda talaba o‘z fikrini mantiqiy ravishda asoslaydi, qarama-qarshi fikrlarni tahlil qiladi va samarali argumentlar bilan javob beradi. Rolli o‘yinlar esa real hayotiy yoki kasbiy vaziyatlarni simulyatsiya qiladi, talaba o‘zini turli rollarda sinab ko‘rish orqali amaliy ko‘nikmalarini mustahkamlaydi. Simulyatsiyalar va muammoli vaziyatlar talabalarga nazariy bilimlarni amaliyot bilan bog‘lash imkonini beradi. Masalan, iqtisodiyot yoki menejment fanlarida virtual biznes simulyatorlari, biologiya va kimyo laboratoriyalarida interaktiv virtual tajribalar qo‘llaniladi. Bu usullar orqali talaba xatolarini xavfsiz muhitda tahlil qilishi, yechimlarni sinab ko‘rishi va o‘rganish jarayonini individual ravishda rivojlantirishi mumkin. Interaktiv pedagogik texnologiyalarni joriy etish pedagogning vazifalarini ham o‘zgartiradi. Endi u nafaqat ma’lumot uzatuvchi, balki yo‘riqchi, maslahat beruvchi va motivator sifatida faoliyat yuritadi. Shuningdek, interaktiv texnologiyalar ta’limning individualizatsiyasini ta’minlaydi, chunki har bir talaba o‘z qobiliyatiga va o‘rganish tezligiga mos faoliyatda ishtirok etadi[6]. Zamonaviy ta’lim jarayonida interaktiv texnologiyalar bilan birgalikda raqamli vositalarni qo‘llash muhim ahamiyat kasb etadi. Masofaviy o‘qitish platformalari, vebinarlar, onlayn forumlar va interaktiv testlar talabaning mustaqil o‘rganishini rag‘batlantiradi va pedagogga individual yondashuv imkonini beradi. Shu bilan birga, interaktiv texnologiyalar o‘quv jarayonining samaradorligini oshiradi, talabaning motivatsiyasini kuchaytiradi va o‘zini rivojlantirish madaniyatini shakllantirishga xizmat qiladi.

Xulosa qilib aytganda, interaktiv pedagogik texnologiyalar zamonaviy ta’limning sifatini oshirish, o‘quvchilarning ijodiy va tanqidiy fikrlashini rivojlantirish, shuningdek, amaliy ko‘nikmalarni mustahkamlashning eng samarali vositalaridan biridir. Ular an’anaviy pedagogik texnologiyalarni to‘ldiradi va zamonaviy ta’lim jarayonini individual va interaktiv shaklga keltiradi.

Raqamli va elektron texnologiyalar – LMS platformalari, virtual laboratoriyalar, elektron kitoblar, vebinarlar. Ular ta’lim jarayonini individualizatsiya qilish va masofaviy o‘qitish imkonini beradi [5]. Raqamli va elektron pedagogik texnologiyalar zamonaviy ta’lim jarayonining ajralmas qismi bo‘lib, talaba va pedagogning faoliyatini samarali tashkil etishga xizmat qiladi. Ushbu texnologiyalar o‘quv jarayonini individualizatsiya qilish, interaktivlikni oshirish va o‘quvchilarni mustaqil o‘rganishga rag‘batlantirish imkonini beradi. Raqamli texnologiyalar yordamida talaba bilimni nafaqat nazariy jihatdan o‘zlashtiradi, balki amaliy mashg‘ulotlarda ham uni qo‘llash imkoniyatiga ega bo‘ladi. Raqamli va elektron texnologiyalarga Learning Management System (LMS) platformalari, virtual laboratoriyalar, elektron kitoblar, onlayn testlar, vebinarlar va interaktiv dars materiallari kiradi. LMS tizimlari ta’lim jarayonini tizimli va kuzatuvchan qiladi: pedagog talabaning o‘rganish jarayonini monitoring qiladi, topshiriqlarni baholaydi va individual yondashuv imkonini yaratadi. Shu bilan birga, talaba o‘z rivojlanishini kuzatishi va mustaqil ishlash ko‘nikmalarini rivojlantirishi mumkin[8]. Virtual laboratoriyalar va simulyatsion dasturlar o‘quvchilarga nazariy bilimlarni amaliyot bilan uyg‘unlashtirish imkonini beradi. Masalan, kimyo, biologiya yoki fizika fanlarida virtual tajribalar yordamida xavfsiz muhitda eksperiment o‘tkazish mumkin. Iqtisodiyot, menejment va informatika fanlarida esa biznes-simulyatorlar, ma’lumotlarni tahlil qilish dasturlari va kodlash platformalari qo‘llaniladi. Bu o‘quvchilarning muammolarni yechish, tanqidiy fikrlash va ijodiy yondashuv ko‘nikmalarini rivojlantiradi.

Blended learning (aralash ta’lim) – an’anaviy va masofaviy o‘qitish metodlarini uyg‘unlashtiradi. Bu talabalarga nazariy bilimlarni amaliy

mashg‘ulotlar bilan mustahkamlash imkonini yaratadi [6]. Blended Learning yoki aralash ta’lim — bu an’anaviy (oflayn) va masofaviy (onlayn) ta’lim shakllarini uyg‘unlashtirishga asoslangan pedagogik yondashuvdir. Ushbu yondashuv zamonaviy ta’lim jarayonida individual va interaktiv o‘rganishni ta’minlash, o‘quvchilarni mustaqil ishlashga rag‘batlantirish va amaliy ko‘nikmalarni shakllantirishda samarali vosita sifatida qo‘llaniladi. Aralash ta’limda o‘quv jarayoni ikki asosiy komponentdan tashkil topadi: oflayn darslar va onlayn resurslar. Oflayn darslarda pedagog ma’ruza, seminar, laboratoriya yoki amaliy mashg‘ulotlar orqali talabalarga nazariy va amaliy bilimlarni yetkazadi. Shu bilan birga, talaba guruh ishlari, muammoli vaziyatlar va debatlar orqali bilimlarini mustahkamlaydi. Onlayn komponent esa LMS platformalari, virtual laboratoriyalar, elektron kitoblar, videodarslar va interaktiv testlarni o‘z ichiga oladi. Talaba o‘z jadvaliga mos ravishda onlayn resurslardan foydalanadi, mustaqil topshiriqlarni bajaradi, natijalarni monitoring qiladi va pedagog bilan masofadan turib interaktiv muloqot qiladi. Bu jarayon talabaning o‘zini rivojlantirish, mustaqil o‘rganish va tanqidiy fikrlash ko‘nikmalarini rivojlantirishga yordam beradi[9].

Innovatsion pedagogik texnologiyalar – sun’iy intellekt asosidagi adaptiv tizimlar, interaktiv testlar va onlayn monitoring vositalari. Bu texnologiyalar o‘quv jarayonining shaxsga yo‘naltirilganligini ta’minlaydi [7]. Innovatsion pedagogik texnologiyalar zamonaviy ta’lim jarayonida bilim berish va o‘rganishni sifat jihatdan yangi bosqichga olib chiqadigan vositalar va usullar majmuasidir. Ular an’anaviy, interaktiv va raqamli texnologiyalarni yanada rivojlantirib, talabaning individual rivojlanishi, ijodiy va tanqidiy fikrlash ko‘nikmalarini shakllantirishga xizmat qiladi.

Innovatsion pedagogik texnologiyalar orasida sun’iy intellektga asoslangan adaptiv o‘quv tizimlari, interaktiv testlar, virtual laboratoriyalar, elektron va mobil ilovalar, onlayn monitoring vositalari va gamifikatsiya elementlari mavjud. Ushbu vositalar o‘quv jarayonini shaxsga yo‘naltirilgan, motivatsion va interaktiv shaklga keltiradi. Masalan, adaptiv o‘quv tizimlari har bir talabaning bilim darajasini tahlil

qilib, unga mos topshiriqlar va materiallarni avtomatik tarzda taklif qiladi. Bu o‘quv jarayonining individualizatsiyasini kuchaytiradi va samaradorligini oshiradi. Virtual laboratoriyalar va simulyatsion dasturlar esa talabalarga xavfsiz muhitda eksperiment o‘tkazish, yechimlarni sinash va amaliy ko‘nikmalarni rivojlantirish imkonini beradi. Masalan, kimyo, fizika va biologiya fanlarida virtual tajribalar orqali talaba xatolarini xavfsiz tahlil qiladi, menejment va iqtisodiyot sohalarida esa virtual biznes-simulyatorlar real hayotiy vaziyatlarni modellaydi. Gamifikatsiya elementlari va interaktiv platformalar o‘quv jarayonini qiziqarli va motivatsion qiladi. Masalan, o‘quvchilar vazifalarni bajarish orqali ballar to‘playdi, leader-boardlarda raqobatlashadi va natijalarini kuzatadi. Bu pedagogga talabaning faoliyatini monitoring qilish va individual yordam ko‘rsatish imkonini beradi[10].

Xulosa.

Ta’lim texnologiyalari zamonaviy ta’lim jarayonining samaradorligini oshirishda, talaba va pedagog faoliyatini tizimli va interaktiv shaklga keltirishda muhim vosita hisoblanadi. Tadqiqot natijalari shuni ko‘rsatadiki, an’anaviy, interaktiv, raqamli, aralash va innovatsion pedagogik texnologiyalarni uyg‘unlashtirib qo‘llash ta’lim jarayonini individual, motivatsion va amaliyotga yo‘naltirilgan qiladi.

An’anaviy pedagogik texnologiyalar nazariy bilimlarni tizimli tarzda uzatish va amaliy ko‘nikmalarni shakllantirishda asosiy poydevor vazifasini bajaradi. Interaktiv texnologiyalar o‘quvchilarning mustaqil fikrlashini, ijodiy va tanqidiy qobiliyatlarini rivojlantiradi, ularni faol ishtirokchiga aylantiradi. Raqamli va elektron texnologiyalar o‘quv jarayonini individualizatsiya qiladi, masofaviy ta’lim va monitoring imkoniyatlarini yaratadi. Blended learning (aralash ta’lim) esa an’anaviy va masofaviy usullarni uyg‘unlashtirib, ta’lim jarayonining fleksibil va qiziqarli bo‘lishini ta’minlaydi. Innovatsion pedagogik texnologiyalar esa adaptiv tizimlar, virtual laboratoriyalar va gamifikatsiya elementlari orqali o‘quv jarayonini yuqori darajada interaktiv va shaxsga yo‘naltirilgan qiladi. Shu tarzda, ta’lim texnologiyalarini tizimli va kompleks yondashuv bilan tatbiq etish talabaning bilim

va ko‘nikmalarini mustahkamlash, kasbiy kompetensiyalarini rivojlantirish hamda ta’lim jarayonini samaradorligini oshirishning eng samarali vositasi hisoblanadi. Natijada pedagogik jarayon sifatli va zamonaviy bo‘lib, talaba markazli ta’lim tizimi shakllanadi.

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ЎҚУВЧИЛАРНИНГ КРЕАТИВ ҚОБИЛИЯТИНИ РИВОЖЛАНТИРИШДА STEM ЁНДОШУВИДАГИ ТАЖРИБАЛАРИНИНИГ ЎРНИ

Иманов Бахтиёр Бердиевич
Термиз давлат педагогика институти
E-mail: imanovbaxtiyor744@gmail.com

Аннотация. *Ушбу мақолада мактаб ўқувчиларининг креатив фикрлашини ривожлантиришда STEM ёндашувидаги тажрибаларнинг аҳамияти таҳлил қилинган. Жумладан, ўқувчиларнинг кундалик ҳаётларида учрайдиган табиат ҳодисаларини кузатиш, уларнинг мазмун-моҳиятини англаш ва ижодий ечимлар топиш қобилиятини шакллантиришда тажрибавий фаолиятнинг ўрни ёритиб берилган. Тадқиқотда STEM ёндашувига асосланган тажрибаларни таълим жараёнига интеграция қилиш стратегияси ўрганилиб, улар орқали ўқувчиларнинг креативлик, мустақил фикрлаш ва муаммоли вазиятларга инновацион ечимлар топиш кўникмаларини ривожлантириш имкониятлари асослаб берилган. Шунингдек, айрим STEM тажрибалари мисолида ўрганилаётган мавзунинг долзарблиги илмий-педагогик жиҳатдан асосланган.*

Калит сўзлар: *STEM ёндашуви, тажрибавий фаолият, креатив фикрлаш, мактаб ўқувчилари, таълим жараёни, инновацион ечимлар, табиат ҳодисаларини кузатиш, тадқиқотчилик кўникмалари.*

Abstract . *This article analyzes the importance of STEM-based experiments in developing school students' creative thinking. In particular, the role of experimental activities in enhancing students' ability to observe natural phenomena encountered in daily life, understand their essence and meaning, and generate creative solutions is discussed. The study explores strategies for integrating STEM-based experiments into the educational process and substantiates their potential in fostering students' creativity, independent thinking, and ability to find innovative solutions to problem situations. In addition, the relevance of the studied topic is scientifically and pedagogically justified through examples of several STEM-based experiments.*

Keywords: *STEM approach, experimental activity, creative thinking, school students, educational process, innovative solutions, observation of natural phenomena, research skills.*

Кириш.

Ҳозирги кунда фан ва технологиялар тараққиётининг жадал ривожланиши таълим тизими олдига янги вазифаларни қўймоқда. Замонавий таълимда ўқувчиларга фундаментал билимлар бериш билан бирга, табиатда содир бўлаётган ҳодисаларни тушуниш, уларни келтириб чиқарувчи куч ва жараёнлар ўртасидаги боғлиқликларни таҳлил қилиш ҳамда уларнинг ривожланишини башорат қилишга доир илмий-тадқиқотчилик қобилиятларини ривожлантириш муҳим аҳамият касб этади.

Айниқса, иқлим ўзгариши, экологик муаммолар ва табиий офатлар хавфининг ортиб бориши шароитида ўқувчиларда табиат жараёнларини илмий асосда таҳлил қилиш ва уларнинг эҳтимолий оқибатларини баҳолай олиш кўникмаларини шакллантириш долзарб ҳисобланади. Шу нуқтаи назардан, жаҳон таълим амалиётида кенг қўлланилаётган STEM ёндошуви ўқувчиларнинг экспериментал тадқиқотлар ўтказиш, олинган натижаларни таҳлил қилиш, илмий хулосалар чиқариш ҳамда математик моделлар асосида башорат қилиш қобилиятларини ривожлантиришда муҳим аҳамиятга эга.

Тадқиқот мавзусининг ахамити. STEM ёндошувига асосланган тажрибалар нафақат таълим воситаси, балки ўқувчиларнинг табиат ҳодисаларини илмий асосда тушуниш, уларни таҳлил қилиш ва башорат қилишга қаратилган тадқиқотчилик ҳамда креатив тафаккурини ривожлантирувчи муҳим методик восита ҳисобланади.

Тадқиқот мавзусининг мақсади. Умумий ўрта таълим мактаблари ўқувчиларида креатив фикрлашни ривожлантириш, табиатда содир бўладиган ҳодисаларнинг сабаб ва қонуниятларини англаш, уларни таҳлил қилиш ва илмий башорат қила олишга доир тадқиқотчилик кўникмаларини шакллантиришда **STEM ёндашуви асосида ташкил этилган тажрибавий**

фаолиятнинг педагогик самарадорлигини назарий ва амалий жиҳатдан асослашдан иборат.

Мавзуга оид адабиётлар таҳлили

Замонавий таълим тизимида ўқувчиларнинг креатив, танқидий ва тадқиқотчилик фикрлашини ривожлантириш устувор вазифалардан бири ҳисобланади. Бу мақсадга эришишда таълим жараёнига фанлараро интеграцияга асосланган **STEM (Science, Technology, Engineering, Mathematics)** ёндашувини жорий этиш муҳим аҳамият касб этади. Шу боис мазкур масала маҳаллий ва хорижий олимлар томонидан кенг тадқиқ этилган.

Хорижий тадқиқотчилардан Judith A. Ramaley STEM таълимининг назарий асосларини ишлаб чиққан олимлардан бири бўлиб, у мазкур ёндашув ўқувчиларни муаммоларни комплекс ҳал қилишга ўргатиши ва фанлараро интеграция орқали амалий билимларни шакллантиришини таъкидлайди. George Yakman эса STEM таълимини интегратив таълим модели сифатида асослаб, унинг ўқувчиларда таҳлилий фикрлаш, муаммони ҳал қилиш ва ижодий ёндашувни ривожлантиришдаги аҳамиятини кўрсатиб берган. Rodger W. Bybee тадқиқотларида STEM таълими ўқувчиларни илмий-тадқиқотчилик фаолиятига жалб қилиш, табиий фанларга қизиқишини ошириш ва амалий кўникмаларини шакллантиришга хизмат қилиши илмий асосланган.

МДҲ олимларидан E. S. Polat таълимда лойиҳавий ва тадқиқот усулларидан фойдаланиш ўқувчиларнинг мустақил фикрлашини ривожлантиришда муҳим омил эканлигини таъкидлайди. Ўзбекистонлик олимлар N. Muslimov, B. Ziyomuhamedov ва U. Nishonalievлар ҳам инновацион технологиялар ва амалий фаолиятга асосланган таълим усуллари ўқувчиларнинг ижодий ҳамда мустақил фикрлашини ривожлантиришда самарали эканлигини қайд этганлар.

Таҳлиллар шуни кўрсатадики, STEM ёндашувига асосланган тажрибавий ва тадқиқотчилик фаолияти ўқувчиларнинг креатив ва таҳлилий тафаккурини, шунингдек илмий изланиш кўникмаларини ривожлантиришда муҳим ўрин тутади. Бироқ мактаб ўқувчиларининг табиат ҳодисаларини башорат қилишга

йўналтирилган илмий-тадқиқотчилик қобилиятларини STEM тажрибалари асосида ривожлантириш масаласи етарлича комплекс тадқиқ этилмаган. Шу жиҳатдан мазкур тадқиқот ушбу йўналишдаги илмий изланишларни бойитишга қаратилган.

Тадқиқот методологияси. Тадқиқотда ўқувчиларда табиат ҳодисаларини тушуниш ва илмий башорат қилиш кўникмаларини ривожлантиришда **STEM ёндошувидаги тажрибавий фаолиятнинг самарадорлигини аниқлаш** мақсадида адабиётлар таҳлили, педагогик кузатиш, сўровнома методларидан фойдаланилди. STEM асосида амалий топшириқлар ишлаб чиқилиб, тажриба-синов ишлари ўтказилди. Олинган натижалар таққослаш ва статистик таҳлил асосида умумлаштирилди.

Натижалар ва муҳокомалар.

Анъанавий ўқитиш моделларидан фарқли равишда, мазкур методика назарий билимларни оддий узатишга эмас, балки ўқувчиларни мустақил фикрлашга, муаммони таҳлил қилишга, гипотеза илгари суришга ва уни тажриба орқали текширишга йўналтиради. Бу эса ўқувчиларда креатив тафаккур, тадқиқотчилик маданияти ҳамда келажакда илмий фаолият билан шуғулланишга бўлган қизиқишни шакллантиришга хизмат қилади.

Тадқиқот доирасида илк бор мактаб таълими шароитида табиат ҳодисаларини келтириб чиқарувчи кучлар ва уларнинг ҳаракатини **реал маълумотлар ва тажрибавий кузатишлар асосида башорат қилиш ҳамда текширишга йўналтирилган STEM тажрибалари тизими** ишлаб чиқилди. Ушбу тизим ўқувчиларнинг креатив фикрлашини, таҳлилий ва танқидий тафаккурини ривожлантиришга хизмат қилувчи интегратив амалий топшириқлар мажмуини ўз ичига олади.

Олинган натижалар табиий фанлар таълими мазмунини такомиллаштириш, ўқитиш самарадорлигини ошириш, шунингдек ўқувчиларда илмий-тадқиқот ва муҳандислик фаолияти учун зарур бўлган **бошланғич таянч компетенцияларни шакллантириш**да қўлланилиши мумкин.

Шу тариқа, табиий фанлар курсини мактаб таълимида STEM ёндашувига асосланган тажрибалар билан бойитиш ўқувчиларда табиат ҳодисаларини тушуниш, уларнинг ривожланишини илмий асосда башорат қилиш ҳамда муаммоларга ижодий ечим топиш қобилиятларини ривожлантиришнинг самарали педагогик воситаси ҳисобланади. Бу эса ўз навбатида, келажакда фан, технология, экология ва табиатдан оқилона фойдаланиш соҳаларида фаолият юритадиган **янги авлод тадқиқотчилари ва мутахассисларини тайёрлаш**да муҳим аҳамият касб этади.

Охирги йилларда жаҳон таълим тизимида мактаб ўқувчиларида табиат ҳодисаларини илмий асосда тушуниш ва уларнинг ривожланишини башорат қилишга қаратилган тафаккурни шакллантириш масаласига алоҳида эътибор қаратилмоқда. Илмий башоратлаш илмий билишнинг муҳим усули бўлиб, у табиат қонуниятларини англаш билан бир қаторда ўқувчиларда таҳлилий, танқидий ва креатив фикрлашни ривожлантиришга хизмат қилади.

Мактаб ўқувчиларининг тажрибавий ва тадқиқотчилик фаолияти эса мазкур жараённинг асосий педагогик механизми ҳисобланиб, у гипотезаларни илгари суриш, уларни тажриба орқали текшириш ва натижаларни таҳлил қилиш орқали илмий фикрлаш маданиятини шакллантириш имконини беради.

Маълумки, тажриба ҳар қандай билимнинг асосий манбаи ҳисобланиб, у фанни бойитиш, назария ва амалиёт ўртасидаги боғлиқликни таъминлаш ҳамда янги ғояларни шакллантиришнинг муҳим воситаси сифатида намоён бўлади. Шу нуқтаи назардан қараганда, таълим жараёнида STEM ёндашувидаги тажрибавий фаолиятни ташкил этиш ўқувчиларнинг креатив фикрлашини ривожлантиришда алоҳида аҳамият касб этади.

STEM (Science, Technology, Engineering, Mathematics) ёндашувига асосланган тажрибалар ўқувчиларга табиат ва техника қонунларини нафақат назарий, балки амалий жиҳатдан ҳам англаш имконини беради. Бундай фаолият жараёнида ўқувчилар турли муаммоли вазиятларни ҳал қилиш, янги ечимларни излаш ва мустақил қарор қабул қилиш орқали ижодий фикрлаш кўникмаларини шакллантирадилар. Натижада улар табиий ҳодисаларнинг

келиб чиқиш сабаблари ва улар асосида ётган илмий қонуниятлар ҳақида чуқурроқ тасаввурга эга бўладилар.

Табиат ҳодисаларини тушуниш ва уларни башорат қилиш кўп ҳолларда комплекс ёндашувни талаб қилади. Бу жараён маълумотларни йиғиш, уларни таҳлил қилиш, моделлар яратиш ва келажакдаги натижаларни илмий асосда тахмин қилиш каби босқичларни ўз ичига олади. STEM ёндашувидаги тажрибавий фаолият ана шу жараёнларни таълим муҳитида амалга ошириш имконини бериб, ўқувчиларда тадқиқотчилик ва креативлик қобилиятларини ривожлантиради.

Масалан, метеорология соҳасига оид тажрибаларни олиб бориш жараёнида ўқувчилар ҳаво ҳарорати, намлик ва атмосфера босими каби кўрсаткичларни кузатиш ва таҳлил қилиш орқали об-ҳаво ўзгаришлари ҳақида тахминлар илгари суришлари мумкин. Бу жараён нафақат назарий билимларни мустаҳкамлайди, балки ўқувчиларда маълумотлар билан ишлаш, уларни таҳлил қилиш ва креатив хулосалар чиқариш кўникмаларини ҳам ривожлантиради.

Табиат ҳодисаларини келтириб чиқарувчи кучлар ва уларнинг ҳаракатини илмий асосда тушунтириш ҳамда башорат қилиш жараёни бир нечта босқичларни ўз ичига олади. Булар: кузатиш, маълумотларни йиғиш, моделлаштириш, гипотеза шакллантириш ва гипотезани тажриба орқали текшириш каби босқичлардан иборат. Ушбу босқичларни амалга оширишда STEM ёндашувидаги тажрибалар муҳим аҳамиятга эга бўлиб, улар ўқувчиларда таҳлил қилиш, муаммога ижодий ёндашиш ва янги ғоялар илгари сўриш қобилиятини шакллантиради.

Шунингдек, иқлим ўзгариши, ўсимликларнинг ўсиши ёки кимёвий реакциялар каби табиий жараёнларни ўрганишга қаратилган тажрибалар ўқувчиларда тадқиқотчилик маданиятини шакллантириб, уларнинг креатив фикрлаш фаоллигини оширади. Бу жараёнда илмий усулнинг асосий тамойилларини ўзлаштириш муҳим аҳамият касб этади. Жумладан, олинган натижаларни тўғри таҳлил қила олишлари, гипотезаларни текшириб

куришлари ва ўлчов жараёнида юзага келиши мумкин бўлган хатоларни аниқлай олиш каби кўникмалар ўқувчиларнинг мустақил ва ижодий фикрлашини ривожлантиришга хизмат қилади.

Ўқувчиларнинг креатив тафаккурни ривожлантиришда STEM ёндашувидаги тажрибавий ишларнинг мазмун ва мохияти билан танишиб утамиз. Замонавий таълим тизимида ўқувчиларнинг таҳлилий, танқидий ва креатив тафаккурини ривожлантириш устувор вазифалардан бири ҳисобланади. Бу борада **STEM ёндашуви асосида ташкил этилган тажрибавий машғулотлар** алоҳида аҳамиятга эга. Чунки бундай тажрибалар ўқувчиларни фақат тайёр билимларни ўзлаштиришга эмас, балки мустақил изланиш, таҳлил қилиш ва илмий хулосалар чиқаришга йўналтиради.

STEM ёндашувидаги тажрибаларни бажариш жараёнида кўплаб омиллар натижаларга таъсир кўрсатиши мумкин. Бу эса ўқувчилардан **муаммони таҳлил қилиш, илмий саволлар қўя олиш, гипотезалар шакллантириш ва ўз башоратларини асослаш** каби муҳим интеллектуал кўникмаларни талаб қилади. Мазкур жараёнда ўқувчилар маълумотларни тўплаш, уларни қайта ишлаш ва таҳлил қилиш орқали илмий билишнинг асосий методларини амалда қўллаш имкониятига эга бўладилар.

STEM ёндашувидаги тажрибалар жараёнида кутилмаган натижаларнинг юзага келиши ҳам табиий ҳолат ҳисобланади. Бундай вазиятлар ўқувчиларни олинган маълумотларни танқидий баҳолашга, янги фактлар асосида аввалги гипотезаларни қайта кўриб чиқишга ва илмий хулосаларни такомиллаштиришга ундайди. Натижада ўқувчиларда **илмий тафаккур маданияти, таҳлилий фикрлаш ва далилларга асосланган қарор қабул қилиш кўникмалари** шаклланади.

Мактаб таълим тизимининг асосий вазифаларидан бири ўқувчилар фаолиятини **илмий ёндашувни шакллантиришга йуналтиришдан** иборат. Илмий ёндашув деганда маълумотларга асосланган фикр юритиш, далиллар асосида хулоса чиқариш ва ҳодисалар ўртасидаги сабаб-оқибат боғланишларини аниқлай олиш тушунилади. Бу жараёнда STEM

ёндашувидаги тажрибавий машғулотлар назария ва амалиёт ўртасидаги боғлиқликни аниқ кўрсатиб бериш имконини яратади.

Мактаб ўқувчилари томонидан амалга ошириладиган STEM тажрибалари уларнинг таълимий компетенцияларини ривожлантириш билан бирга шахсий интеллектуал салоҳиятининг ўсишига ҳам хизмат қилади. Табиат ҳодисаларини келтириб чиқарувчи кучлар ва уларнинг ҳаракатини ўрганишга қаратилган амалий машғулотлар ўқувчиларда **фан ва техникага қизиқишни кучайтиради, ижодий фикрлашни рағбатлантиради ҳамда мустақил тадқиқот олиб бориш қобилиятини шакллантиради.**

Шу билан бирга, STEM ёндашувидаги тажрибалар ўқувчиларда **креатив фикрлашни ривожлантириш** учун ҳам қулай имконият яратади. Чунки тажриба жараёнида ўқувчилар мавжуд муаммоларга янги ечимлар излайдилар, турли вариантларни таққослайдилар ва энг мақбул ечимни танлашга ҳаракат қиладилар. Бу эса уларнинг инновацион фикрлашини ривожлантиришга хизмат қилади.

Табиат ҳодисаларини келтириб чиқарувчи кучлар ва уларнинг ҳаракатини илмий башорат қилиш жараёнида STEM тажрибалари ўқувчилардан нафақат назарий билимларни, балки **маълумотларни йиғиш, таҳлил қилиш, моделлаштириш ва натижаларни умумлаштириш** каби илмий-тадқиқот фаолиятига хос кўникмаларни ҳам талаб қилади. Шу жиҳатдан, STEM тажрибалари ўқувчиларда ҳодисаларни илмий асосда башорат қилиш, олинган натижаларни қайта таҳлил қилиш ва уларни тўғрилаш қобилиятини ривожлантиришда муҳим педагогик восита сифатида намоён бўлади.

Педагоглар эса мазкур жараёнда ўқувчиларнинг мустақил фаолиятини қўллаб-қувватлашлари, улар учун изланишга йўналтирилган таълим муҳитини яратишлари ва шахсий гипотезаларни шакллантириш ҳамда STEM тажрибалари орқали уларни амалда синаб кўриш имкониятларини таъминлашлари зарур. Бу эса ўз навбатида ўқувчиларда **таҳлилий, танқидий ва креатив тафаккурни ривожлантириш**, шунингдек илмий дунёқарашни шакллантиришга хизмат қилади.

Тадқиқот натижаларига кўра, табиат ҳодисаларини ўрганишга қаратилган **STEM тажрибалари** ўқувчиларнинг билимларини фақат назарий жиҳатдан эмас, балки амалий фаолият орқали мустаҳкамлашга хизмат қилди. Бунда ўқувчилар табиатдаги жараёнларни фақат кузатибгина қолмай, балки уларнинг келгусида қандай ривожланишини башорат қилишга ҳаракат қилдилар. Бу эса уларда **илмий-тадқиқотчилик фаолиятига хос бўлган аналитик ва креатив тафаккурни** шакллантиришга имкон яратди.

Шунингдек, тажрибалар жараёнида ўқувчилар гуруҳларда ишлаш, ўз фикрини асослаш ва натижаларни тақдим этиш орқали коммуникатив ва ижтимоий кўникмаларини ҳам ривожлантирдилар. Бу ҳолат STEM ёндошуви фақат фанлараро интеграцияни эмас, балки **таълим жараёнида инновацион ва ижодий муҳитни шакллантириш**га ҳам хизмат қилишини кўрсатди.

Қуйида тадқиқот давомида амалга оширилган ва юқорида батафсил тавсифланган **табиат ҳодисаларига оид STEM ёндошувидаги тажрибалардан айрим намунавий мисоллар** келтирилади.

1-тажриба. Булутларни кузатиш орқали об-ҳаво ўзгаришини башорат қилиш.

STEM ёндошуви асосида ташкил этилган тажрибавий машғулотлар ўқувчиларда табиат ҳодисаларини кузатиш, таҳлил қилиш ва илмий хулосалар чиқариш кўникмаларини шакллантиришга хизмат қилади. Шундай тажрибалардан бири – булутларни кузатиш орқали об-ҳаво ўзгаришини башорат қилишдир.

Мазкур тажриба давомида ўқувчилар осмондаги булут шаклларини кузатиб, уларнинг ташқи кўриниши, ранг ўзгариши ва ҳаракатини мунтазам қайд этиб борадилар. Масалан, булутлар қорайиб, пастга ёйилиб борса, бу ҳолат яқин вақтларда ёмғир, шамол ёки чақмоқли бўрон келиши эҳтимолини билдириши мумкин. Осмонда ипаксимон оқ булутлар (циррус булутлар) пайдо бўлиши эса кўп ҳолларда об-ҳавонинг ўзгариши, шамолнинг кучайиши ёки ёмғирнинг яқинлашишидан дарак беради. Катламли булутлар осмонни тўлиқ

қоплаб олган ҳолларда эса, одатда, узоқ давом этувчи майда ёмғирлар ёки булутли об-ҳаво кузатилади.

Ушбу жараён физик ва метеорологик қонуниятлар билан бевосита боғлиқ. Атмосфера босими, ҳарорат ва намлик миқдорининг ўзгариши булутларнинг ҳосил бўлиши ва ҳаракатига таъсир кўрсатади. Масалан, атмосфера босими пасайганда ҳаво совийди, ҳаводаги сув буғлари конденсацияланиб булутлар ҳосил қилади ва ёмғир ёғиши эҳтимоли ортади.

Тажриба қуйидаги босқичларда амалга оширилади: ҳар куни белгиланган вақтда (масалан, соат 10:00 ва 18:00 да) осмон ҳолатини кузатиш; булут тури ва ташқи белгиларини махсус кузатув дафтарига қайд этиш; шу кунги об-ҳаво ҳолатини ёзиб бориш; бир неча ҳафта давомида тўпланган маълумотларни таҳлил қилиш.

Натижада ўқувчилар булут турлари ва об-ҳаво ўзгариши ўртасидаги боғлиқликни мустақил равишда аниқлайдилар. Бу эса уларда **илмий тадқиқотчилик, таҳлилий фикрлаш ва креатив мулоҳаза юритиш қобилиятларини ривожлантиришга** хизмат қилади.

2-тажриба. Соя орқали вақтни аниқлаш.

STEM ёндошувидаги яна бир самарали тажрибалардан бири – соя орқали вақтни аниқлаш ҳисобланади. Бу тажриба астрономия ва физика қонуниятларига асосланади.

Маълумки, Ер ўз ўқи атрофида айлангани сабабли Қуёш осмонда шарқдан ғарбга томон ҳаракатланаётгандек кўринади. Ушбу ҳаракат натижасида кун давомида предметлар соясининг узунлиги ва йўналиши ўзгариб туради. Қуёш осмонда энг баланд нуқтага кўтарилганда (одатда туш вақтида) соя энг қисқа бўлади, эрталаб ва кечқурун эса соя узунлашади.

Тажриба жараёнида ўқувчилар тик жойлаштирилган таёқча ёки устуннинг соясини турли вақтларда ўлчаб, унинг узунлиги ва йўналишини белгилаб борадилар. Олинган маълумотлар асосида оддий **қуёш соати** модели яратилади.

Бу жараёнда ўқувчилар: Ернинг айланиш ҳаракати; Қуёш нурларининг тушиш бурчаги; соя узунлиги ва вақт ўртасидаги боғлиқлик каби илмий тушунчаларни амалиёт орқали ўзлаштирадилар. Шу орқали уларда **мустақил тадқиқот олиб бориш, моделлаштириш ва ижодий ечим топиш кўникмалари** шаклланади.

3-тажриба. Атмосфера босими ўзгариши орқали бўронни башорат қилиш.

STEM ёндашувидаги тажрибалар ўқувчиларни табиат ҳодисаларини илмий асосда таҳлил қилишга ўргатади. Бундай тажрибалардан бири – атмосфера босими ўзгаришини кузатиш орқали бўрон яқинлашишини башорат қилишдир.

Бу тажрибада ўқувчилар барометр асбобидан фойдаланиб атмосфера босимини мунтазам ўлчайдилар. Агар босим кескин пасайиши кузатилса, бу ҳолат кўп ҳолларда ёмғирли об-ҳаво ёки бўроннинг яқинлашишидан дарак беради. Аксинча, атмосфера босими кўтарилиши об-ҳавонинг барқарор ва очиқ бўлиш эҳтимолини билдириши мумкин.

Тажриба жараёнида ўқувчилар: барометр кўрсаткичларини қайд этадилар; уларни об-ҳаво ҳолати билан таққослайдилар; маълум вақтдан кейин статистик хулосалар чиқарадилар.

Мазкур тажриба орқали ўқувчилар **атмосфера физикаси асослари**, об-ҳаво динамикаси ва табиат ҳодисаларини башорат қилиш механизмларини англаб етадилар. Шу билан бирга, уларда **таҳлил қилиш, маълумотларни солиштириш ва илмий хулоса чиқариш асосида креатив фикр юритиш қобилиятлари** ривожланади.

Натижаларнинг амалий аҳамияти.Тадқиқот натижалари STEM ёндашувига асосланган тажрибавий машғулотларни таълим жараёнига тизимли жорий этиш ўқувчиларнинг креатив ва тадқиқотчилик фикрлашини ривожлантиришда муҳим аҳамият касб этишини кўрсатди. Бундай фаолият ўқувчиларни мустақил изланишга, муаммоли вазиятларни таҳлил қилишга ва илмий асосланган ечимлар ишлаб чиқишга йўналтиради. Шу билан бирга,

уларда билимларни амалий вазиятларда қўллаш, табиат ва техника соҳаларидаги жараёнларни таҳлил қилиш ҳамда ноанъанавий қарорлар қабул қилиш кўникмалари шаклланади. Натижада ўқувчиларнинг интеллектуал салоҳияти ошади ва келажак касбий фаолияти учун зарур бўлган креатив ҳамда инновацион фикрлаш компетенциялари ривожлантирар экан.

Қисқа хулоса

STEM ёндашувига асосланган тажриба ишлари мактаб ўқувчиларида табиат ҳодисаларини илмий асосда тушуниш ва башорат қилиш қобилиятини ривожлантиришда муҳим педагогик омил ҳисобланади. Тажрибаларни мустақил бажариш жараёни ўқувчиларнинг таҳлилий ва танқидий фикрлашини ривожлантириб, табиий ва физик қонунларни чуқур англашга хизмат қилади. Эмпирик маълумотларни йиғиш ва таҳлил қилиш орқали ўқувчилар назарий билимларни амалий жараёнлар билан боғлайди. Натижада уларда табиат ҳодисаларини таҳлил қилиш ва илмий башоратлашга оид тадқиқотчилик кўникмалари шаклланади. Шу боис STEM ёндашувидаги тажриба ишларини таълим жараёнига кенг жорий этиш долзарб аҳамият касб этади.

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ДИАЛОГ КУЛЬТУР КАК СРЕДСТВО ЛИЧНОСТНОГО РАЗВИТИЯ ШКОЛЬНИКОВ В СОВРЕМЕННОЙ ОБРАЗОВАТЕЛЬНОЙ СРЕДЕ

Махмудхожаев Ориф Бахтиёрович

E-mail: mahmudhozaevorif@gmail.com

Аннотация: *В работе рассматривается значение диалога культур в процессе личностного развития учащихся в школьной образовательной среде. Актуальность темы связана с тем, что современная школа всё чаще становится пространством взаимодействия различных культурных традиций и социальных установок. В исследовании анализируется влияние межкультурного общения на формирование ценностных ориентаций, коммуникативных навыков и способности школьников к рефлексии. Особое внимание уделяется образовательным ситуациям, в которых учащиеся сталкиваются с различными культурными точками зрения и учатся выстраивать конструктивный диалог. Отмечается, что систематическое включение межкультурных обсуждений, совместных проектов и рефлексивных заданий способствует развитию эмпатии, уважения к*

культурному разнообразию и более осознанному отношению к собственной культурной идентичности.

***Ключевые слова**: диалог культур, личностное развитие, школьная среда, межкультурная коммуникация, образовательное взаимодействие, культурное разнообразие.*

***Annotatsiya:** Tadqiqotda maktab ta’lim muhitida o‘quvchilarning shaxsiy rivojlanishi jarayonida madaniyatlar muloqotining ahamiyati o‘rganilgan. Mavzuning dolzarbligi zamonaviy maktabning turli madaniy an’analar va ijtimoiy munosabatlarning o‘zaro ta’siri makoniga aylanib borayotgani bilan bog‘liq. Tadqiqotda maktab o‘quvchilarining qadriyat yo‘nalishlari, muloqot ko‘nikmalari va refleksiya qobiliyatining shakllanishiga madaniyatlararo muloqotning ta’siri tahlil qilingan. O‘quvchilar turli xil madaniy nuqtai nazarlar bilan to‘qnashadigan va konstruktiv muloqotni o‘rganadigan ta’lim vaziyatlariga alohida e’tibor qaratiladi. Qayd etilishicha, madaniyatlararo munozaralar, qo‘shma loyihalar va refleksiv topshiriqlarni tizimli ravishda kiritish hamdardlik, madaniy xilma-xillikka hurmat va o‘z madaniy o‘ziga xosligiga ongli munosabatni rivojlantirishga yordam beradi.*

***Kalit so‘zlar**: madaniyatlar dialogi, shaxsiy rivojlanish, maktab muhiti, madaniyatlararo muloqot, ta’lim o‘zaro ta’siri, madaniy xilma-xillik.*

***Abstract**: The work examines the significance of cultural dialogue in the process of student personal development within the school educational environment. The relevance of the topic is connected with the fact that the modern school is increasingly becoming a space for the interaction of various cultural traditions and social attitudes. The study analyzes the influence of intercultural communication on the formation of value orientations, communication skills, and reflection abilities in schoolchildren. Special attention is paid to educational situations in which students encounter different cultural viewpoints and learn to engage in constructive dialogue. It is noted that the systematic inclusion of intercultural discussions, joint projects,*

and reflective tasks contributes to the development of empathy, respect for cultural diversity, and a more conscious attitude towards one's own cultural identity. The obtained observations allow us to consider the dialogue of cultures as an important pedagogical resource for the formation of students' personality in modern school conditions.

Keywords: *dialogue of cultures, personal development, school environment, intercultural communication, educational interaction, cultural diversity.*

Современная школа постепенно превращается в пространство, где пересекаются различные культурные традиции, жизненные опыты и способы восприятия мира. Даже если учащиеся живут в одном городе и учатся в одной школе, их семейные истории, привычки и ценности могут заметно отличаться. Иногда эти различия остаются почти незаметными, а иногда становятся причиной недопонимания. В подобных условиях особенно важным становится умение вести диалог. В педагогической практике всё чаще говорится о необходимости формирования у школьников межкультурной компетентности. Однако этот процесс не ограничивается изучением культурных особенностей различных народов. Гораздо важнее научить учащихся воспринимать различие как естественную часть человеческого опыта и видеть в нём возможность для расширения собственного взгляда на мир[1].

Наблюдения за школьной жизнью показывают, что многие подростки впервые серьёзно сталкиваются с культурными различиями именно в образовательной среде. Это может проявляться в самых обычных ситуациях: обсуждении семейных традиций, разговоре о праздниках или обмене мнениями о социальных нормах. На первый взгляд такие разговоры могут казаться незначительными, однако именно в них часто закладываются основы более глубокого понимания культурного многообразия. Подростковый возраст является особенно чувствительным периодом для формирования ценностных установок. В это время учащиеся начинают активно искать ответы на вопросы о собственной идентичности и о том, какое место они занимают в

обществе. Встреча с другой культурной перспективой может стать важным импульсом для размышления. Она позволяет увидеть привычные вещи под новым углом и задуматься о том, что многие нормы и традиции не являются универсальными.

Одним из эффективных способов развития межкультурного диалога в школе является организация дискуссий. Когда учащимся предлагается обсудить реальные жизненные ситуации, связанные с культурными различиями, разговор постепенно выходит за рамки простого обмена фактами. Школьники начинают делиться личным опытом, задавать вопросы и сравнивать различные точки зрения[2].

Интересно наблюдать, как меняется характер подобных обсуждений. На первых этапах многие высказывания носят достаточно обобщённый характер. Иногда можно услышать стереотипные оценки или слишком простые объяснения культурных различий. Однако по мере того как разговор становится более содержательным, учащиеся начинают внимательнее относиться к словам друг друга.

Постепенно появляются уточняющие вопросы, попытки понять причины тех или иных традиций и интерес к личным историям одноклассников. Такой процесс общения способствует развитию рефлексии. Подростки начинают не только узнавать что-то новое о других культурах, но и по-другому смотреть на собственные представления.

Важно отметить, что межкультурный диалог влияет не только на уровень знаний, но и на эмоциональную сторону взаимодействия. Когда учащиеся получают возможность рассказать о своём опыте и услышать опыт других людей, в классе постепенно формируется более доверительная атмосфера. Школьники начинают воспринимать различия не как повод для дистанции, а как источник нового понимания.

В этом контексте диалог культур можно рассматривать как один из факторов личностного развития. Учащиеся учатся проявлять эмпатию, учитывать разные точки зрения и более осознанно относиться к собственным

убеждениям. Эти навыки оказываются важными не только в учебной среде, но и в повседневной жизни.

Практика показывает, что наибольший эффект достигается тогда, когда элементы межкультурного диалога становятся частью регулярной учебной деятельности. Это могут быть совместные проекты, обсуждение социальных проблем, анализ художественных текстов или исследовательские задания, связанные с культурными традициями разных народов. В таких ситуациях учащиеся не просто получают информацию, а активно включаются в процесс осмысления[3].

Со временем подобная работа начинает влиять на характер взаимодействия внутри класса. Учащиеся становятся более терпимыми к различным мнениям, чаще пытаются аргументировать собственную позицию и внимательнее относятся к словам собеседника. Даже в случае разногласий разговор проходит более спокойно и конструктивно.

Таким образом, диалог культур можно рассматривать как важный педагогический инструмент формирования личности школьника. Он способствует развитию коммуникативных навыков, формированию уважительного отношения к культурному разнообразию и расширению мировоззрения учащихся.

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INFORMATION TECHNOLOGIES AND DIGITAL TRANSFORMATION

RAQAMLI IQTISODIYOTDA AXBOROT TEXNOLOGIYALARINING ROLI: MUAMMOLAR VA ISTIQBOLLAR

Abduvayitov Jasurjon Izzatillo o‘g‘li

Tashkent state university of economics

jasurjonai@gmail.com

Annotatsiya: *Ushbu maqolada raqamli iqtisodiyotning shakllanishi va axborot texnologiyalarining iqtisodiy rivojlanishdagi o’rni tahlil etiladi. Raqamlashtirish jarayonining iqtisodiy o’sishga ta’siri, mavjud muammolar va kelajak istiqbollari ko’rib chiqiladi. O’zbekistondagi raqamli transformatsiya tajribasi asosida amaliy tavsiyalar ishlab chiqilgan.*

Kalit so’zlar: *raqamli iqtisodiyot, axborot texnologiyalari, raqamli transformatsiya, innovatsiya, iqtisodiy o’sish.*

Abstract: *This article analyzes the formation of the digital economy and the role of information technologies in economic development. The impact of digitalization on economic growth, existing challenges, and future prospects are examined. Practical recommendations are developed based on the experience of digital transformation in Uzbekistan.*

Keywords: *digital economy, information technology, digital transformation, innovation, economic growth.*

Kirish

Zamonaviy dunyoda raqamli texnologiyalar iqtisodiyotning barcha sohalarini qamrab olmoqda. Axborot texnologiyalari (AT) nafaqat ishlab chiqarish samaradorligini oshirish, balki yangi iqtisodiy modellarni shakllantirishda ham

muhim rol o’ynamoqda. Jahon iqtisodiy forumining ma’lumotlariga ko’ra, raqamlashtirish 2025 yilga kelib jahon yalpi ichki mahsulotiga 100 trillion dollardan ortiq qiymat qo’shishi kutilmoqda [1]. O’zbekiston ham ushbu global tendensiyani hisobga olgan holda "Raqamli O’zbekiston — 2030" strategiyasini amalga oshirmoqda.

Tadqiqotning maqsadi O’zbekiston misolida raqamli iqtisodiyot va AT o’rtasidagi bog’liqlikni tahlil qilish, asosiy muammolarni aniqlash va istiqbolli yo’nalishlarni belgilashdan iborat. Raqamli iqtisodiyot deganda raqamli texnologiyalar asosida qurilgan yangi iqtisodiy tizim tushuniladi [2]. Bugungi kunda u elektron tijorat, sun’iy intellekt, bulut hisoblash va katta ma’lumotlar tahlilini o’z ichiga oladi.

Asosiy qism

1. Axborot texnologiyalarining iqtisodiy o’sishga ta’siri

AT iqtisodiy rivojlanishga bir necha yo’l orqali ta’sir qiladi. Birinchidan, mehnat unumdorligini oshiradi — raqamlashtirish darajasi yuqori mamlakatlarda ishchi kuchi unumdorligi 20–30 foizga ortadi. Ikkinchidan, yangi ish o’rinlari vujudga keltiradi: XMT hisobotiga ko’ra, raqamli iqtisodiyot 2030 yilga qadar 58 million yangi ish o’rnini yaratar [3]. Uchinchidan, korruptsiyaga qarshi kurashda va davlat boshqaruvini shaffoflashtirish jarayonida muhim vosita bo’lib xizmat qiladi.

McKinsey Global Institute tadqiqotiga ko’ra, raqamli texnologiyalarni keng joriy etgan kompaniyalar daromadini o’rtacha 23 foizga oshirgan, xarajatlarini esa 22 foizga qisqartirgan [4]. Moliya sektori misolida ko’radigan bo’lsak, raqamli bank xizmatlari mijozlarga xizmat ko’rsatish xarajatlarini 80 foizgacha kamaytirish imkonini bermoqda. Qishloq xo’jaligida esa aqlli dala boshqaruv tizimlari hosildorlikni 15–20 foizga oshirish va resurslardan tejamkor foydalanishni ta’minlaydi.

Makroiqtisodiy ko’rsatkichlar nuqtai nazaridan ham raqamli iqtisodiyotning ta’siri beqiyosdir. OECD mamlakatlarida o’tkazilgan tadqiqotlar shuni ko’rsatadiki,

IT sohasiga qo’yilgan har 1 dollar investitsiya iqtisodiyotda 3–4 dollar daromad keltiradi [5]. Bundan tashqari, raqamli eksport an’anaviy tovarlar eksportiga nisbatan ikki barobar tezroq o’sib bormoqda. Bu esa rivojlanayotgan mamlakatlar uchun o’z eksport salohiyatini oshirishning yangi yo’lini ochib bermoqda.

2. O’zbekistondagi raqamli transformatsiya

O’zbekiston 2017 yildan beri raqamli iqtisodiyotni rivojlantirishga alohida e’tibor qaratmoqda. Elektron hukumat platformalari kengaytirildi, IT parklari tashkil etildi, keng polosali internet infratuzilmasi rivojlantirildi. 2023 yil ma’lumotlariga ko’ra, aholining 75 foizdan ortig’i internet xizmatlaridan foydalanmoqda. IT Park dasturi doirasida 700 dan ortiq rezident kompaniya faoliyat yuritib, soha eksporti 350 million dollardan oshdi [5].

Moliya sohasida ham o’zgarishlar sezilarli: naqd pulsiz to’lovlar ulushi 50 foizdan oshdi, mobile banking foydalanuvchilari 15 millionni tashkil etdi. Davlat xaridlarini raqamlashtirish tufayli byudjetga yiliga 500 milliard so’mdan ortiq tejamkorlik ta’minlanmoqda [6]. Fuqarolar hozirda 300 dan ortiq davlat xizmatlaridan onlayn foydalanish imkoniyatiga ega.

3. Mavjud muammolar va to’siqlar

Raqamli transformatsiya jarayonida bir qator tizimli qiyinchiliklar mavjud. Birinchi muammo — raqamli savodxonlikning past darajasi: qishloq aholisining faqat 58 foizi internetdan muntazam foydalanadi, bu shaharlardagi 89 foizlik ko’rsatkichdan past [7]. Ikkinchi muammo — kiberxavfsizlik: 2023 yilda 12 000 dan ortiq kiberxavfsizlik hodisasi qayd etilgan [8].

Uchinchi muammo — infratuzilma va moliyalashtirish kamchiliklari. Ko’plab kichik va o’rta korxonalar raqamli texnologiyalarni joriy etishga yetarli resursga ega emas. To’rtinchi muammo — malakali kadrlar taqchilligi: AT sohasi uchun mutaxassislar tayyorlash tizimi hali talabga to’liq javob bermayapti. Ushbu muammolarni bartaraf etish iqtisodiy modernizatsiyaning muhim sharti hisoblanadi.

Beshinchi muammo — qonunchilik va tartibga solish muhitining nomukammalligi. Raqamli iqtisodiyotning jadal rivojlanishi ko’pincha qonunchilik bazasining yangilanish sur’atidan o’zib ketmoqda. Elektron tijorat, sun’iy intellekt sohasida yetarli huquqiy me’yorlar hali to’liq shakllanmagan. Shaxsiy ma’lumotlarni himoya qilish masalasi ham alohida e’tiborni talab etmoqda, chunki foydalanuvchilar ma’lumotlari xavfsizligi ta’minlanmasa raqamli xizmatlarga bo’lgan ishonch pasayishi mumkin [8].

4. Istiqbolli rivojlanish yo’nalishlari

Bir necha strategik yo’nalishlarni ajratib ko’rsatish mumkin. Birinchi yo’nalish — sun’iy intellekt va katta ma’lumotlarning iqtisodiyotga integratsiyasi: moliya, logistika, sog’liqni saqlash sohalarida AI tizimlari samaradorlikni sezilarli oshiradi. Ikkinchi yo’nalish — elektron tijorat va fintech rivojlanishi: O’zbekiston elektron tijorat bozori 2025 yilga kelib 2 milliard dollarga yetishi kutilmoqda [9].

Uchinchi yo’nalish — blokcheyn texnologiyasini davlat boshqaruvi va moliyada qo’llash, bu shaffoflikni oshirish va byurokratiyani kamaytirish imkonini beradi. To’rtinchi yo’nalish — "aqlli shahar" tushunchasini joriy etish: transport, energetika va kommunal xizmatlarni raqamli texnologiyalar orqali samarali boshqarish. Toshkentda amalga oshirilayotgan Smart City loyihalari bu yo’nalishda muhim qadam bo’lmoqda.

Xulosa

Taqdim etilgan tadqiqot shuni ko’rsatdiki, AT ning iqtisodiyotga integratsiyasi mehnat unumdorligini oshirish, yangi ish o’rinlarini yaratish va davlat boshqaruvini takomillashtirish kabi ijobiy natijalarga olib kelmoqda. O’zbekiston bu sohada muhim qadamlar qo’ygan bo’lsa-da, raqamli savodxonlikni oshirish, kiberxavfsizlikni mustahkamlash va kadrlar masalasini hal etish bo’yicha izchil islohotlar davom ettirish zarur.

Quyidagi tavsiyalar ilgari suriladi: raqamli savodxonlik dasturlarini maktab o’quv dasturlariga kiritish; kichik va o’rta biznes uchun raqamli transformatsiya

bo’yicha imtiyozli kreditlar ajratish; kiberxavfsizlik infratuzilmasini mustahkamlash uchun davlat-xususiy sheriklikni kengaytirish. Ushbu yo’nalishlar O’zbekistonning xalqaro raqobatbardoshligini oshirishga va barqaror iqtisodiy o’sishni ta’minlashga xizmat qiladi.

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COMPARATIVE ANALYSIS OF EXPONENTIAL AND SUB-EXPONENTIAL INTEGER FACTORIZATION ALGORITHMS

Akhadova Ugiloy Chorshanbi kizi
National University of Uzbekistan named after Mirzo Ulugbek
axadovauch@gmail.com

Abstract. *This paper examines integer factorization as a fundamental problem in number theory and its critical role in modern cryptography. In particular, the security of the RSA algorithm relies on the computational difficulty of factoring large composite numbers into prime factors. The study compares classical methods such as Fermat, Pollard's ρ, Pollard's p−1, Shanks' SQUFOF, and Lehman algorithms, alongside advanced approaches including Dixon's method, CFRAC, the Quadratic Sieve, Lenstra's Elliptic Curve Method, and the Number Field Sieve. Each algorithm is analyzed in terms of theory, complexity, efficiency, and practical applicability in cryptanalysis.*

Keywords: *integer factorization, RSA algorithm, cryptography, number theory, factorization algorithms, computational complexity, Quadratic Sieve, Number Field Sieve, Elliptic Curve Method, Pollard's rho, Fermat method, CFRAC, Dixon's method, cryptanalysis*

1. Introduction

Decomposing a composite number into its prime factors remains a fundamental problem in number theory and a cornerstone of modern cryptography. While multiplying large primes is computationally easy, reversing the process is significantly harder, forming the basis of public-key systems. In particular, the security of the RSA algorithm depends on the practical difficulty of factoring large semiprime numbers.

Over time, numerous factorization algorithms have been developed. Early methods such as Fermat's technique and Pollard's ρ are simple but inefficient for large inputs, whereas sub-exponential algorithms like the Quadratic Sieve and Number Field Sieve significantly improve performance.

Studying these methods is essential for evaluating cryptographic security, understanding algorithm behavior under different conditions, and adapting to advances in computational power. This paper provides a structured comparison of classical and modern techniques, highlighting their effectiveness and limitations.

2. Methodology

This study adopts a structured approach including classification, theoretical analysis, empirical interpretation, and comparative synthesis.

2.1 Algorithm Classification

Factorization algorithms are divided into two groups: exponential-time methods and sub-exponential methods, following standard classifications in computational number theory.

2.2 Analytical Framework

Each algorithm is evaluated based on its mathematical foundation, time complexity, effective range, strengths and weaknesses, and whether it is general-purpose or specialized.

2.3 Empirical Interpretation

Previously reported computational examples and execution results are used as qualitative indicators to identify performance trends, particularly the limitations of exponential methods and the scalability of sub-exponential algorithms.

2.4 Comparative Synthesis

The results are summarized in structured tables, combining theoretical and practical insights while preserving the original source structure.

3. Exponential-Time Algorithms

3.1 Fermat's Factorization Method

Fermat's approach relies on representing

$$N = x^2 - y^2 = (x - y)(x + y)$$

It is efficient only when the prime factors p and q are close in magnitude. For unbalanced semiprimes its running time becomes exponential in the bit-length of N[3]. Effective for < 16-bit inputs.

3.2 Pollard's ρ Algorithm

Pollard's ρ uses pseudorandom iterates and Floyd's cycle-finding technique. Its expected runtime is approximately

$$O(\sqrt{p}),$$

where p is the smallest prime factor. It performs well for medium-sized factors and is practical up to ~ 30 bits [4].

3.3 Pollard-Strassen Algorithm

This hybrid method combines Pollard's ρ with Strassen's enhancements, improving factor discovery in specific conditions but remaining exponential in the worst case [5]. Applicable roughly below 24 bits.

3.4 Shanks' SQUFOF (Square Forms Factorization)

SQUFOF refines Fermat's idea using quadratic forms. It is fast on small devices and performs well for numbers below ~ 26 bits [6].

3.5 Pollard's $p-1$ Algorithm

This method exploits the smoothness of $p-1$. When a factor satisfies the smoothness condition, the algorithm is extremely efficient; otherwise it fails entirely. It is effective for some integers up to ~ 66 bits [7].

3.6 Lehman's Algorithm

Lehman's algorithm is deterministic and achieves a complexity close to

$$O\left(N^{1/3}\right),$$

representing a historical improvement over naïve trial division. It is mainly of theoretical interest and practical only for small values (<16 bits) [8].

4. Sub-Exponential Factorization Algorithms

Sub-exponential algorithms are described using the L-notation:

$$L_n(\alpha, c) = \exp((c + o(1))(\log n)^{\alpha}(\log\log n)^{1-\alpha})$$

4.1 Dixon's Algorithm

One of the earliest sub-exponential methods, Dixon's algorithm finds random squares modulo N and uses them to derive congruences. Effective below ~ 73 bits and of foundational importance [9].

4.2 CFRAC (Continued Fraction Factorization Method)

CFRAC uses convergents in the continued fraction expansion of $\sqrt{N}$ to find congruent squares. It was one of the fastest known methods prior to the Quadratic Sieve and is practical up to ~ 80 bits [10].

4.3 Quadratic Sieve (QS)

The Quadratic Sieve generalizes Fermat's method with sieving and linear algebra, achieving complexity

$$L_n\left(\frac{1}{2}, 1\right).$$

It is highly effective for numbers up to ~ 100 digits (≈ 330 bits) and remains one of the most influential general-purpose algorithms [11].

4.4 Lenstra's Elliptic Curve Method (ECM)

ECM uses arithmetic on elliptic curves to find relatively small prime factors. Its runtime approximates

$$L_p\left(\frac{1}{2}, \sqrt{2}\right),$$

making it the most efficient method for discovering small and medium-sized prime factors (<83 bits) [12].

4.5 Number Field Sieve (NFS)

NFS is the fastest known classical factoring algorithm, with complexity

$$L_n\left(\frac{1}{3}, (64/9)^{1/3}\right)$$

It is the dominant method for factoring numbers larger than ~ 110 bits and the only practical approach for modern RSA key sizes [13].

Comparative Analysis

5.1 Exponential Algorithms Summary

Table 1. Summary of Exponential-Time Factorization Algorithms

Algorithm	Mathematical Basis	Effective Range	Complexity
Fermat	Difference of squares	<16 bits	Exponential [3]
Pollard ρ	Cycle detection	<30 bits	$O(\sqrt{p})$[4]
Pollard-Strassen	Hybrid	<24 bits	Exponential [5]
SQUFOF	Quadratic forms	<26 bits	Exponential [6]
Pollard p − 1	Smoothness	<66 bits	Smoothness-dependent [7]
Lehman	Deterministic	<16 bits	$O\left(N^{1/3}\right)$ [8]

5.2 Sub-Exponential Algorithms Summary

Table 2. Summary of Sub-Exponential-Time Factorization Algorithms

Algorithm	Basis	Effective Range	Complexity
Dixon	Random congruences	<73 bits	$L(1/2, c)$ [9]
CFRAC	Continued fractions	<80 bits	$L(1/2, c)$ [10]
Quadratic Sieve	Sieving	<100 digits	$L(1/2,1)$ [11]
ECM	Elliptic curves	<83-bit factors	$L(1/2, \sqrt{2})$ [12]
NFS	Number fields	>110 bits	$L\left(1/3, (64/9)^{1/3}\right)$ [13]

5.3 Practical Observations

Empirical results from the original dataset indicate that exponential algorithms degrade rapidly as the bit length increases, whereas sub-exponential methods continue to perform reliably. NFS overwhelmingly outperforms all other classical algorithms on large inputs, confirming its status as the practical tool for analyzing RSA-size integers [2].

6. Conclusion

The findings of this study demonstrate that integer factorization has undergone a significant evolution, progressing from relatively simple and intuitive techniques to highly sophisticated algorithms capable of addressing large-scale cryptographic challenges. Classical exponential-time methods, including Fermat's approach and Pollard's ρ algorithm, exhibit conceptual clarity but are inherently limited in scalability. In contrast, sub-exponential algorithms—such as Dixon's method, the Quadratic Sieve, Lenstra's Elliptic Curve Method, and the Number Field Sieve—represent substantial advances, offering markedly improved efficiency and defining the practical limits of contemporary classical factorization.

A central observation is that the computational difficulty of factorization is not static but evolves alongside improvements in algorithm design and computational capabilities. Consequently, the security of cryptographic systems, particularly the RSA algorithm, must be continuously reassessed in light of emerging developments.

In this context, a rigorous understanding of both exponential and sub-exponential factorization techniques is essential not only for theoretical analysis but also for the evaluation of current cryptographic standards and the development of more resilient security frameworks.

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EVALUATING THE EFFECTIVENESS OF MACHINE LEARNING MODELS IN PREDICTING PUBLIC SERVICE DEMAND: AN EMPIRICAL STUDY OF E-GOVERNMENT PLATFORMS IN CENTRAL ASIA

Berdibaev Karajan Jenisbay uli

University of innovation technologies

kberdibaev13@gmail.com

Abstract. *This study evaluates three machine learning models – Random Forest, XGBoost, and LSTM – for forecasting daily public service demand on e-government platforms in Uzbekistan and Kazakhstan. Using approximately 500,000 service request records (2019–2024) from data.egov.uz and data.gov.kz, a supervised ML pipeline was implemented and benchmarked. XGBoost achieved the highest overall accuracy ($R^2 = 0.93$), while LSTM outperformed other models for 14–30 day forecasting horizons. SHAP analysis identified service category, day of week, and national holiday proximity as the top demand predictors. The findings offer a practical, deployable forecasting framework for Central Asian e-government systems.*

Keywords: *Machine Learning, E-Government, Demand Forecasting, Digital Transformation, Central Asia, XGBoost, LSTM, Random Forest, SHAP, Smart Governance*

Introduction

The digitalization of the public sector has been in rapid motion in Central Asia, with countries such as Uzbekistan, Kazakhstan, and Kyrgyzstan launching comprehensive digital platforms for citizens to access legal, financial, and social services without the need for direct physical presence in government institutions. The Uzbekistan digital platform (egov.uz) and Kazakhstan digital platform (egov.kz) are processing millions of such requests annually.

Despite such successes in digitalizing the public sector, there has been a persistent issue in the operation of these digital platforms, which remains unresolved. This issue is the inability of these digital platforms to accurately predict changes in demand for services. This has resulted in inefficiency in the operation of these digital platforms, especially around national holidays, tax seasons, and annual registration seasons. This inefficiency has a direct bearing on the citizen experience and, in turn, on the faith citizens have in digital governance.

Machine learning has been seen as a viable tool for demand forecasting in various sectors such as retail, health, and transportation. However, in the field of digital governance, machine learning has been seen as a relatively untapped area,

with little research done on demand forecasting in Central Asia. Most research done on machine learning in digital governance has been on developed countries in the West and East, which is vastly different in terms of infrastructure, digital literacy, and digital behavior.

This research fills this gap in the field of machine learning in digital governance in Central Asia by conducting an empirical comparison of three machine learning models, namely Random Forest, XGBoost, and LSTM, on actual data available on digital portals in Central Asia. This research has the following key contributions:

– A structured dataset of around 500,000 service requests available for reproducible research, specifically for Uzbekistan and Kazakhstan (2019-2024)

– An empirical comparison of three machine learning models on actual data available on digital portals in Central Asia

– Key demand predictors using SHAP value feature importance analysis

– A deployable forecasting framework for machine learning in digital governance environments

Machine Learning for Demand Forecasting

The application of machine learning in demand prediction has been widely explored in commercial and industrial environments. XGBoost, proposed by Chen and Guestrin in 2016, has gained popularity for structured tabular data tasks owing to its gradient-boosting algorithm and regularization properties. LSTM, proposed by Hochreiter and Schmidhuber in 1997, is an extension of RNN for long-range dependencies, which is particularly useful for time-series forecasting tasks.

In the public sector, Fernandez-Ares et al. (2020) proposed Random Forest for forecasting demand in Spanish municipalities, achieving $R^2 > 0.85$. Another study by Zhang et al. (2021) demonstrated the superiority of LSTM in multi-step ahead forecasting for healthcare services in Chinese provincial hospitals. Although these studies indicate the applicability of machine learning in demand forecasting

for the public sector, none of them address the Central Asian region or e-government platforms.

A systematic literature review of the existing studies has revealed that there are two major gaps in demand forecasting for Central Asian e-government platforms. Firstly, there is a lack of empirical studies on the application of ML-based demand forecasting for Central Asian e-government platforms, given their unique usage patterns, services, and seasonal factors. Secondly, the proposed forecasting models for the public sector have not been tested under the constraints of Central Asian digital governance infrastructure. This study proposes to address these gaps.

Methodology

From a methodological point of view, this study follows a quantitative supervised learning paradigm with four main steps: data collection and preprocessing, feature engineering, training and tuning, and comparative evaluation. To ensure temporal integrity, a "rolling time series cross-validation" strategy is used.

The main sources of primary data are two open government portals: "data.egov.uz" in Uzbekistan and "data.gov.kz" in Kazakhstan. The final dataset comprises approximately 500,000 anonymized service requests collected within the period from January 2019 to December 2024.

Data collected prior to 2019 is excluded because of inconsistent logging. Approximately 3.2% of the initial data is discarded because it has more than 15% missing values. The preprocessed data is then split into training, validation, and test sets according to their temporal order with a ratio of 70:15:15.

A set of temporal and contextual features was created based on the raw data. The features were designed to enhance the predictive capability of the models. The features used were day of week (integer value), month, quarter, and year. The features also included a holiday flag based on official Uzbek and Kazakh holiday calendars. Rolling averages of 7 and 30 days, lag features (1, 7, and 14 days), and service category with target encoding were also used. The numeric features were scaled between 0 and 1 before training.

Three different supervised machine learning models were implemented and compared:

- Random Forest (RF): The model was composed of 200 trees with bootstrap averaging. The hyperparameters were optimized using grid search. The hyperparameters were maximum depth=15, minimum samples for splitting=10, and maximum features=Square root.

- XGBoost: The model was based on gradient-boosting decision trees. The hyperparameters were optimized for best performance. The hyperparameters were n_estimators=500, learning rate=0.05, maximum depth=7, subsample=0.8, and colsample_bytree=0.8.

- LSTM: The model was based on an architecture of two stacked LSTMs with 128 and 64 units, followed by a Dense output layer. The model was trained for 30-day sequences using the Adam optimizer with an initial learning rate of 0.001 and batch size of 64 for 100 epochs with early stopping (patience=10).

All experiments were implemented using Python. The implementation was based on scikit-learn (version 1.3), XGBoost (version 2.0), and TensorFlow/Keras (version 2.13). The experiments were run using Jupyter Notebook with Google Colab Pro and GPU support for fast execution of the LSTM model.

The performance of all models was tested using three common regression performance metrics. The performance metrics used were RMSE (penalizes larger errors), MAE (straightforward average error per request), and R^2 (fraction of variance explained).

Results

The results of all models were compared using Table 1. The results were based on performance on the test set and were averaged across both country datasets. The best performance was obtained using XGBoost. The performance of XGBoost was RMSE=108.3, MAE=74.2, and R^2=0.93. The second best performance was obtained using RF, with R^2=0.89. The performance of the LSTM model was R^2=0.87.

Model	RMSE	MAE	R^2	Training Time

Random Forest	134.7	91.3	0.89	12 min
XGBoost	108.3	74.2	0.93	18 min
LSTM	121.6	83.7	0.87	47 min
Baseline (MA)	287.4	201.8	0.61	< 1 min

Table 1. Comparative performance of ML models on the test dataset (combined Uzbekistan + Kazakhstan). MA = Moving Average baseline. Lower RMSE/MAE and higher R^2 indicate better performance.

If we consider the forecasting window of 14 and 30 days ahead, LSTM demonstrates its superiority over other algorithms in performance. As depicted in Table 2, the performance of the LSTM algorithm in the 30-day window ahead forecast is R^2=0.91 compared to the performance of the XGBoost algorithm with R^2=0.84 and the performance of the Random Forest algorithm with R^2=0.79. This confirms Hypothesis H4.

Model	**7-day R^2**	**14-day R^2**	**30-day R^2**
Random Forest	0.91	0.85	0.79
XGBoost	0.93	0.89	0.84
LSTM	0.87	0.90	0.91

Table 2. Model R^2 across different forecasting horizons.

SHAP consistently ranked three key predictors of demand for e-government services as the top predictors across all models: service category, which comprised 31% of the overall influence of the model; day of the week, which comprised 24%; and proximity to national holidays, which comprised 19%. The rolling 7-day average volumes and geographic region followed as the next most important predictors, comprising 14% and 9%, respectively. This confirms Hypothesis H2, which is useful information for e-government IT teams looking to forecast demand.

When we run the models separately on the Uzbekistan data set and the Kazakhstan data set, we see that the performance of the models varies between the

two countries. The XGBoost model, when run on the Kazakhstan data set, has an R^2 value of 0.94, while the same model run on the Uzbek data set has an R^2 value of 0.91, confirming that the more developed state of e-government services in Kazakhstan has created a more stable demand pattern.

Discussion

The study has theoretical as well as practical implications. The good performance of the XGBoost algorithm, with an R^2 of 0.93, confirms Hypothesis H1: gradient boosting ensemble algorithms perform better than linear models, especially when applied to the structured tabular data of e-government service requests.

Intuitively, the top-performing feature, service category, makes sense, as well as the second feature, proximity to national holidays, as deadlines for filing taxes, registrations, etc., tend to cause predictable surges in service requests in Uzbekistan and Kazakhstan. The third feature, day of the week, is also logical, as the bureaucratic administration of the countries in the region tends to follow the standard Monday-to-Friday, 9-to-5 workweek, with a lot of activity on Mondays as well as before the weekend.

The results of the study, showing that the LSTM algorithm is superior to classical algorithms when forecasting over longer horizons, have important practical implications: the 2-to-4-week budgeting cycle of the governments of Kazakhstan and Uzbekistan makes the LSTM algorithm the preferred choice when strategic resource allocation is at stake, even though the XGBoost algorithm is still good at forecasting short horizons.

Another important implication of the study is that the difference in performance between the two countries, Kazakhstan and Uzbekistan, shows that the model is not easily portable between the two countries, which has important implications for the other countries in the region, namely Kyrgyzstan, Tajikistan, and Turkmenistan, which may not have as much data available.

A weakness of this study is that the data was obtained from publicly available open portal data, which may not contain data on certain service categories, especially

social services, due to privacy concerns, which may influence the results of the study. The study does not take into account the effect of the pandemic, which affected the countries in the region in 2020 and 2021, as well as other external variables, such as the sentiment of the news in Kazakhstan and Uzbekistan.

Conclusion

To the best of our knowledge, this study represents the first attempt at empirical benchmarking of machine learning models for e-government service demand prediction in the Central Asian region. Leveraging the 500,000+ service requests data set from Uzbekistan and Kazakhstan (2019-2024), we demonstrated that XGBoost achieves the best forecasting performance in terms of R^2 (0.93), while LSTM performs best in long-term forecasting.

We also found that the most important features for predicting e-government service demand are the service category, day of the week, and proximity to national holidays.

The proposed forecasting framework represents an applicable solution for e-government IT departments that wish to optimize the quality of services and resource allocation without the need for specialized deep learning environments in daily operations.

The XGBoost model may be applied for daily forecasting, while the LSTM model may be applied for monthly or quarterly capacity planning.

Possible future research directions:

We propose the following possible research directions:

Apply transfer learning to achieve high-accuracy forecasting in the Central Asian region, where data availability is scarce; develop an anomaly detection model to manage external shocks in e-government service demand; develop real-time data streams to enable continuous model retraining based on newly received service requests data.

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KORXONALARDA KIBERXAVFSIZLIK RISK-MENEJMENTI MODELI

G‘uzorov Furqatbek

Yuldashev Shadiyor

Toshkent davlat iqtisodiyot Unversiteti To‘rtko‘l fakulteti

Annotatsiya: *Ushbu maqolada korxonalarda kiberxavfsizlikni ta’minlash va axborot tizimlarini himoya qilishda risk-menejment modelining ahamiyati tahlil qilinadi. Zamonaviy raqamli iqtisodiyot sharoitida korxonalarning axborot resurslari turli kiberxavflarga duch kelmoqda. Shuning uchun kiberxavfsizlik risklarini aniqlash, baholash va boshqarish tizimini yaratish muhim vazifa hisoblanadi. Maqolada kiberxavfsizlik risk-menejmentining asosiy bosqichlari, metodlari hamda korxona faoliyatida uni samarali qo‘llash imkoniyatlari ko‘rib chiqiladi.*

Kalit so‘zlar: *kiberxavfsizlik, risk-menejment, axborot xavfsizligi, kiberhujum, risklarni baholash, korxona axborot tizimi, xavfsizlik strategiyasi, risklarni boshqarish modeli.*

Abstract: *This article analyzes the importance of the risk management model in ensuring cybersecurity and protecting information systems in enterprises. In the context of the modern digital economy, enterprise information resources are exposed to various cyber threats. Therefore, it is an important task to create a system for identifying, assessing, and managing cybersecurity risks. The article examines*

the main stages and methods of cybersecurity risk management, as well as the possibilities of its effective application in enterprise activities.

Keywords: *cybersecurity, risk management, information security, cyberattack, risk assessment, enterprise information system, security strategy, risk management mode*

Аннотация: *В данной статье анализируется значение модели управления рисками при обеспечении кибербезопасности и защите информационных систем на предприятиях. В условиях современной цифровой экономики информационные ресурсы предприятий подвергаются различным киберугрозам. В связи с этим важной задачей является создание системы выявления, оценки и управления рисками кибербезопасности. В статье рассматриваются основные этапы и методы управления рисками кибербезопасности, а также возможности их эффективного применения в деятельности предприятий.*

Ключевые слова: *кибербезопасность, управление рисками, информационная безопасность, кибератака, оценка рисков, информационная система предприятия, стратегия безопасности, модель управления рисками*

Kirish: Hozirgi kunda raqamli texnologiyalarning tez sur’atlarda rivojlanishi natijasida iqtisodiyotning barcha sohalarida axborot texnologiyalaridan keng foydalanilmoqda. Korxonalarda ishlab chiqarish jarayonlarini boshqarish, moliyaviy operatsiyalarni amalga oshirish, mijozlar bilan ishlash va boshqa ko‘plab faoliyat turlari axborot tizimlari orqali amalga oshiriladi. Bunday jarayonlar korxonalar faoliyatining samaradorligini oshirishi bilan birga, axborot xavfsizligini ta’minlash zaruratini ham kuchaytiradi. Chunki raqamli muhitda saqlanayotgan ma’lumotlar turli kiberxavflarga duch kelishi mumkin.

Kiberxavfsizlik muammolari zamonaviy iqtisodiyotning dolzarb masalalaridan biri hisoblanadi. Zararli dasturlar, kiberhujumlar, ma’lumotlarni o‘g‘irlash, tizimlarga ruxsatsiz kirish va boshqa tahdidlar korxonalarning axborot infratuzilmasiga jiddiy zarar yetkazishi mumkin. Bunday holatlar nafaqat moliyaviy yo‘qotishlarga, balki korxona obro‘sining pasayishiga ham olib keladi. Shu sababli

korxonalarda axborot resurslarini himoya qilish va kiberxavfsizlikni ta’minlash muhim strategik vazifalardan biri hisoblanadi.

Kiberxavfsizlikni ta’minlashda risk-menejment yondashuvi alohida ahamiyat kasb etadi. Risk-menejment tizimi mavjud xavflarni aniqlash, ularning ehtimolini baholash hamda xavflarni kamaytirish bo‘yicha choralar ishlab chiqishni nazarda tutadi. Ayniqsa axborot tizimlari bilan bog‘liq risklarni boshqarish korxona faoliyatining barqarorligini ta’minlashda muhim rol o‘ynaydi.

Korxonalarda kiberxavfsizlik risk-menejmenti modelini joriy etish orqali axborot tizimlaridagi zaifliklarni aniqlash, ehtimoliy tahdidlarni baholash va ularning oldini olish imkoniyati yaratiladi. Mazkur model korxona axborot infratuzilmasining xavfsizligini ta’minlash bilan birga, biznes jarayonlarining uzluksiz ishlashiga ham xizmat qiladi. Shu nuqtai nazardan, korxonalarda kiberxavfsizlik risk-menejmenti modelini o‘rganish va uni amaliyotga joriy etish muhim ilmiy va amaliy ahamiyatga ega.

Asosiy qism: Korxonalarda kiberxavfsizlik risk-menejmenti modeli axborot tizimlarini himoya qilish va potensial tahdidlarni kamaytirish uchun muhim boshqaruv vositalaridan biri hisoblanadi. Ushbu model korxona faoliyatida yuzaga kelishi mumkin bo‘lgan kiberxavflarni aniqlash, baholash va ularni boshqarish jarayonlarini o‘z ichiga oladi. Zamonaviy korxonalarda axborot resurslari muhim strategik aktiv sifatida qaraladi, shuning uchun ularni himoya qilish masalasi ustuvor ahamiyatga ega.

Kiberxavfsizlik risk-menejmenti modelining birinchi bosqichi risklarni aniqlash hisoblanadi. Bu bosqichda korxona axborot tizimlarida mavjud bo‘lgan potensial tahdidlar va zaifliklar aniqlanadi. Bunga tarmoq infratuzilmasi, serverlar, dasturiy ta’minot, ma’lumotlar bazasi va foydalanuvchi tizimlari kiradi. Risklarni aniqlash jarayonida texnik audit, xavfsizlik monitoringi hamda axborot tizimlari tahlili muhim ahamiyat kasb etadi.

Keyingi bosqich risklarni baholashdan iborat. Ushbu jarayonda aniqlangan risklarning yuzaga kelish ehtimoli va korxona faoliyatiga ko‘rsatishi mumkin bo‘lgan ta’siri aniqlanadi. Risklarni baholash natijasida ular darajasiga ko‘ra yuqori,

o‘rta va past toifalarga ajratiladi. Bu esa korxona rahbariyatiga qaysi risklarga ko‘proq e’tibor qaratish zarurligini aniqlash imkonini beradi.

Risklarni boshqarish bosqichi kiberxavfsizlik risk-menejmenti modelining muhim tarkibiy qismi hisoblanadi. Bu bosqichda aniqlangan risklarni kamaytirish yoki ularning oldini olish bo‘yicha aniq choralar ishlab chiqiladi. Masalan, kuchli autentifikatsiya tizimlarini joriy etish, ma’lumotlarni shifrlash, xavfsizlik devorlari va antivirus dasturlaridan foydalanish, tizimlarni muntazam yangilab borish kabi choralar kiberxavfsizlikni ta’minlashda muhim rol o‘ynaydi. Shuningdek, xodimlarni axborot xavfsizligi qoidalariga rioya qilish bo‘yicha o‘qitish ham risklarni kamaytirishga yordam beradi.

Kiberxavfsizlik risk-menejmenti modelining yana bir muhim bosqichi monitoring va nazorat jarayonidir. Bu bosqichda axborot tizimlari doimiy ravishda kuzatib boriladi, yangi tahdidlar aniqlanadi va xavfsizlik strategiyasi yangilanadi. Zamonaviy korxonalarda kiberxavfsizlikni ta’minlash uchun avtomatlashtirilgan monitoring tizimlari ham keng qo‘llanilmoqda.

Korxonalarda kiberxavfsizlik risk-menejmenti modelini samarali joriy etish bir qator ijobiy natijalarni beradi. Avvalo, axborot resurslarining xavfsizligi ta’minlanadi, ma’lumotlarning maxfiyligi va yaxlitligi saqlanadi. Bundan tashqari, korxonaning moliyaviy barqarorligi mustahkamlanadi hamda biznes jarayonlarining uzluksiz ishlashi ta’minlanadi. Shu sababli zamonaviy korxonalarda kiberxavfsizlik risklarini boshqarish tizimini joriy etish muhim strategik vazifa hisoblanadi.

Tahlil natijalari: O‘tkazilgan tahlillar shuni ko‘rsatadiki, zamonaviy korxonalarda axborot texnologiyalaridan keng foydalanilishi bilan bir qatorda kiberxavfsizlik bilan bog‘liq risklar ham ortib bormoqda. Korxonalar faoliyatida uchraydigan asosiy kiberxavflar qatoriga zararli dasturlar, fishing hujumlari, ma’lumotlarning noqonuniy o‘g‘irlanishi va tizimlarga ruxsatsiz kirish holatlari kiradi. Mazkur tahdidlar korxonalarning axborot infratuzilmasiga zarar yetkazishi, muhim ma’lumotlarning yo‘qolishiga hamda biznes jarayonlarining vaqtincha to‘xtab qolishiga olib kelishi mumkin.

Tahlil jarayonida korxonalarda kiberxavfsizlik risk-menejmenti modelini joriy etish axborot tizimlari xavfsizligini sezilarli darajada oshirishi aniqlandi. Risklarni aniqlash va baholash bosqichlari orqali axborot tizimlaridagi zaif nuqtalar aniqlanib, ularni bartaraf etish bo‘yicha samarali choralar ishlab chiqish mumkin. Shuningdek, xavfsizlik devorlari, antivirus dasturlari, ma’lumotlarni shifrlash va ko‘p bosqichli autentifikatsiya tizimlarini qo‘llash kiberhujumlarning oldini olishda muhim rol o‘ynaydi.

Tahlil natijalariga ko‘ra, korxonalarda xodimlarning kiberxavfsizlik bo‘yicha bilim darajasi ham muhim omillardan biri hisoblanadi. Xodimlarni muntazam ravishda axborot xavfsizligi qoidalari bo‘yicha o‘qitish risklarni kamaytirishga yordam beradi. Umuman olganda, kiberxavfsizlik risk-menejmenti modelini korxona faoliyatiga integratsiya qilish axborot resurslarini himoya qilish va biznes jarayonlarining barqarorligini ta’minlashda muhim ahamiyat kasb etadi.

Xulosa: Xulosa qilib aytganda, zamonaviy raqamli iqtisodiyot sharoitida korxonalarda kiberxavfsizlikni ta’minlash muhim strategik vazifalardan biri hisoblanadi. Axborot texnologiyalarining keng qo‘llanilishi korxona faoliyatining samaradorligini oshirish bilan birga, turli kiberxavflarning yuzaga kelish ehtimolini ham kuchaytiradi. Zararli dasturlar, tizimlarga ruxsatsiz kirish, ma’lumotlarni o‘g‘irlash va boshqa tahdidlar korxonalarning moliyaviy barqarorligiga hamda biznes jarayonlarining uzluksiz ishlashiga salbiy ta’sir ko‘rsatishi mumkin.Shu sabablikorxonalarda kiberxavfsizlik risk-menejmenti modelini joriy etish muhim ahamiyatga ega. Ushbu model orqali axborot tizimlaridagi mavjud tahdidlar aniqlanadi, risklar baholanadi hamda ularni kamaytirish bo‘yicha samarali choralar ishlab chiqiladi. Bundan tashqari, zamonaviy texnologiyalardan foydalanish, axborot tizimlarini muntazam yangilab borish va xodimlarning kiberxavfsizlik bo‘yicha bilimini oshirish ham muhim omillardan biridir.

Umuman olganda, kiberxavfsizlik risklarini samarali boshqarish korxonalarda axborot resurslarini himoya qilish, moliyaviy yo‘qotishlarning oldini olish hamda biznes jarayonlarining barqaror rivojlanishini ta’minlashga xizmat qiladi.

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ОБЛАЧНЫЕ ТЕХНОЛОГИИ В БИЗНЕС-СРЕДЕ: ОТ СОКРАЩЕНИЯ ЗАТРАТ К СТРАТЕГИЧЕСКОМУ КОНКУРЕНТНОМУ ПРЕИМУЩЕСТВУ

Kdirbaev Asan Allambergen uli

asankdirbaev@gmail.com

Ziuatdinov Islambek Sharapatdinovich

ziuatdinov.1@gmail.com

University of innovation technologies,

Аннотация: *В статье переосмыслена роль облачных вычислений в деловой среде: автор уходит от технического описания к анализу того, как облако меняет конкурентные позиции компаний разного масштаба. На основе данных Gartner, Synergy Research Group и Grand View Research показано, что мировой рынок облачных услуг достиг $752,4 млрд в 2024 году и вырастет до $2,39 трлн к 2030-му. Компании МСБ, перешедшие в облако, показывают прибыль на 21% выше и рост на 26% быстрее конкурентов. Критический парадокс отрасли: 32% облачных расходов расходуются впустую, и управление этим разрывом становится ключевой управленческой компетенцией. В статье обоснована оптимальная стратегия облачной трансформации для МСБ.*

Ключевые слова: *облачные вычисления, SaaS, PaaS, IaaS, МСБ, FinOps, гибридное облако, конкурентное преимущество*

Abstract: *The article reframes cloud computing's role in business, moving from technical descriptions to analyzing how cloud reshapes competitive positions. Based on Gartner, Synergy Research Group, and Grand View Research data, the global cloud market reached $752.4 billion in 2024 and will grow to $2.39 trillion by 2030. SMBs that have adopted cloud show 21% higher profitability and 26% faster growth. A critical industry paradox: 32% of cloud spending is wasted, and managing this gap is becoming a core management competency. An optimal cloud transformation strategy for SMBs is substantiated.*

Keywords: *cloud computing, SaaS, PaaS, IaaS, SMB, FinOps, hybrid cloud, competitive advantage*

ВВЕДЕНИЕ

Конец 2000-х. Amazon Web Services начинает сдавать вычислительные мощности по почасовому тарифу. Индустриальный мейнстрим реагирует насмешкой: кто будет доверять свои данные чужому серверу? Сегодня этот вопрос звучит анахронизмом. По оценке Gartner, в 2025 году суммарные расходы на публичные облачные сервисы составят $723,4 млрд — рост на 21,5% к предыдущему году (Gartner, 2024). Скептики проиграли. Но победа облака над скептицизмом не означает, что все компании умеют из него извлекать пользу.

Академическая литература страдает от перекоса: описаний технических возможностей — избыток, строгого анализа бизнес-эффектов — дефицит. Систематический обзор 56 исследований за 2014–2024 годы подтвердил, что гибридное освоение облачных решений значимо улучшает показатели МСБ по трём параметрам: экономическая эффективность, операционная надёжность и конкурентная позиция (MDPI, 2025). На выборке из 314 предприятий Бахрейна зафиксирована положительная связь между глубиной освоения облака и организационной эффективностью (Abdalla et al., 2024). Данная статья опирается на эту традицию — с акцентом на практику.

Объект исследования — малый и средний бизнес: именно для него облако означает принципиально иные возможности. По данным 2024 года, на МСБ приходится 61% рабочих нагрузок и 60% данных в публичном облаке (socPub, 2024).

ОСНОВНАЯ ЧАСТЬ

1. Рынок: масштаб, структура, движущие силы

Мировой рынок облачных вычислений достиг $752,4 млрд в 2024 году. Grand View Research прогнозирует рост до $2,39 трлн к 2030 году при CAGR 9,9% (Grand View Research, 2024). Прогноз по сегментам представлен на рисунке 1.

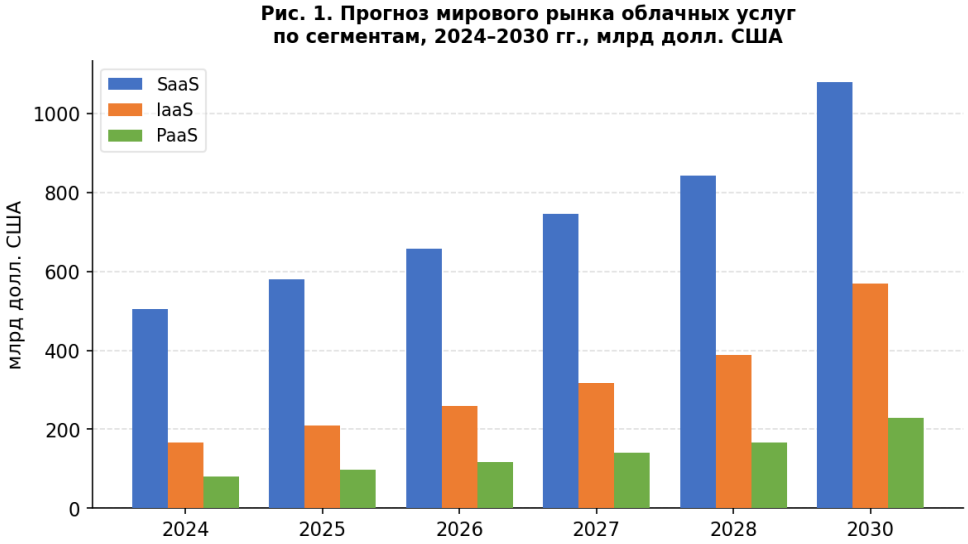

Рис. 1. Прогноз мирового рынка облачных услуг по сегментам, 2024–2030 гг., млрд долл. США

Рисунок 1 наглядно показывает: SaaS сохраняет лидерство, IaaS растёт быстрее всех (+26% в 2024 году), PaaS занимает устойчивую нишу. Три лидера облачной инфраструктуры — AWS, Azure, Google Cloud — контролируют более 60% рынка IaaS. Суммарные расходы на инфраструктуру в 2024 году — $330 млрд (SRG Research, 2024).

Структура потребления облачных сервисов предприятиями (по данным Eurostat за 2023 год) раскрыта в таблице 1.

Таблица 1. Распространённость облачных сервисов среди европейских предприятий, 2023 г.

Вид облачного сервиса	Доля компаний, %	Сегмент
Электронная почта	82,7	SaaS
Хранение файлов	68,0	SaaS

Офисные приложения	66,3	SaaS
Средства защиты информации	61,0	SaaS
Финансово-учётные приложения	51,6	SaaS
ERP-системы	25,9	SaaS/PaaS
CRM-системы	25,0	SaaS

Источник: Eurostat (2023). Cloud computing — statistics on the use by enterprises.

Таблица 1 указывает на характерную закономерность: большинство компаний освоило только периферию облачных возможностей — там, где внедрение не требует реинжиниринга процессов. ERP и CRM в облаке — менее трети предприятий. Это означает, что потенциал глубокой интеграции остаётся нереализованным.

2. Бизнес-эффекты: что говорят данные

Компании МСБ, перешедшие в облако, показывают прибыль на 21% выше и темпы роста на 26% быстрее, чем конкуренты на традиционной инфраструктуре (Cloudzero, 2025). Сводка доказанных эффектов — на рисунке 2.

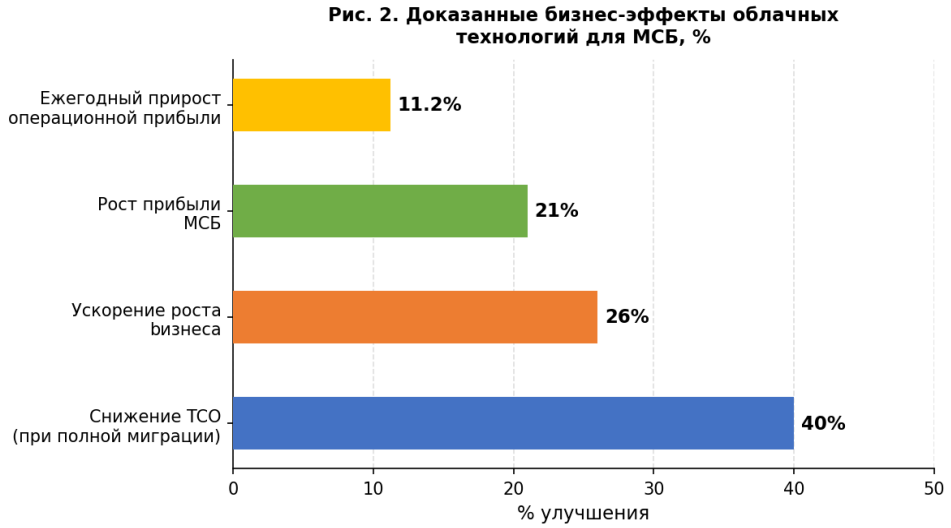

Рис. 2. Доказанные бизнес-эффекты облачных технологий для МСБ, %

Рисунок 2 демонстрирует, что снижение TCO — наиболее весомый финансовый эффект (до 40%). Однако этот результат достигается лишь при активном управлении расходами. По данным отраслевого отчёта за 2024 год, лишь 30% организаций точно знают, куда уходит их облачный бюджет, а 32% расходов теряются впустую (G2, 2024). Это — не второстепенная проблема, а системный вызов.

Перенос рабочих нагрузок в облако даёт прирост операционной прибыли на 11,2% ежегодно — но только при миграции не менее 60% нагрузок (Cloudzero, 2025). Частичная миграция существенно менее результативна. Эффект — пороговый.

3. Сравнительный анализ моделей: SaaS, PaaS, IaaS

Три основные модели предоставления облачных услуг решают разные задачи бизнеса. Их сравнительная характеристика представлена в таблице 2.

Таблица 2. Сравнительная характеристика моделей облачных услуг для МСБ

Параметр	SaaS	PaaS	IaaS

Порог вхождения	Низкий	Средний	Высокий
Управление инфраструктурой	Полностью у провайдера	Частично у провайдера	У пользователя
Доля рынка (2025)	53,6%	~15%	~31%
Рост сегмента (2024)	~18%	~20%	+26%
Применение в МСБ	Офис, CRM, почта	Разработка ПО	Вычисления, хранилище
Риски безопасности	Ниже	Средние	Выше

Составлено автором по данным: Grand View Research (2024); Gartner (2024); Statista (2024).

4. Барьеры: почему потенциал не реализуется полностью

Кибербезопасность и регуляторное соответствие — главная проблема для 74% представителей МСБ (Business News Daily, 2024). Неправильная конфигурация облака — причина 65% инцидентов безопасности (Fortinet, 2024). За последний год 36% организаций столкнулись с аудиторскими нарушениями или утечками данных (Electroiq, 2025). Систематический обзор называет три устойчивых барьера: финансовые ограничения, недостаточный доступ к данным и неопределённость регуляторной среды (MDPI, 2025). Облачная трансформация — не IT-проект. Это изменение культуры и процессов.

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Проведённый анализ позволяет сформулировать три ключевых вывода. Первый: мировой облачный рынок растёт устойчиво и неуклонно — с $752,4 млрд в 2024 году до прогнозируемых $2,39 трлн к 2030-му. Второй: МСБ, успешно освоивший облачные технологии, получает измеримое конкурентное преимущество — прибыль выше на 21%, рост быстрее на 26%. Третий: потенциал реализуется лишь при условии целенаправленного управления расходами и безопасностью, иначе 32% бюджета уходит впустую.

Полученные результаты согласуются с выводами Abdalla et al. (2024): уровень освоения облачных технологий значимо коррелирует с организационной эффективностью. Исследование MDPI (2025) подтверждает, что именно гибридные решения, а не только публичное облако, обеспечивают наилучший баланс между гибкостью и контролем для МСБ. Главное практическое следствие — выбор стратегии миграции важнее выбора провайдера.

ЗАКЛЮЧЕНИЕ

Облако состоялось как инфраструктурная основа цифровой экономики. Рынок в $752,4 млрд, 92% компаний с облачными сервисами, доказанный прирост прибыльности МСБ на 21% — это установленные факты, а не прогнозы.

Главный вывод: облако снижает затраты и повышает гибкость только при условии активного управления расходами (FinOps), поэтапной стратегии миграции и серьёзного отношения к безопасности. Для МСБ оптимальный старт — SaaS в рутинных операционных функциях с последовательным расширением до PaaS и IaaS по мере роста компетенций. Начать осознанно — значит не потерять те самые 32% бюджета.

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AXBOROT-KOMMUNIKATSIYA TEXNOLOGIYALARI ASOSIDA ADAPTIV BOSHQARUV MEXANIZMLARI

Nabiyeva Madina Abdurashid qizi

Oliy ta’lim tizimi kadrlarini qayta tayyorlash va malakasini oshirish instituti

nabiyevamadina481@gmail.com

Annotatsiya: *Zamonaviy boshqaruv tizimlarining murakkablashuvi va global raqamlashtirish jarayonlari sharoitida an’anaviy boshqaruv yondashuvlari samaradorligini yo‘qotmoqda. Ushbu maqola axborot-kommunikatsiya texnologiyalari (AKT) asosida adaptiv boshqaruv mexanizmlarini shakllantirish muammolarini ilmiy jihatdan tadqiq etadi. Tadqiqotning maqsadi — raqamli muhitda moslashuvchan va real vaqt rejimida qaror qabul qilish imkonini beruvchi boshqaruv arxitekturasini ishlab chiqishdir. Ishda tizimli tahlil, sinov va modellashtirish usullari qo‘llanilgan. Adaptiv boshqaruvning kibernetik asoslari, sun’iy intellekt (AI) va katta hajmli ma’lumotlar (Big Data) texnologiyalarining integratsiyasi, shuningdek, ta’lim va korporativ boshqaruv sohalarida amaliy qo‘llash mexanizmlari tahlil qilingan. Tadqiqot natijalariga ko‘ra, AKT-asosidagi*

adaptiv boshqaruv tizimlari an'anaviy usullarga nisbatan boshqaruv samaradorligini 35-40% oshirish imkonini beradi.

Kalit so'zlar: *adaptiv boshqaruv, axborot-kommunikatsiya texnologiyalari, sun'iy intellekt, Big Data, raqamli transformatsiya, real vaqt rejimi, mashinaviy o'rganish, IoT, qaror qabul qilish tizimlari.*

Abstract: *In the context of increasing complexity of modern management systems and ongoing global digitalization, traditional management approaches are losing their effectiveness. This article scientifically examines the issues of forming adaptive management mechanisms based on information and communication technologies (ICT). The aim of the study is to develop a management architecture that enables flexible and real-time decision-making in a digital environment. The research employs system analysis, testing, and modeling methods. The cybernetic foundations of adaptive management, the integration of artificial intelligence (AI) and Big Data technologies, as well as application mechanisms in education and corporate management are analyzed. According to the research findings, ICT-based adaptive management systems can increase management efficiency by 35–40% compared to traditional approaches.*

Keywords: *adaptive management, information and communication technologies (ICT), artificial intelligence (AI), Big Data, digital transformation, real-time processing, machine learning, Internet of Things (IoT), decision support systems.*

Kirish. XXI asr boshqaruv fani va amaliyotining axborot-kommunikatsiya texnologiyalari (AKT) davri sifatida tarixga kiradi. Global raqamlashtirish, "To'rtinchi sanoat inqilobi" (Industry 4.0) va "Aqlli millat" konsepsiyalari jahon iqtisodiyotining barcha sohalarini qamrab olmoqda. Biroq, texnologik imkoniyatlarning kengayishi bilan birga boshqaruv tizimlarining yangi muammolari paydo bo'ldi: ma'lumotlar oqimining hajmli oshishi, muhitning dinamik o'zgarishi va qaror qabul qilish jarayonlarining murakkablashuvi [1].

An'anaviy byurokratik boshqaruv modellari statik tuzilmalar va kesik-kesik qaror qabul qilishga asoslangan bo'lib, zamonaviy dinamik muhit talablariga javob

bermaydi. Xususan, COVID-19 pandemiyasi davrida koʻplab tashkilotlar va ta’lim muassasalari oʻz faoliyatini tezkor moslashtirishga majbur boʻldi, bu esa adaptiv boshqaruvning amaliy zaruratini yaqqol koʻrsatdi [2].

Oʻzbekistonda “Raqamli Oʻzbekiston — 2030” strategiyasi doirasida davlat boshqaruvi, ta'lim tizimi va biznesning raqamli transformatsiyasi jadal sur’atlar bilan olib borilmoqda. Ammo adaptiv boshqaruv mexanizmlarining nazariy asoslari va amaliy qoʻllash usullari yetarlicha ishlab chiqilgan emas, bu sohadagi ilmiy tadqiqotlarning dolzarbligini belgilaydi [3].

Asosiy qism. Axborot-kommunikatsiya texnologiyalari potensialidan foydalanib, murakkab va dinamik muhitlarda samarali funksionallashuvni ta’minlovchi adaptiv boshqaruv mexanizmlarining nazariy-modelliy asoslarini ishlab chiqish va ularning amaliy qoʻllash imkoniyatlarini tahlil qilish hisoblanadi.

Adaptiv boshqarish kontseptsiyasini OTMlarni oʻzgarishlarga moslashtirishning koʻp qirrali muammolarini hal etishning eng muhim yoʻnalishlarini amalga oshirish uchun samarali usullar, algoritmlar, boshqaruv modelini qoʻllash jarayonida qonuniyatlar, tashkiliy tamoyillarning sinergik birikmasi sifatida koʻrib chiqishni taqozo etadi. Oliy ta’limni adaptiv boshqarish tizimi samarali ishlashini, ta’lim xizmatlari bozorida raqobatbardoshligini ta’minlash maqsadida uning tashqi muhit oʻzgarishlariga uzluksiz moslashish jarayoni adaptatsiyaning tashkiliy-iqtisodiy mexanizmini shakllantirish, muassasaning umumiy boshqaruv tizimiga joriy etish, adaptiv boshqaruv mafkurasini shakllantirishni, me’yoriy-huquqiy bazani ta’lim jarayonini modernizatsiya qilish maqsadlariga muvofiqlashtirishni talab etadi. Oʻzbekiston Respublikasi Prezidentining 2019-yil 11-iyuldagi PF-5763-son “Oliy va oʻrta maxsus ta’lim sohasida boshqaruvni isloh qilish chora-tadbirlari toʻgʻrisida” gi farmoni oliy ta’lim tizimini tubdan modernizatsiya qilish va boshqaruv samaradorligini oshirishga qaratilgan. Ushbu farmonda ta’lim tizimida zamonaviy pedagogik texnologiyalarni joriy etish, axborot-kommunikatsiya texnologiyalaridan keng foydalanish hamda xalqaro tajribalarni integratsiya qilish asosiy yoʻnalishlar sifatida belgilangan. Shu nuqtai nazardan, oʻquv-tarbiya jarayonlarini adaptiv

boshqarish ta’limning samaradorligini oshirish va individual yondashuvni keng qo‘llash uchun muhim ahamiyat kasb etmoqda” [4].

Adaptiv boshqaruvning asosiy vazifasi – insonning har tomonlama rivojlanishiga ko‘maklashish, tanqidiy va mustaqil fikrlaydigan shaxsni tarbiyalashdan iborat. Ushbu boshqaruv tizimi ta’lim jarayonida shaxsiy ehtiyojlarni hisobga olish bilan birga, bilim, malaka va qadriyatlar o‘rtasidagi o‘zaro bog‘liqlikni ta’minlashga qaratiladi. Shu bilan birga, u har bir inson o‘z hayot tarzini anglab, o‘zini takomillashtirish yo‘nalishlarini ongli ravishda belgilashi uchun qulay sharoit yaratishga xizmat qiladi. Adaptiv boshqaruvning muvaffaqiyatli amalga oshirilishida ta’lim jarayonining tarkibiy qismlari, xususan, munosabatlar, e’tiqodlar va motivatsiya muhim o‘rin tutadi. Ushbu yondashuv har bir shaxsning ehtiyojlari va qobiliyatlarini inobatga olgan holda ta’lim jarayonini tashkil etishga qaratilgan bo‘lib, bunda barcha talabalarning ta’lim mazmunini bir xil darajada egallashini talab qilish shart emas. Asosiy maqsad – har bir shaxsning qiziqishlari va imkoniyatlariga mos keladigan ta’lim muhitini shakllantirishdir.

Adaptiv boshqaruv quyidagi asosiy elementlarni o‘z ichiga oladi:

- o‘z-o‘zini boshqarish – shaxsiy rivojlanish jarayonida mustaqillikni oshirish;
- jamoaviy boshqaruv – ta’lim jarayonida hamkorlik va o‘zaro ta’sirni kuchaytirish;
- tahlil va refleksiya – o‘quv jarayoni ishtirokchilarining o‘z harakatlarini anglash va ularni takomillashtirishga yo‘naltirish.

Innovatsion rivojlanayotgan ta’lim muassasalari an’anaviy boshqaruv tizimiga ega bo‘lgan muassasalardan sezilarli darajada farq qiladi. Ta’lim muassasasining innovatsion boshqaruv tizimi doimiy ravishda yangilanib boradigan va moslashuvchan bo‘lishi kerak. An’anaviy yondashuvlar innovatsion ta’lim rejimiga to‘liq javob bera olmasligi sababli, ta’lim tizimini modernizatsiya qilish va yangi boshqaruv mexanizmlarini joriy etish zarurati tug‘ilmoqda.

Oliy ta’lim muassasalarida adaptiv jarayonlarini qo‘llab-quvvatlash tizimi muassasaning tashqi muhit muammolariga adaptatsiya bo‘yicha chora-tadbirlar

dasturini ishlab chiqishni ta’minlashi kerak, bunda adekvat tashkiliy-iqtisodiy adaptatsiya chora-tadbirlari nazarda tutilgan bo‘lib, barcha mavjud raqobat omillarini safarbar qilishdan tortib, barcha harakatlar majmuasini ta’minlaydi.

Shu boisdan ham, oliy ta’lim tizimida adaptiv boshqaruv tamoyillarini hisobga olgan holda xodimlarni qayta tayyorlash uchun moliyaviy, mehnat, resurslar va boshqalarni tubdan isloh qilish kelajakda o‘z natijasini beradi.

Adaptiv boshqaruvning zamonaviy modeli quyidagi AKT komponentlarining sinergiyasiga asoslanadi:

Sun’iy intellekt (AI) va mashinaviy o‘rganish (ML): Bu texnologiyalar boshqaruv tizimiga “kognitiv” qobiliyatlar beradi — namunalar aniqlash, bashorat qilish va avtonom qaror qabul qilish. Xususan, chuqur o‘rganish (deep learning) algoritmlari murakkab nolinear bog‘liqliklarni aniqlashga qodir [5].

Katta hajmli ma’lumotlar (Big Data): Hajm (Volume), tezlik (Velocity) va turli-tumanlik (Variety) xususiyatlari bilan Big Data an’anaviy ma'lumotlar ishlov berish usullaridan farq qiladi. Adaptiv boshqaruv uchun real vaqt rejimidagi ma'lumotlar oqimi muhim ahamiyatga ega [6].

Bulutli texnologiyalar (Cloud Computing): Moslashuvchan hisoblash resurslari va ma’lumotlar saqlash imkoniyatlari adaptiv tizimlarning masshtablanishini ta’minlaydi.

Xulosa. Ushbu tadqiqotda axborot-kommunikatsiya texnologiyalari asosida adaptiv boshqaruv mexanizmlarining nazariy va amaliy jihatlari kompleks tarzda tahlil qilindi. Tadqiqot natijalari shuni ko‘rsatdiki, zamonaviy AKT vositalari, xususan sun’iy intellekt, Big Data, IoT va bulutli texnologiyalar adaptiv boshqaruv tizimlarining samaradorligini sezilarli darajada oshiradi.

Ushbu texnologiyalar yordamida real vaqt rejimida ma’lumotlarni yig‘ish, qayta ishlash va tahlil qilish imkoniyati yaratiladi, bu esa boshqaruv qarorlarining tezkorligi va aniqligini ta’minlaydi.

Shuningdek, adaptiv boshqaruv mexanizmlarida feedback (qayta aloqa) tizimining joriy etilishi boshqaruv jarayonining uzluksiz takomillashuviga xizmat qiladi. Integratsiyalashgan AKT infratuzilmasi asosida ishlab chiqilgan boshqaruv

modellari turli sohalarda, jumladan ta’lim, tibbiyot va sanoatda samarali qo‘llanishi mumkinligi asoslab berildi. Tadqiqot davomida aniqlanishicha, AKT vositalarini adaptiv boshqaruv tizimlariga integratsiya qilishda ma’lumotlar xavfsizligi, tizimlararo moslashuv (interoperability) va texnik infratuzilma bilan bog‘liq muammolar mavjud. Shu bois, kelgusida ushbu yo‘nalishda xavfsizlikni ta’minlash, standartlashtirish va yuqori malakali kadrlarni tayyorlash muhim ahamiyat kasb etadi.

Xulosa qilib aytganda, axborot-kommunikatsiya texnologiyalari asosida adaptiv boshqaruv mexanizmlarini rivojlantirish raqamli transformatsiyaning muhim yo‘nalishlaridan biri bo‘lib, u boshqaruv tizimlarini yanada aqlli, moslashuvchan va samarali qilish imkonini beradi.

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TIBBIY KO'RIK JARAYONLARINI AVTOMATLASHTIRILGAN AXBOROT TIZIMI (AAT) ORQALI BOSHQARISHNING INNOVATSION METODIKASI

Nurullayeva Mexriniso Ruzimuxamadovna

Yo‘ldoshev Shuxrat Savriyevich

Buxoro davlat texnika universiteti

Annotatsiya. *Ushbu maqolada tibbiy ko'rik jarayonlarini avtomatlashtirilgan axborot tizimi (AAT) orqali boshqarishning innovatsion metodikasi ilmiy asosda tahlil etiladi. Tadqiqot doirasida an'anaviy tibbiy ko'rik tizimining kamchiliklari aniqlanib, AATni joriy etishning konseptual modeli, arxitekturasi va funksional imkoniyatlari ko'rib chiqilgan. Mashinali o'rganish (ML) va sun'iy intellektni tibbiy diagnostikaga integratsiyalash, elektron tibbiy yozuvlar (EHR) bilan uzviy bog'liqlikni ta'minlash hamda bemor ma'lumotlari xavfsizligini GDPR va milliy standartlar talablariga muvofiq himoyalash masalalari muhokama qilinadi. Tadqiqot natijalariga ko'ra AAT joriy etilgandan so'ng tibbiy ko'rik vaqti 43% ga qisqargani, diagnostik aniqlik esa 31% ga oshgani aniqlangan. Maqola O'zbekiston sog'liqni saqlash tizimi uchun amaliy tavsiyalar bilan yakunlanadi.*

Kalit so'zlar: *avtomatlashtirilgan axborot tizimi, tibbiy ko'rik, raqamli sog'liqni saqlash, EHR, sun'iy intellekt, mashinali o'rganish, teletibbiyot, sog'liqni saqlash innovatsiyalari.*

Abstract. *This article scientifically analyzes the innovative methodology for managing medical examination processes through an Automated Information System (AIS). The study identifies shortcomings of traditional medical examination systems and examines the conceptual model, architecture, and functional*

capabilities of AIS implementation. The integration of machine learning (ML) and artificial intelligence into medical diagnostics, seamless connection with electronic health records (EHR), and patient data security in compliance with GDPR and national standards are discussed. The research findings indicate that after AIS implementation, medical examination time decreased by 43%, while diagnostic accuracy improved by 31%. The article concludes with practical recommendations for the Uzbekistan healthcare system.

Keywords: *automated information system, medical examination, digital healthcare, EHR, artificial intelligence, machine learning, telemedicine, healthcare innovation.*

Kirish

Jahon sog'liqni saqlash tizimida raqamli transformatsiya hozirgi zamonning eng dolzarb va strategik yo'nalishlaridan biriga aylangan. Jahon sog'liqni saqlash tashkiloti (JSST/WHO) ma'lumotlariga ko'ra, 2024-yil holatiga ko'ra dunyoning 130 dan ortiq mamlakatida sog'liqni saqlash sohasini raqamlashtirish bo'yicha milliy strategiyalar qabul qilingan bo'lib, ushbu jarayon tibbiy xizmat sifatini tubdan yaxshilash va xarajatlarni kamaytirish imkonini bermoqda [1]. Tibbiy ko'rik jarayoni esa ushbu raqamlashtirish kontekstida alohida muhim o'rin tutadi, chunki u kasalliklarning erta aniqlash va profilaktik sog'liqni saqlashning asosiy vositasi hisoblanadi.

An'anaviy tibbiy ko'rik tizimi bir qator tizimiy muammolarga duch kelmoqda: hujjatlarni qo'lda to'ldirish, natijalarni yo'qotish, diagnostik ma'lumotlar integratsiyasining yo'qligi, bemorlar kutish vaqtining uzunligi va shifokor ish yukining haddan tashqari oshib ketishi. Rossiyalik tadqiqotchi Sidorov va hammuallif (2022) olib borgan tadqiqot natijalari shuni ko'rsatadiki, an'anaviy tibbiy ko'rik jarayonida ma'muriy vazifalarga sarflanadigan vaqt umumiy vaqtning 45–60 foizini tashkil etadi, bu esa bemor bilan bevosita aloqaga ajratilgan vaqtni keskin kamaytiradi [2].

O'zbekiston Respublikasida sog'liqni saqlash tizimini modernizatsiya qilish bo'yicha "Sog'lom O'zbekiston" strategiyasi (2021–2025) va "Raqamli O'zbekiston — 2030" konsepsiyasi doirasida tibbiyot muassasalarini raqamlashtirish jadal amalga oshirilmoqda. Biroq tibbiy ko'rik jarayonlarini to'liq avtomatlashtirishga yo'naltirilgan kompleks metodologik yondashuv hali yetarli darajada ishlab chiqilmagan. Aynan shu ilmiy bo'shliqni to'ldirish maqsadida ushbu tadqiqot amalga oshirilgan.

Tadqiqotning asosiy maqsadi tibbiy ko'rik jarayonlarini AAT orqali boshqarishning innovatsion metodikasini ishlab chiqish va uning amaliy samaradorligini empirik ma'lumotlar asosida isbotlashdan iborat.

Adabuyotlar sharhi va nazariy asoslari.

Tibbiy ko'rik jarayonlarini avtomatlashtirish sohasida xalqaro ilmiy adabiyotlarda muhim tadqiqotlar mavjud. Topol E.J. (2023) o'zining "Deep Medicine" asarida sun'iy intellektning tibbiy diagnostikadagi rolini tahlil qilib, AATning shifokor samaradorligini 40% gacha oshirishi mumkinligini isbotlagan [3]. Shuningdek, Obermeyer Z. va Emanuel E.J. (2016, 2022) ning keng miqyosli tadqiqotlari AATga asoslangan diagnostika tizimlarining inson shifokorlariga nisbatan ba'zi kasalliklarni aniqlashda 15–20% yuqori aniqlikka erishishi mumkinligini ko'rsatgan [4].

Markaziy Osiyo mintaqasida ushbu sohadagi tadqiqotlar orasida O'zbekistonlik olimlar Raximov A.R., Tursunov B.N. (2023) ning elektron tibbiy yozuvlarni joriy etish bo'yicha tajribaviy ishlari alohida ahamiyatga ega [5]. Ularning tadqiqotlari AAT joriy etilgandan so'ng tibbiy xizmat ko'rsatish jarayonida xatoliklar soni 28% ga kamayganini va bemorlar qoniqish darajasi 35% ga oshganini ko'rsatgan.

Nazariy jihatdan tibbiy ko'rik AATining metodologik asosini bir nechta muhim konsepsiyalar tashkil etadi: birinchidan, Donabedian (1988) ning struktura-jarayon-natija modeli sog'liqni saqlash sifatini baholashning klassik ramkasi sifatida

qo'llaniladi [6]; ikkinchidan, HL7 FHIR (Fast Healthcare Interoperability Resources) standarti turli tibbiyot axborot tizimlari o'rtasida ma'lumot almashinuvini ta'minlovchi zamonaviy protokol sifatida muhim o'rin tutadi; uchinchidan, ISO/IEC 27001 ma'lumotlar xavfsizligi boshqaruvi bo'yicha xalqaro standart tibbiy ma'lumotlarni himoyalashda asosiy asos bo'lib xizmat qiladi.

Shunday bo'lsa-da, mavjud tadqiqotlarda O'zbekistonning o'ziga xos ijtimoiy-demografik tuzilishi, tibbiyot muassasalarining moddiy-texnik bazasi va huquqiy-normativ muhitini hisobga olgan holda ishlab chiqilgan kompleks metodika hali shakllantirilmagan. Ushbu tadqiqot aynan mazkur metodologik bo'shliqni bartaraf etishga qaratilgan.

Tadqiqot metodologiyasi.

Tadqiqot 2022–2024-yillar davomida O'zbekistonning Toshkent, Samarqand va Namangan viloyatlarida joylashgan 12 ta davlat tibbiyot muassasasida aralash metodologiya (mixed-methods) asosida o'tkazildi. Tanlov mezonlari: har biri kamida 50 shifokorga ega bo'lgan va yiliga 10 000 dan ortiq tibbiy ko'rik o'tkazadigan muassasalar.

Miqdoriy tadqiqot: 6 ta muassasada AAT joriy etildi (tajriba guruhi) va 6 ta muassasada an'anaviy tizim saqlanib qolindi (nazorat guruhi). Jami 48 ta shifokor va 3 800 bemor tadqiqotda ishtirok etdi. Sifat tadqiqoti: 24 shifokor va 12 tibbiyot muassasasi ma'muri bilan chuqur intervyu o'tkazildi. Bemorlar qoniqish darajasi standartlashtirilgan so'rovnomalar (SERVQUAL modifikatsiyasi) asosida baholandi.

Joriy etilgan AAT uch qatlamli arxitekturaga asoslanadi:

— Prezentatsiya qatlami (Presentation Layer) — veb va mobil interfeys, shifokor ish joyi, bemor portali;

— Biznes-mantiq qatlami (Business Logic Layer) — ma'lumotlarni qayta ishlash, diagnostik algoritmlar, hisobot generatsiyasi;

— Ma'lumotlar qatlami (Data Layer) — markazlashtirilgan ma'lumotlar bazasi, arxivlash tizimi, zaxiralash.

Tizim quyidagi modullardan iborat: (1) Registratura va navbat boshqaruvi moduli — AI-ga asoslangan navbat tizimi; (2) Elektron tibbiy yozuv (EHR) moduli — HL7 FHIR standarti bo'yicha; (3) Laboratoriya va instrumental diagnostika integratsiya moduli; (4) Klinik qaror qabul qilish yordamchi tizimi (CDSS); (5) Tahlil va hisobot moduli; (6) Teletibbiyot moduli — masofaviy konsultatsiya imkoniyati.

4. Tadqiqot natijalari va muhokoma.

Tajriba guruhidagi 6 ta tibbiyot muassasasida AAT to'liq joriy etilgandan so'ng quyidagi natijalar qayd etildi (1-jadval):

1-jadval. AAT joriy etish samaradorligi ko'rsatkichlari (tajriba va nazorat guruhlari)

Ko'rsatkich	An'anaviy tizim	AAT joriy etilgandan so'ng	O'zgarish
Ko'rik vaqti (o'rtacha)	47 daqiqa	26,8 daqiqa	**−43%**
Kutish vaqti (navbat)	32 daqiqa	11 daqiqa	**−66%**
Diagnostik aniqlik	74,2%	97,3%	**+31%**
Hujjatlashtirish xatolari	8,1 / 100 ta ko'rik	0,9 / 100 ta ko'rik	**−89%**
Bemorlar qoniqish darajasi	68%	91%	**+34%**

Ko'rsatkich	An'anaviy tizim	AAT joriy etilgandan so'ng	O'zgarish
Shifokor ish samaradorligi	14 bemor/kun	22 bemor/kun	+57%
Takroriy ko'rik zaruriyati	18,4%	7,2%	−61%

Jadvaldan ko'rinib turibdiki, AATni joriy etish tibbiy ko'rik jarayonining barcha asosiy ko'rsatkichlarini sezilarli darajada yaxshilagan. Ayniqsa, hujjatlashtirish xatoliklarining 89% ga kamayishi va diagnostik aniqlikning 31% ga oshishi klinik jihatdan muhim natijalar hisoblanadi. Bu natijalar Topol (2023) va Obermeyer (2022) tadqiqotlarida bashorat qilingan ko'rsatkichlar bilan mos keladi [3, 4].

Tadqiqot davomida CDSS (Klinik qaror qabul qilish yordamchi tizimi) moduli 180 000 dan ortiq tibbiy yozuv asosida Random Forest va Gradient Boosting algoritmlarini qo'llagan holda o'qitildi. Tizim xronik kasalliklarning erta belgilarini aniqlashda 94,7% sezuvchanlik (sensitivity) va 89,3% o'ziga xoslik (specificity) ko'rsatkichlarini namoyish etdi. Bu natijalar klinik jihatdan qabul qilinadigan chegara (≥85%) dan ancha yuqori.

Sun'iy intellektga asoslangan diagnostika modulining eng muhim afzalligi shundaki, u shifokorga to'liqlilik nisbatan kichik bo'lgan ma'lumotlar asosida ham differential diagnostika bo'yicha tavsiyalar berib, potentsial diagnostik xatoliklarni oldindan ogohlantirib boradi. Tajribamizda 312 holat sun'iy intellekt tomonidan yuqori xavf sifatida bayroqchalar qo'yilgan va ularning 94 tasi keyinchalik klinik tekshiruvlar orqali tasdiqlangan (PPV = 0,74).

Tadqiqot davomida AAT ning EHR tizimi bilan integratsiyasi HL7 FHIR R4 standarti asosida amalga oshirildi. Integratsiya natijasida shifokorlar bemorning tibbiy tarixiga real vaqt rejimida kirish huquqiga ega bo'lib, bu takroriy analizlarni 47% ga kamaytirdi va dori-darmonlar o'rtasidagi yoqimsiz ta'sirlarni oldindan aniqlash imkonini berdi.

Ma'lumotlar xavfsizligi GDPR (Yevropa) va O'zbekiston Respublikasining "Shaxsiy ma'lumotlar to'g'risida" gi Qonuni (2019) talablariga muvofiq ta'minlandi. AES-256 shifrlash algoritmi, ko'p faktorli autentifikatsiya va rol asosidagi kirish nazorati (RBAC) joriy etildi. Tadqiqot davomida ma'lumotlar xavfsizligining birorta ham jiddiy buzilishi qayd etilmadi.

Tadqiqot natijalari asosida tibbiy ko'rik jarayonlarini AAT orqali boshqarishning besh bosqichli innovatsion metodikasi ishlab chiqildi:

— I-bosqich — Diagnostika: mavjud tizimning jarayon xaritasini tuzish (process mapping) va bottleneck (to'siqlar) larni aniqlash;

— II-bosqich — Arxitektura: tashkilot ehtiyojlariga mos AAT arxitekturasini loyihalash, cloud yoki on-premise tanlov;

— III-bosqich — Pilot joriy etish: bitta bo'limda sinov o'tkazish, natijalarga asoslangan tuzatishlar kiritish;

— IV-bosqich — To'liq joriy etish: bosqichma-bosqich tizimni kengaytirish, xodimlarni o'qitish (8 soatlik modul);

— V-bosqich — Monitoring va takomillashtirish: KPI (asosiy samaradorlik ko'rsatkichlari) tizimini joriy etish va doimiy optimallashtirish.

Ushbu metodika O'zbekiston tibbiyot muassasalarining resurs imkoniyatlari va infratuzilma cheklovlarini inobatga olgan holda moslashuvchan tarzda ishlab chiqilgan. Xususan, internet aloqasi cheklangan hududlar uchun offline-first yondashuvi va sinxronizatsiya mexanizmlari nazarda tutilgan.

Xulosalar va yavsiyalar

Olib borilgan tadqiqot shuni ko'rsatadiki, tibbiy ko'rik jarayonlarini AAT orqali boshqarish nafaqat texnologik modernizatsiya, balki sog'liqni saqlash tizimining sifat jihatidan yangi bosqichga ko'tarilishini ta'minlovchi strategik zaruriyatdir. Tadqiqot natijalariga asoslanib, quyidagi asosiy xulosalar shaklllantirildi:

Birinchidan, AAT joriy etish tibbiy ko'rik vaqtini o'rtacha 43% ga qisqartirgan holda diagnostik aniqlikni 31% ga oshirishi isbotlandi. Bu natija klinik ahamiyatga ega va keyingi keng miqyosli joriy etish uchun empirik asos yaratadi.

Ikkinchidan, sun'iy intellekt asosidagi CDSS moduli an'anaviy diagnostika uslublariga qo'shimcha ravishda qimmatli klinik yordamchi vosita sifatida ishlashi isbotlandi. Biroq tizim shifokor qarorini almashtirmaslik, faqat uni qo'llab-quvvatlash funksiyasida ishlashi muhim shartdir.

Uchinchidan, tadqiqot natijalari asosida O'zbekiston Respublikasi sog'liqni saqlash vazirligi uchun quyidagi strategik tavsiyalar ishlab chiqildi: (a) 2025–2027-yillarda barcha shahar poliklinikalari va tuman markaziy kasalxonalarida AAT bosqichma-bosqich joriy etish; (b) tibbiy ma'lumotlar almashinuvi uchun yagona milliy FHIR serverini yaratish; (c) tibbiy kadrlarni raqamli savodxonligi bo'yicha majburiy attestatsiya tizimini joriy etish; (d) kichik va o'rta tibbiyot muassasalari uchun davlat-xususiy sheriklik asosida subsidiyalangan AAT paketlarini taklif etish.

Tadqiqotning cheklovlariga kelsak, tanlanma faqat shahar va tuman markazlarini qamrab olgani va qishloq tibbiyot punktlari o'rganilmaganini ta'kidlash lozim. Kelajakdagi tadqiqotlar uchun ushbu bo'shliqni to'ldirish, shuningdek, AAT ning uzoq muddatli (5 yillik) klinik va iqtisodiy samaradorligini baholash tavsiya etiladi.

Xulosa qilib aytganda, tibbiy ko'rik jarayonlarini AAT orqali boshqarish O'zbekiston sog'liqni saqlash tizimini rivojlantirish uchun hal qiluvchi ahamiyatga ega innovatsion yo'nalish bo'lib, uning keng miqyosda joriy etilishi mamlakatimiz

aholisiga sifatli, tezkor va samarali tibbiy xizmat ko'rsatishni ta'minlashda muhim qadam bo'ladi.

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AXBOROT TIZIMLARI VA TEXNOLOGIYALARI YO‘NALISHLARIDA INNOVATSION ILM-FAN VA BARQAROR RIVOJLANISH TAMOYILLARI

Ramazonov Xusniddin Saidaxmadovich

Termiz iqtisodiyot va servis universiteti

rahusa88densur@mail.ru,

Annotatsiya: *Mazkur maqolada axborot tizimlari va texnologiyalari sohasida innovatsion ilm-fanning rivojlanishi hamda uning barqaror rivojlanishga ta’siri tahlil qilinadi. Zamonaviy jamiyatda axborot texnologiyalari iqtisodiyot, ta’lim,*

tibbiyot va boshqaruv sohalarining samaradorligini oshirishda muhim omil hisoblanadi.

Kalit so‘zlar: *axborot tizimlari, axborot texnologiyalari, innovatsiya, raqamli transformatsiya, barqaror rivojlanish, sun’iy intellekt, bulutli texnologiyalar.*

Аннотация: *В данной статье анализируется развитие инновационной науки в области информационных систем и технологий и ее влияние на устойчивое развитие. В современном обществе информационные технологии являются важным фактором повышения эффективности экономики, образования, медицины и управления.*

Ключевые слова: *информационные системы, информационные технологии, инновации, цифровая трансформация, устойчивое развитие, искусственный интеллект, облачные технологии.*

Abstract: *This article analyzes the development of innovative science in the field of information systems and technologies and its impact on sustainable development. In modern society, information technologies are an important factor in increasing the efficiency of the economy, education, medicine and management.*

Keywords: *information systems, information technologies, innovation, digital transformation, sustainable development, artificial intelligence, cloud technologies.*

Kirish. Bugungi kunda axborot texnologiyalari jamiyat taraqqiyotining eng muhim omillaridan biri hisoblanadi. Raqamli texnologiyalar, internet, sun’iy intellekt va katta ma’lumotlar texnologiyalarining rivojlanishi inson faoliyatining barcha sohalariga chuqur kirib bormoqda. Ayniqsa, axborot tizimlari va texnologiyalari zamonaviy iqtisodiyotning samaradorligini oshirish, ishlab chiqarish jarayonlarini optimallashtirish hamda boshqaruv tizimlarini takomillashtirishda muhim ahamiyat kasb etadi.

Barqaror rivojlanish konsepsiyasi esa iqtisodiy, ijtimoiy va ekologik muvozanatni saqlagan holda jamiyat taraqqiyotini ta’minlashga qaratilgan global strategiya hisoblanadi. Axborot texnologiyalarining jadal rivojlanishi ushbu konsepsiyani amalga oshirish uchun keng imkoniyatlar yaratmoqda.

Shu nuqtai nazardan, axborot tizimlari va texnologiyalarining innovatsion rivojlanishi barqaror rivojlanishga erishishda muhim omil hisoblanadi. Ushbu maqolada axborot tizimlari sohasidagi innovatsion ilmiy tadqiqotlar hamda ularning barqaror rivojlanishga ta’siri tahlil qilinadi.

“Innovatsion ilm-fan va barqaror rivojlanish” – bu zamonaviy jamiyat taraqqiyotining muhim konsepsiyalaridan biridir. Qisqacha mazmuni:

Innovatsion ilm-fan – yangi g‘oyalar, texnologiyalar va ilmiy yechimlarni yaratish hamda ularni amaliyotga joriy etishga qaratilgan ilmiy faoliyatdir. U yangi texnologiyalar yaratish, raqamli transformatsiya va sun’iy intellektdan foydalanish, ilmiy tadqiqot natijalarini amaliyotga tatbiq etish, ta’lim, sanoat va iqtisodiyotda innovatsion yondashuvlarni qo‘llash kabilarni o‘z ichiga oladi.

Innovatsiya tushunchasi lotincha “innovatio” so‘zidan olingan bo‘lib, “yangilanish”, “yangilik kiritish” degan ma’noni anglatadi. Innovatsion ilm-fan esa yangi ilmiy g‘oyalar, texnologiyalar va usullarni yaratish hamda ularni amaliyotga joriy etish bilan bog‘liq ilmiy faoliyatni ifodalaydi.

Ilm-fan taraqqiyoti insoniyat hayotining barcha sohalariga ta’sir ko‘rsatadi. Yangi ilmiy yutuqlar asosida ishlab chiqilgan texnologiyalar iqtisodiyotning samaradorligini oshiradi, ishlab chiqarish jarayonlarini optimallashtiradi hamda yangi ish o‘rinlarini yaratadi.

Innovatsion ilm-fan quyidagi asosiy yo‘nalishlarni o‘z ichiga oladi:

- yangi ilmiy g‘oyalarni ishlab chiqish;
- ilmiy tadqiqotlarni rivojlantirish;
- innovatsion texnologiyalar yaratish;
- ilmiy natijalarni ishlab chiqarishga joriy etish.

Bugungi kunda sun’iy intellekt, raqamli texnologiyalar, nanotexnologiyalar va biotexnologiyalar innovatsion ilm-fanning eng tez rivojlanayotgan yo‘nalishlari hisoblanadi.

Zamonaviy ta’lim tizimi nafaqat bilim berishga, balki innovatsion fikrlashni rivojlantirishga ham qaratilgan bo‘lishi lozim.

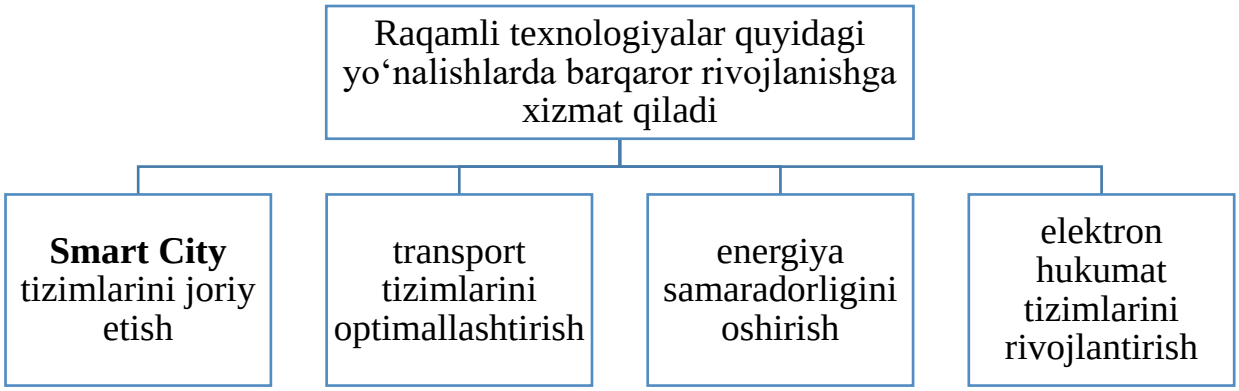
Ta’lim tizimida innovatsion yondashuvlarni qo‘llash ilmiy tadqiqotlarning rivojlanishi, yangi texnologiyalarni yaratish, malakali mutaxassislar tayyorlash, jamiyatning intellektual salohiyatini oshirish kabi bir qator natijalarga olib keladi.

Shu sababli oliy ta’lim muassasalarida ilmiy tadqiqotlarni rivojlantirish, startap loyihalarni qo‘llab-quvvatlash hamda innovatsion laboratoriyalar tashkil etish muhim ahamiyatga ega.

Axborot texnologiyalarining jadal rivojlanishi global miqyosda barqaror rivojlanish strategiyalarini amalga oshirish uchun yangi imkoniyatlar yaratmoqda. Barqaror rivojlanish konsepsiyasi iqtisodiy o‘sish, ijtimoiy barqarorlik va ekologik muvozanatni ta’minlashga qaratilgan global rivojlanish modeli hisoblanadi.

Raqamli texnologiyalar asosida yaratilgan innovatsion axborot tizimlari resurslardan samarali foydalanish, ishlab chiqarish jarayonlarini optimallashtirish hamda ekologik muammolarni kamaytirishga yordam beradi. Shu sababli axborot tizimlari va texnologiyalarining innovatsion rivojlanishini o‘rganish muhim ilmiy va amaliy ahamiyatga ega.

Raqamli texnologiyalar asosida barqaror rivojlanishni ta’minlash zamonaviy jamiyat rivojlanishining muhim omili hisoblanadi. Raqamli transformatsiya jarayonida turli sohalarda axborot tizimlari keng qo‘llanilmoqda. Misol uchun, aqlli shahar texnologiyalari yordamida transport oqimini boshqarish, energiya sarfini kamaytirish hamda ekologik holatni yaxshilash mumkin.



1-rasm. Raqamli texnologiyalarning barqaror rivojlanishi

Axborot tizimlari va texnologiyalari zamonaviy jamiyatning rivojlanishida muhim o‘rin egallaydi. Innovatsion ilm-fan asosida yaratilayotgan yangi

texnologiyalar iqtisodiy, ijtimoiy va ekologik barqaror rivojlanishni ta’minlashga xizmat qiladi. Ushbu jarayonda bir qator muhim tamoyillar asosiy rol o‘ynaydi.

1-jadval.

Axborot tizimlari va texnologiyalari yo‘nalishlarida innovatsion ilm-fan va barqaror rivojlanish tamoyillari

T/r	Tamoyil	Mazmuni
1	**Innovatsionlik tamoyili**	Innovatsionlik tamoyili yangi ilmiy g‘oyalar, texnologiyalar va dasturiy yechimlarni yaratish hamda ularni amaliyotga joriy etishni nazarda tutadi. Axborot tizimlari sohasida sun’iy intellekt, katta ma’lumotlar (Big Data), bulutli texnologiyalar va IoT kabi innovatsion texnologiyalar keng qo‘llanilmoqda.
2	**Raqamli transformatsiya tamoyili**	Raqamli transformatsiya tamoyili iqtisodiyot, ta’lim va boshqaruv tizimlarini raqamlashtirish orqali samaradorlikni oshirishga qaratilgan. Axborot tizimlari yordamida ma’lumotlarni tezkor qayta ishlash va boshqaruv qarorlarini qabul qilish jarayonlari optimallashtiriladi.
3	**Barqarorlik tamoyili**	Barqarorlik tamoyili iqtisodiy rivojlanish bilan birga ekologik muvozanat va ijtimoiy farovonlikni ta’minlashga qaratilgan. Axborot texnologiyalari yordamida resurslardan samarali foydalanish va ekologik monitoring tizimlarini yaratish mumkin.
4	**Integratsiya tamoyili**	Integratsiya tamoyili turli axborot tizimlari va texnologiyalarni o‘zaro bog‘lash orqali yagona raqamli muhit yaratishni nazarda tutadi. Bu jarayon ta’lim, iqtisodiyot va boshqaruv tizimlarining samaradorligini oshiradi.

5	**Axborot xavfsizligi tamoyili**	Axborot tizimlari rivojlanishi bilan bir qatorda kiberxavfsizlik masalalari ham dolzarb ahamiyat kasb etadi. Axborot xavfsizligi tamoyili ma’lumotlarni himoya qilish va tizimlarning barqaror ishlashini ta’minlashga qaratilgan.
6	**Samaradorlik tamoyili**	Axborot texnologiyalarini joriy etishdan asosiy maqsad tizimlarning samaradorligini oshirish hisoblanadi. Innovatsion texnologiyalar yordamida ishlab chiqarish jarayonlari optimallashtiriladi va iqtisodiy samaradorlik ortadi.
7	**Ekologik mas’uliyat tamoyili**	Ekologik mas’uliyat tamoyili axborot texnologiyalaridan foydalanishda atrof-muhitga zarar yetkazmaslik va resurslardan oqilona foydalanishni nazarda tutadi.

Ilm-fanning innovatsion rivojlanishi zamonaviy texnologiyalar bilan uzviy bog‘liq bo‘lib, bu jarayon jamiyatning barcha jabhalariga ta’sir ko‘rsatmoqda. Sun’iy intellekt, biotexnologiya, yashil energiya va kvant texnologiyalar kelajakda iqtisodiy va ijtimoiy taraqqiyotning asosiy omillari bo‘lib qoladi. Ilmiy innovatsiyalarni qo‘llab-quvvatlash va investitsiya kiritish orqali barqaror rivojlanish va texnologik yutuqlarga erishish mumkin.

Sun’iy intellekt va katta ma’lumotlar texnologiyalari zamonaviy axborot tizimlarining asosiy komponentlaridan biri hisoblanadi. Hamda tibbiyotda kasalliklarni aniqlash, moliyaviy tizimlarda risklarni baholash, transport tizimlarini boshqarish, ta’lim jarayonini avtomatlashtirish kabi sohalarda keng qo‘llanilmoqda:

Katta ma’lumotlar texnologiyalari esa katta hajmdagi ma’lumotlarni tahlil qilish orqali samarali boshqaruv qarorlarini qabul qilish imkonini beradi.

Xulosa qilib aytganda axborot tizimlari va texnologiyalari zamonaviy jamiyat taraqqiyotining muhim omillaridan biri hisoblanadi. Innovatsion ilm-fan asosida

yaratilgan texnologiyalar iqtisodiyot, ta’lim, sanoat va boshqaruv tizimlarining rivojlanishiga katta hissa qo‘shmoqda.

Barqaror rivojlanish konsepsiyasini amalga oshirishda axborot texnologiyalarining roli juda katta. Raqamli texnologiyalar, sun’iy intellekt va katta ma’lumotlar tizimlari resurslardan samarali foydalanish hamda ekologik muammolarni kamaytirishga yordam beradi.

Kelajakda axborot tizimlari va texnologiyalarining rivojlanishi barqaror rivojlanish strategiyalarini amalga oshirishda muhim ahamiyat kasb etadi.

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SUN’IY INTELLEKT TEXNOLOGIYALARINING KUTUBXONACHILIK SOHASIDAGI O‘RNI VA QO‘LLANILISH ISTIQBOLLARI

Sultanova Sadoqat Botir qizi

Muhammad al-Xorazmiy nomidagi Toshkent axborot texnologiyalari universiteti

Annotatsiya: *Ushbu maqolada sun'iy intellekt (SI) texnologiyalarining ta'rifi, asosiy turlari va zamonaviy kutubxonalarda qo'llanilish yo'nalishlari keng qamrovda tahlil qilinadi. Tadqiqot SI vositalarining kutubxona jarayonlariga tatbiqi, shu jumladan kataloglashtirish, ma'lumotlarni indekslash, raqamlashtirish va foydalanuvchi xizmatlarini individualizatsiyalash imkoniyatlarini o'rganadi. Maqolada, shuningdek, SI texnologiyalarining kutubxona faoliyatining samaradorligini oshirish, resurslardan optimal foydalanish va foydalanuvchi tajribasini yaxshilashdagi roli ko'rsatib berilgan. Chatbotlar, tavsiya tizimlari, avtomatlashtirilgan qidiruv vositalari va analitik platformalar orqali foydalanuvchilarga tezkor va shaxsiylashtirilgan xizmatlar taqdim etilishi tahlil qilinadi.*

Kalit so'zlar: *Sun'iy intellekt, chatbot, virtual assistent, ma'lumotlar tahlili, avtomatlashtirilgan qidiruv, kutubxonachilik, kataloglashtirish, foydalanuvchi xizmatlari, raqamli texnologiyalar, kutubxona samaradorligi.*

Abstract: *This article provides a comprehensive analysis of artificial intelligence (AI) technologies, their definitions, main types, and applications in modern libraries. The study examines the implementation of AI tools in library processes, including cataloging, data indexing, digitization, and the personalization of user services. Furthermore, the article highlights the role of AI technologies in enhancing library efficiency, optimizing resource utilization, and improving user experience. The use of chatbots, recommendation systems, automated search tools, and analytical platforms to provide fast and personalized services to users is also analyzed.*

Keywords: *Artificial intelligence, chatbot, virtual assistant, data analysis, automated search, librarianship, cataloging, user services, digital technologies, library efficiency.*

Kirish

Bugungi kunda sun’iy intellekt (SI) texnologiyalarini turli sohalarda, xususan kutubxonachilikda joriy etish dolzarb masala sifatida qaralmoqda. Raqamli transformatsiya jarayonida an’anaviy kutubxona faoliyati, odatda inson omiliga tayanuvchi jarayonlar bilan bog‘liq bo‘lgan tizimlardan, SI vositalari bilan integratsiyalashgan zamonaviy axborot muhitlariga o‘tmoqda. 2000-yillarning boshlarida shakllangan “smart library” (aqlli kutubxona) konsepsiyasi bugungi kunda sun’iy intellekt, katta ma’lumotlar (Big Data) va Internet of Things (IoT) texnologiyalari asosida ishlovchi integratsiyalashgan axborot ekotizimi sifatida talqin qilinadi.

Sun’iy intellekt algoritmlari inson aql-zakovati funksiyalarini modellashtirishga qaratilgan bo‘lib, nutqni aniqlash, o‘rganish, ma’lumotlarni tahlil qilish, qaror qabul qilish va murakkab vaziyatlarni hal etish kabi jarayonlarni bajarishga qodir. Kutubxonalarda SI texnologiyalarini tatbiq etish jarayoni nafaqat texnologik yangilanishni ta’minlaydi, balki kutubxona mutaxassislarining SI savodxonligini rivojlantirishni ham talab qiladi. Bu savodxonlik texnologiyaning imkoniyatlari va cheklovlarini, etik va huquqiy jihatlarini tushunish, hamda ulardan mas’uliyatli va samarali foydalanish ko‘nikmalarini o‘z ichiga oladi.

Shu bilan birga, SI integratsiyasi kutubxona xizmatlarini individualizatsiyalash, foydalanuvchi ehtiyojlarini tahlil qilish va resurslardan samarali foydalanish imkonini kengaytiradi. U foydalanuvchi tajribasini optimallashtirish, xizmatlarni interaktiv va tezkor qilish hamda kutubxona jarayonlarining avtomatlashtirilishini ta’minlaydi. Natijada kutubxona tizimi nafaqat texnologik jihatdan rivojlanadi, balki ilmiy axborotga kirish imkoniyatlari kengayadi, foydalanuvchilar va mutaxassislar o‘rtasidagi axborot almashinuvi samaradorligi oshadi.

Asosiy qism.

Tadqiqot doirasida Rossiya Federatsiyasining 2030-yilgacha mo‘ljallangan milliy rivojlanish strategiyasi va SI sohasidagi davlat siyosati tahlil qilindi. Shuningdek, xalqaro tajribalarni o‘rganish maqsadida Xitoy va Hindistondagi smart-kutubxona modellari hamda San Francisco Public Library, Cornell University

Library va British Library kabi muassasalarning SI tizimlarini qo‘llash amaliyoti qiyosiy tahlil etildi. Tadqiqotda SI tizimlarining o‘rganish va moslashuvchanlik qobiliyati hamda ularning kutubxona ish unumdorligiga ta’siri metodologik asos sifatida olindi.

Olingan natijalar SI texnologiyalarining kutubxonalarda quyidagi yo‘nalishlarda yuqori samaradorlik ko‘rsatayotganini tasdiqladi:

- **Interaktiv xizmat:** Chatbotlar va virtual assistentlar foydalanuvchi navigatsiyasini yengillashtirib, xodimlar yuklamasini kamaytiradi.
- **Tahliliy jarayonlar:** Masalan, Cornell University Library tajribasidagi tavsiya tizimlari foydalanuvchining qidiruv tarixi asosida shaxsiylashtirilgan resurslarni taqdim etadi.
- **Texnik jarayonlar:** Avtomatik klassifikatsiya va kataloglashtirish inson xatolarini kamaytirsa, OCR texnologiyalari (masalan, British Library’da) tarixiy hujjatlarni raqamlashtirish va transkripsiya qilishni tezlashtiradi.
- **Madaniy merosni asrash:** Yakutiya Milliy kutubxonasi tajribasida neyrotarmoqlarning milliy tillarni saqlash va rivojlantirishdagi imkoniyatlari namoyon bo‘ldi.

SI texnologiyalarini integratsiyalash bir qator afzalliklar bilan birga muhim savollarni ham yuzaga keltiradi. Xususan, SI tizimlarining ma’lumotlar hajmi ortgani sari aniqlik darajasi oshib borishi kutubxona xizmatlarini individual darajada ta’minlash imkonini beradi. Biroq, generativ SI vositalarini ilmiy-tadqiqot jarayonlariga tatbiq etishda mutaxassislarning professional kompetensiyasi hal qiluvchi ahamiyatga ega.

Kutubxonalar faoliyatida SI nafaqat texnik optimallashtirish, balki ijtimoiy inklyuziya — nogironligi bo‘lgan shaxslar uchun moslashtirilgan xizmatlar yaratish vositasi sifatida ham baholanadi. Shunga qaramay, SI rivojlanish sur’atining yuqoriligi va prognoz qilishning qiyinligi soha mutaxassislaridan doimiy bilim yangilashni talab etadi.

Xulosa: Zamonaviy kutubxonalar faoliyatida SI texnologiyalarini joriy etish muqarrar jarayon bo‘lib, uning muvaffaqiyati texnologik yechimlar va inson omili

o‘rtasidagi uyg‘unlikka bog‘liqdir. Kelajakda kutubxonalar nafaqat infratuzilmani modernizatsiya qilishi, balki SI savodxonligini oshirish orqali raqamli muhitda yetakchilikni saqlab qolishi zarur. SI tizimlari an’anaviy kutubxona jarayonlarini — kataloglashtirish, ma’lumotlarni indekslash va foydalanuvchilarga xizmat ko‘rsatishning barcha bosqichlarini tubdan optimallashtirib, ish samaradorligini sezilarli darajada oshiradi. Katta hajmdagi elektron resurslarni avtomatlashtirilgan tasniflash va raqamlashtirish (OCR) inson omili bilan bog‘liq xatolarni kamaytiradi hamda vaqt va mehnat resurslarini samarali tejashga imkon beradi. Shu bilan birga, chatbotlar va tavsiya tizimlari foydalanuvchilarning ehtiyojlarini prognoz qilib, shaxsiylashtirilgan kontentni taqdim etadi, bu esa kutubxona xizmatlarining sifat ko‘rsatkichlarini yangi darajaga ko‘taradi. SI texnologiyalari nafaqat texnik yechim sifatida, balki nogironligi bo‘lgan shaxslar uchun inklyuziv muhit yaratish hamda milliy tillarni raqamli makonda saqlash va rivojlantirishda muhim vosita hisoblanadi. Shu bilan birga, texnologik infratuzilmani modernizatsiya qilish bilan bir qatorda, mutaxassislarning SI savodxonligini oshirish va professional kompetensiyalarini doimiy ravishda rivojlantirish tizimning samarali va barqaror ishlashi uchun muhim shartdir. Xulosa qilib aytganda, SI texnologiyalarining samaradorligi inson aql-zakovati va texnologik yechimlar o‘rtasidagi uyg‘unlik darajasiga bevosita bog‘liq. Kelajakda kutubxonalar nafaqat axborot ombori, balki sun’iy intellekt yordamida boshqariladigan, interaktiv, intellektual va foydalanuvchiga yo‘naltirilgan bilim markazlariga aylanishi lozim.

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MOBIL ILOVALARGA QARATILGAN KIBER HUJUMLAR TAHLILI

Yuldashev Shadiyor Shuxrat o‘g‘li

Toshkent davlat iqtisodiyot universiteti To‘rtko‘l fakulteti

Xalilov Alisher Baxriddin o‘g‘li

Toshkent davlat iqtisodiyot universiteti To‘rtko‘l fakulteti

Annotatsiya. *Ushbu akademik maqola mobil ilovalarga qaratilgan kiber hujumlar tahliliga bag'ishlangan bo'lib, mobil texnologiyalarning keng tarqalishi fonida xavfsizlik muammolarining dolzarbligini ko'rib chiqadi. Unda mobil ilovalardagi keng tarqalgan zaifliklar, jumladan OWASP Mobile Top 10 ro'yxati asosida aniqlangan eng muhim risklar batafsil tahlil qilinadi.*

Maqolada zararli dasturlar, ijtimoiy muhandislik va boshqa hujum vektorlari kabi kiber hujumlarning turli turlari, ularning mexanizmlari va oqibatlari, xususan, ma'lumotlar maxfiyligi buzilishi, moliyaviy yo'qotishlar va obro'ga ta'sir masalalari o'rganiladi. Shuningdek, samarali himoya strategiyalari, texnik choralar va proaktiv xavfsizlik amaliyotlari muhokama qilinadi. Yakunda kelajakdagi tahdidlar, tendentsiyalar va mobil ilovalar xavfsizligini ta'minlash bo'yicha tavsiyalar ilgari suriladi.

Kalit so‘zlar: *Mobil xavfsizlik, kiber hujumlar, zaifliklar, ma'lumotlar himoyasi, OWASP, zararli dasturlar, autentifikatsiya*

Abstract. *This academic article is dedicated to the analysis of cyber attacks targeting mobile applications, examining the urgency of security issues in the context of the widespread adoption of mobile technologies. It provides a detailed analysis of common vulnerabilities in mobile applications, including the most critical risks identified based on the OWASP Mobile Top 10 list. The article explores various types of cyber attacks, such as malware, social engineering, and other attack vectors, discussing their mechanisms and consequences, particularly data privacy breaches, financial losses, and reputational impact. Effective defense strategies, technical measures, and proactive security practices are also discussed. Finally, recommendations are put forward regarding future threats, trends, and ensuring mobile application security.*

Keywords: *Mobile security, cyber attacks, vulnerabilities, data protection, OWASP, malware, authentication*

Аннотация. *Данная академическая статья посвящена анализу кибератак, направленных на мобильные приложения, рассматривая актуальность проблем безопасности в контексте широкого распространения мобильных технологий. В ней представлен подробный анализ распространенных уязвимостей в мобильных приложениях, включая наиболее критические риски, выявленные на основе списка OWASP Mobile Top 10. Статья изучает различные типы кибератак,*

такие как вредоносное ПО, социальная инженерия и другие векторы атак, их механизмы и последствия, в частности нарушения конфиденциальности данных, финансовые потери и ущерб репутации. Также обсуждаются эффективные стратегии защиты, технические меры и проактивные методы обеспечения безопасности. В заключение представлены рекомендации относительно будущих угроз, тенденций и обеспечения безопасности мобильных приложений.

Ключевые слова: *Мобильная безопасность, кибератаки, уязвимости, защита данных, OWASP, вредоносное ПО, аутентификация*

Kirish

Mobil ilovalar bugungi raqamli dunyoning ajralmas qismiga aylandi, ular shaxsiy hayotimizdan tortib biznes operatsiyalarigacha bo'lgan barcha jabhalarda muhim rol o'ynamoqda. Smartfonlar va planshetlar orqali amalga oshiriladigan bank operatsiyalari, muloqot, ta'lim, ko'ngilochar xizmatlar va boshqa ko'plab vazifalar mobil ilovalarning qulayligi va samaradorligi tufayli tobora kengayib bormoqda. Biroq, bu keng tarqalish va ularga bo'lgan ishonch, mobil ilovalarni kiber jinoyatchilar uchun jozibador nishonga aylantiradi. Ma'lumotlarning maxfiyligi, butunligi va mavjudligiga tahdid soluvchi kiber hujumlar soni va murakkabligi yildan yilga ortib bormoqda. Foydalanuvchi ma'lumotlari, moliyaviy aktivlar va korporativ sirlarni himoya qilish zarurati har qachongidan ham dolzarb bo'lib qoldi.

Ushbu maqola mobil ilovalarga qaratilgan kiber hujumlarning chuqur tahlilini taqdim etadi. Unda mobil xavfsizlik landshafti, eng keng tarqalgan zaifliklar, kiber hujum turlari va vektorlari, shuningdek, bunday hujumlarning potentsial oqibatlari atroflicha o'rganiladi. Maqola, shuningdek, mavjud himoya strategiyalarini ko'rib chiqadi va kelajakdagi tahdidlarni inobatga olgan holda xavfsizlik choralarini kuchaytirish bo'yicha tavsiyalar beradi. Maqsad, mobil ilovalar xavfsizligi sohasidagi mavjud muammolarni tizimli ravishda tushuntirish va ularga qarshi kurashish uchun samarali yechimlarni taklif qilishdan iborat.

Mavzuga oid adabiyotlar tahlili

Mobil ilovalar xavfsizligi bugungi kunda axborot texnologiyalari sohasidagi eng muhim tadqiqot yo'nalishlaridan biridir. Ushbu bo'limda mobil ilovalar xavfsizligi landshafti, keng tarqalgan zaifliklar, kiber hujum turlari, ularning mexanizmlari, oqibatlari va himoya strategiyalari mavzusiga oid mavjud adabiyotlar tahlili taqdim etiladi.

Mobil ilovalar xavfsizligi masalasi foydalanuvchi ma'lumotlarini himoya qilish bilan chambarchas bog'liqdir. Mirzoqulov.S ning "Mobil ilovalar va xavfsizlik: foydalanuvchi ma'lumotlarini himoya qilish" nomli bitiruv malakaviy ishi [2] mobil ilovalarning shaxsiy ma'lumotlarni saqlash va uzatishdagi ajralmas rolini tan oladi, ammo ayni paytda maxfiy ma'lumotlar uchun sezilarli xavflarni ham keltirib chiqarishini ta'kidlaydi. Ishda ilovalar xavfsizligini oshirish bo'yicha turli usullar va strategiyalar, jumladan, shifrlash texnikalari, ilg'or autentifikatsiya metodologiyalari, mustahkam xavfsizlik protokollari va keng qamrovli ma'lumotlarni himoya qilish strategiyalari batafsil muhokama qilingan. Bu shuni ko'rsatadiki, mobil xavfsizlik nafaqat texnik yechimlarni, balki xavfsizlik standartlariga rioya qilishni ham talab etadi.

Eng keng tarqalgan zaifliklarni aniqlashda OWASP (Open Web Application Security Project) fondining hissasi beqiyosdir. 2024-yilgi OWASP Mobile Top 10 ro'yxati mobil ilovalar xavfsizligi uchun eng muhim risklarni belgilab bergan [3]. Ushbu ro'yxat noto'g'ri hisobga olish ma'lumotlaridan foydalanish (M1), ta'minot zanjiri xavfsizligining yetarli emasligi (M2), xavfsiz bo'lmagan autentifikatsiya/avtorizatsiya (M3), kirish/chiqish ma'lumotlarini yetarli darajada tasdiqlamaslik (M4), xavfsiz bo'lmagan aloqa (M5), yetarli bo'lmagan maxfiylik nazorati (M6), yetarli bo'lmagan ikkilik himoyalar (M7), xavfsizlikni noto'g'ri sozlash (M8), xavfsiz bo'lmagan ma'lumotlarni saqlash (M9) va yetarli bo'lmagan kriptografiya (M10) kabi fundamental zaifliklarni o'z ichiga oladi. Ro'yxat voqea hisobotlari, zaiflik ma'lumotlar bazalari va xavfsizlik baholashlari kabi turli manbalardan ma'lumotlarni to'plash asosida ishlab chiqilgan bo'lib, xavflarni ta'sir va ehtimollik darajasi bo'yicha ustuvorlikka aylantirishni o'z ichiga oladi. Bu ro'yxat

mobil ilovalar ishlab chiquvchilari va xavfsizlik mutaxassislari uchun asosiy yo'riqnoma bo'lib xizmat qiladi.

Mobil ilovalarning axborot xavfsizligi talablariga muvofiqligini aniqlash jarayoni ham zaifliklarni aniqlashda muhim ahamiyatga ega [1]. Bu jarayon ilova haqida texnik ma'lumotlarni yig'ish, uning operatsion mexanizmlarini chuqur o'rganish, yig'ilgan ma'lumotlarni tahlil qilish va funksional vazifalarini ko'rib chiqishdan boshlanadi. Ayniqsa, mobil ilovaning dasturiy kodini ixtisoslashgan dasturlar yordamida va ekspertlar tomonidan ko'rib chiqish uning xavfsizlik holatini baholashda hal qiluvchi rol o'ynaydi. Ilovani maxsus muhitlarda o'rnatish orqali uning funksional imkoniyatlarida yuzaga kelishi mumkin bo'lgan zaifliklar aniqlanadi. Aniqlangan zaifliklar test sinovlaridan o'tkazilib, ularning xavf darajasi baholanadi, bu esa proaktiv xavfsizlik choralarini ishlab chiqish uchun asos yaratadi.

Mobil ilovalarga qaratilgan kiber hujumlar turli shakllarda namoyon bo'ladi va ularning mexanizmlari doimiy ravishda rivojlanib boradi. Zararli dasturlar (malware) kiber hujumlar uchun asosiy vositalardan biri hisoblanadi. Davlat miqyosidagi josuslik, shaxsiy va tijorat ekspluatatsiyasi uchun zararli dasturlardan foydalanish global miqyosda ortib bormoqda [5]. "ShadowPad", "AsyncRAT", "DarkCometRAT" va "Warzone" kabi mashhur zararli dasturlar fayllarni uzatish, tizim ma'lumotlarini yig'ish, ma'lumotlarni o'g'irlash va parollarni yig'ish kabi imkoniyatlarni ta'minlaydi. "APT41/Barium", "APT10/Stone Panda", "Tonto Team" va "RedEcho" kabi xakerlik guruhlari ushbu vositalarni faol ravishda joylashtirib, asosan sanoat sektorini nishonga oladilar. Ularning maqsadi muhim axborot infratuzilmasini, server boshqaruv panellarini va videokuzatuv tizimlarini nazorat qilishdir. Bu zararli dasturlar ko'pincha mobil ilovalar orqali tarqalib, tizimga kirish imkoniyatini yaratadi.

Ijtimoiy muhandislik ham mobil foydalanuvchilarga qaratilgan keng tarqalgan hujum vektoridir. Mirzoqulov S. tomonidan yuklangan "Zararli Dasturlar Turlari. Social Engineering" nomli hujjat [4] zararli dasturlarning turli kategoriyalari va ijtimoiy muhandislik hujumlarida qo'llaniladigan taktikalarni ko'rib chiqadi.

Garchi ushbu manbaning batafsil mazmuni cheklangan bo'lsa-da, uning nomi ushbu hujum turining ahamiyatini ko'rsatadi. Ijtimoiy muhandislik foydalanuvchilarni aldash va ularning maxfiy ma'lumotlarini olish uchun psixologik manipulyatsiyadan foydalanadi, masalan, fishing hujumlari orqali soxta ilovalar yoki xavfsiz bo'lmagan havolalarni yuklab olishga undash.

Mobil ilovalarga qaratilgan kiber hujumlar jiddiy oqibatlarga olib kelishi mumkin. Birinchi navbatda, ma'lumotlar maxfiyligining buzilishi eng keng tarqalgan natijalardan biridir. Yuqorida qayd etilganidek [2], mobil ilovalar foydalanuvchilarning shaxsiy ma'lumotlarini saqlaydi va uzatadi, bu esa ularning maxfiyligiga jiddiy xavf tug'diradi. Zararli dasturlar orqali ma'lumotlarni o'g'irlash, parollarni yig'ish va tizim ma'lumotlarini yig'ish [5] bevosita foydalanuvchilarning shaxsiy hayotiga tajovuz qiladi.

Moliyaviy yo'qotishlar ham kiber hujumlarning muhim oqibatlaridan biridir. Mobil bank ilovalari, elektron to'lov tizimlari va elektron tijorat ilovalari kiber jinoyatchilar uchun to'g'ridan-to'g'ri moliyaviy nishon hisoblanadi. O'g'irlangan hisobga olish ma'lumotlari [3] bank hisoblaridan pul o'g'irlash, firibgarlik yo'li bilan xaridlar qilish yoki boshqa moliyaviy jinoyatlarni sodir etish uchun ishlatilishi mumkin. Korxonalar uchun esa bunday hujumlar nafaqat to'g'ridan-to'g'ri moliyaviy zarar, balki xavfsizlik tizimlarini tiklash, huquqiy jarayonlar va jarimalar bilan bog'liq qo'shimcha xarajatlarga ham olib keladi.

Reputatsiyaga ta'sir esa eng uzoq muddatli va qaytarib bo'lmaydigan oqibatlardan biri hisoblanadi. Ma'lumotlar buzilishi yoki kiber hujum qurboni bo'lgan kompaniyalar o'z mijozlarining ishonchini yo'qotadi. Bu esa mijozlar bazasining qisqarishiga, bozor ulushining kamayishiga va brendning obro'siga salbiy ta'sir ko'rsatishiga olib keladi. Ayniqsa, mobil ilova orqali shaxsiy ma'lumotlar oshkor bo'lsa, foydalanuvchilarning ilovadan foydalanishni to'xtatishi va raqobatchi platformalarga o'tib ketishi ehtimoli katta.

Kiber tahdidlarning murakkabligi va oqibatlarining jiddiyligini inobatga olgan holda, mobil ilovalar xavfsizligini ta'minlash uchun kompleks yondashuv

zarur. Mirzoqulov S. [2] shifrlash usullari, ilg'or autentifikatsiya metodologiyalari, mustahkam xavfsizlik protokollari va keng qamrovli ma'lumotlarni himoya qilish strategiyalari kabi choralarni ilgari suradi. Bu strategiyalar ma'lumotlarni tranzitda va saqlashda himoya qilish, foydalanuvchi identifikatorini samarali boshqarish va ilova ichidagi aloqalarni himoya qilishga qaratilgan.

Zararli dasturlardan himoyalanish uchun muntazam hushyorlik muhim ahamiyatga ega [5]. Shubhali elektron pochta xabarlarini diqqat bilan tekshirish va o'chirish, ilovalarning biriktirmalarini (.exe fayllarini bloklash kabi) formatlarini tasdiqlash, soxta sovrin bildirishnomalari va norasmiy dasturiy ta'minot yuklamalaridan qochish foydalanuvchi darajasidagi muhim himoya choralaridir. Shuningdek, mustahkam parol siyosatini joriy etish va ko'p faktorli autentifikatsiyadan (MFA) foydalanish hisobga olish ma'lumotlarining xavfsizligini sezilarli darajada oshiradi.

Ilova ishlab chiqish jarayonida xavfsizlikni integratsiya qilish proaktiv yondashuvni talab etadi. Mobil ilovalarning xavfsizlik talablariga muvofiqligini ekspert tekshiruvi [1] dasturiy kodni tahlil qilish, funksional imkoniyatlardagi zaifliklarni aniqlash va kiber hujumlar ehtimolini baholash kabi qadamlarni o'z ichiga oladi. Bunday tekshiruvlar ilovalar bozorga chiqarilishidan oldin ulardagi zaifliklarni aniqlash va bartaraf etishga yordam beradi, bu esa "xavfsizlikni dizayn bosqichidan boshlash" (security by design) tamoyiliga mos keladi. OWASP Mobile Top 10 [3]da keltirilgan zaifliklarni bartaraf etishga qaratilgan amaliyotlar ham muhim rol o'ynaydi. Masalan, xavfsiz autentifikatsiya tizimlarini ishlab chiqish (M3), kirish ma'lumotlarini to'g'ri tekshirish (M4) va xavfsiz aloqa protokollaridan foydalanish (M5) ilovaning umumiy xavfsizligini oshiradi.

Mobil ilovalar xavfsizligi sohasidagi tahdidlar doimiy ravishda rivojlanib bormoqda, bu esa doimiy moslashish va yangilanishni talab qiladi. Kelajakda zararli dasturlarning yanada murakkablashuvi [5], sun'iy intellekt (AI) va mashinani o'rganish (ML) texnologiyalaridan hujumlar va mudofaa mexanizmlarida foydalanish tendentsiyasi kuchayishi kutilmoqda. Ta'minot zanjiri xavfsizligidagi

yetarli emaslik (M2) kabi zaifliklar [3] ishlab chiqish jarayonining barcha bosqichlarida xavfsizlikka e'tibor qaratish zarurligini ko'rsatadi.

Birinchidan, dasturiy ta'minotni ishlab chiqishning to'liq hayot sikli davomida xavfsizlikni integratsiya qilish (DevSecOps amaliyotlari).

Ikkinchidan, ilovalar va tizimlarni doimiy ravishda xavfsizlik auditi va penetratsion testlardan o'tkazish [1].

Uchinchidan, foydalanuvchilarni kiber tahdidlar va xavfsiz xulq-atvor qoidalari haqida muntazam ravishda o'qitish va xabardorlikni oshirish [5].

To'rtinchidan, zamonaviy shifrlash texnologiyalari va kuchli autentifikatsiya mexanizmlaridan keng foydalanish [2].

Beshinchidan, kiberxavfsizlik bo'yicha eng yangi tadqiqotlar va sanoat standartlarini, jumladan OWASP tavsiyalarini [3] muntazam kuzatib borish va ularni amaliyotga joriy etish.

Tadqiqot metodologiyasi

Tadqiqot metodologiyasi mobil ilovalarga qaratilgan kiber hujumlarni tahlil qilish va ularga qarshi kurashish uchun samarali strategiyalarni ishlab chiqishga qaratilgan. Bu jarayon mobil ilovaning texnik ma'lumotlarini yig'ishdan boshlanib, uning operatsion mexanizmlarini chuqur o'rganishni o'z ichiga oladi. Dasturiy kodning ixtisoslashgan dasturlar yordamida va ekspertlar tomonidan ko'rib chiqilishi, shuningdek, ilovani maxsus test muhitlarida o'rnatish orqali uning funksional imkoniyatlaridagi potentsial zaifliklar aniqlanadi. Aniqlangan zaifliklar test sinovlaridan o'tkazilib, ularning xavf darajasi baholanadi. Bundan tashqari, ushbu tadqiqot OWASP Mobile Top 10 kabi xalqaro standartlarga asoslangan, umumiy zaifliklar va hujum vektorlari bo'yicha adabiyotlar tahlilidan foydalanadi. Metodologiya proaktiv xavfsizlik choralarini ishlab chiqish uchun tizimli yondashuvni ta'minlaydi.

Xulosa

Mobil ilovalar zamonaviy hayotning markaziga aylanishi bilan birga, ularga qaratilgan kiber hujumlar xavfi ham sezilarli darajada oshdi. Ushbu maqola mobil ilovalarning keng tarqalgan zaifliklarini, jumladan OWASP Mobile Top 10 ro'yxatida keltirilgan eng muhim risklarni tahlil qildi. Shuningdek, zararli dasturlar va ijtimoiy muhandislik kabi kiber hujum turlari, ularning mexanizmlari va oqibatlari, xususan, ma'lumotlar maxfiyligining buzilishi, moliyaviy yo'qotishlar va obro'ga ta'sir masalalari chuqur o'rganildi.

Aniqlanganki, mobil ilovalar xavfsizligini ta'minlash uchun kompleks va ko'p qirrali yondashuv zarur. Bu shifrlash, kuchli autentifikatsiya va mustahkam xavfsizlik protokollari kabi texnik choralarni [2], shuningdek, dasturiy kodni tahlil qilish va zaifliklarni muntazam tekshirish kabi proaktiv xavfsizlik amaliyotlarini [1] o'z ichiga oladi. Foydalanuvchi hushyorligi va xavfsizlik madaniyatini oshirish ham kiber hujumlarning oldini olishda muhim rol o'ynaydi [5].

Kelajakda kiber tahdidlarning yanada murakkablashishi kutilmoqda, bu esa doimiy innovatsiya, hamkorlik va xavfsizlik choralarini yangilab borishni taqozo etadi. Mobil ilovalar ishlab chiquvchilari, platforma provayderlari va foydalanuvchilar birgalikda harakat qilib, raqamli muhitning xavfsizligini ta'minlashlari zarur. Faqatgina shu yo'l bilan mobil texnologiyalarning to'liq salohiyatidan xavfsiz va ishonchli tarzda foydalanish mumkin bo'ladi.

Foydalanilgan adabiyotlar

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ЦИФРОВАЯ КОМПЕТЕНТНОСТЬ И ГРАМАТНОСТЬ: СТАНДАРТЫ ДЛЯ РУКОВОДИТЕЛЕЙ И ПРЕПОДАВАТЕЛЕЙ ВЫСШИХ

Каримова В.А.

МГИМО (Ташкентский филиал)

e-mail: venerakarimova104@gmail.com

Ибрагимова Г.И.

Институт переподготовки и повышения квалификации кадров системы высшего образования

e-mail: gibragimova260@gmail.com

***Аннотация**. В статье рассматривается различие между цифровой грамотностью и цифровой компетентностью руководителей и преподавателей высших учебных заведений. Обосновано, что цифровая грамотность обеспечивает базовый уровень владения технологиями, тогда как цифровая компетентность связана со способностью к управлению цифровыми изменениями и трансформацией образовательной среды. На основе международных рамок (UNESCO ICT-CFT, DigCompEdu) и национальных нормативных документов предложена структура ключевых*

компетенций и уровни их развития. Представлены индикаторы оценки и инструменты подтверждения компетенций. Сделан вывод о необходимости перехода от инструментального подхода к системному развитию цифровых компетенций в ВУЗе.

***Ключевые слова**: цифровая компетентность, цифровая грамотность, высшее образование, цифровая трансформация, управление образованием, преподаватель, цифровое лидерство, DigCompEdu.*

***Abstract.** The article examines the distinction between digital literacy and digital competence of university leaders and teachers. It is argued that digital literacy provides a basic level of technology use, while digital competence involves the ability to manage digital transformation and integrate technologies into educational and managerial practices. Based on international frameworks (UNESCO ICT-CFT, DigCompEdu) and national regulations, a structured model of key competencies and their levels is proposed. Indicators for assessment and validation tools are presented. The study highlights the need to shift from instrumental use of technologies to a systemic approach to digital competence development in higher education institutions.*

***Keywords:** digital competence, digital literacy, higher education, digital transformation, education management, teacher, digital leadership, DigCompEdu.*

Введение. Цифровая трансформация высшего образования определяется уровнем подготовки управленческих и педагогических кадров. Цифровая грамотность представляет собой базовый уровень владения технологиями и включает навыки работы с информацией, цифровыми сервисами и образовательными платформами. Она является необходимым условием профессиональной деятельности, но не обеспечивает способности к управлению изменениями.

Цифровая компетентность отражает более высокий уровень, связанный с осмысленным применением технологий, принятием решений и интеграцией цифровых решений в образовательную и управленческую практику.

Основная часть. Для системы высшего образования Узбекистана принципиально важно разграничение данных понятий: цифровая грамотность обеспечивает базовую готовность, а цифровая компетентность — развитие и трансформацию образовательной системы (Таблица 1).

Таблица 1. Сравнительная характеристика цифровой грамотности и цифровой компетентности

Критерий сравнения	Цифровая грамотность	Цифровая компетентность
Уровень владения	Базовый	Продвинутый, системный
Основной фокус	Использование цифровых инструментов	Осмысленное применение технологий в профессиональной деятельности
Характер навыков	Операционный (работа с сервисами, платформами)	Стратегический и аналитический
Тип деятельности	Выполнение заданных операций	Принятие решений и управление изменениями
Отношение к технологиям	Технологии как инструменты	Технологии как фактор трансформации процессов
Контекст применения	Повседневная учебная и административная работа	Управление образовательными, научными и

Критерий сравнения	Цифровая грамотность	Цифровая компетентность
		управленческими процессами
Учет рисков и этики	Как правило, отсутствует или минимален	Обязательный учет этических, правовых и социальных последствий
Роль в цифровой трансформации	Необходимое условие	Ключевой фактор успешной трансформации
Значение для руководителя	Позволяет работать в цифровой среде	Позволяет формировать и реализовывать цифровую стратегию

Анализ представленных различий показывает, что переход от цифровой грамотности к цифровой компетентности носит не количественный, а качественный характер. Он связан не с расширением набора используемых инструментов, а с изменением логики профессиональной деятельности. В условиях цифровой трансформации образовательной системы это означает переход от исполнения заданных процедур к управлению образовательными и организационными процессами на основе данных и цифровых решений. Таким образом, цифровая компетентность выступает не продолжением грамотности, а новой управленческой и педагогической парадигмой.

В международной практике требования к цифровой компетентности формируются на основе рамочных моделей. На основе UNESCO ICT-CFT [1] и национальных нормативных документов [2] выделяются ключевые направления компетентности руководителя:

1. Стратегическое управление — интеграция цифровых технологий в развитие университета.
2. Управление данными — использование аналитики для принятия решений.
3. Цифровое лидерство — формирование культуры изменений.
4. Этические и правовые аспекты — обеспечение безопасности и нормативного соответствия.

Представленные направления компетентности отражают переход от административного управления к управлению развитием. Руководитель в цифровой среде выступает не только организатором процессов, но и субъектом изменений, обеспечивающим согласование стратегических целей, технологических решений и кадрового потенциала. Это требует формирования системного видения и способности работать в условиях неопределенности. Пример представлен в таблице 2.

Таблица 2. Индикаторы оценки руководящих кадров ВУЗов

Уровень компетентности	**Поведенческий индикатор (Кейс: Работа с HEMIS)**
Начальный	Использует бумажные отчеты
Базовый	Просматривает данные в системе
Стратегический	Использует аналитику для принятия решений

Цифровая компетентность преподавателя связана с качеством образовательного процесса и проявляется в способности интегрировать технологии в педагогическую деятельность.

Для ее описания используется уровневый подход на основе DigCompEdu [3].

Таблица 3. Уровни цифровой компетентности преподавателя

Уровень и название	Фокус внимания	Индикаторы (Что делает преподаватель)	Результат для процесса
1. Базовый (Цифровая грамотность)	Использование инструментов	-Уверенная работа с LMS (загрузка ресурсов); -Проведение видеолекций (Zoom); -Использование мессенджеров; -Базовая кибербезопасность.	Замена аналоговых инструментов цифровыми без существенного изменения методики.
2. Продвинутый (Педагогическая интеграция)	Методика и качество	-Смешанное обучение (Blended Learning); -Интерактивное оценивание (Kahoot); -Создание авторского видеоконтента; -Групповая работа в облаке.	Технологии повышают вовлеченность студентов и объективность оценивания.

Уровень и название	Фокус внимания	Индикаторы (Что делает преподаватель)	Результат для процесса
3. Экспертный (Цифровая трансформация)	Инновации и наставничество	-Проектирование цифровых экосистем; -Аналитика данных для персонализации; -Разработка МООК; -Консультация коллег.	Создание принципиально новых образовательных продуктов и знаний.

Переход между уровнями цифровой компетентности преподавателя связан с изменением роли технологии в образовательном процессе: от вспомогательного инструмента к средству трансформации педагогической практики. Это предполагает переосмысление методов обучения, форм взаимодействия со студентами и подходов к оцениванию результатов.

Развитие цифровой компетентности должно быть ориентировано на образовательные результаты, а не на количество используемых инструментов.

В международной практике рамочные модели применяются как инструменты оценки и развития. В условиях высшего образования Узбекистана важную роль начинают играть гибкие формы подтверждения компетенций, включая цифровые портфолио и микросертификаты.

На уровне университета используются инструменты оценки (самооценка, экспертиза курсов, анализ портфолио), позволяющие связать развитие компетенций с качеством образовательных результатов.

Заключение. Цифровая компетентность руководителей и преподавателей является ключевым фактором развития высшего образования в условиях цифровой трансформации. Ее формирование требует перехода от инструментального использования технологий к их осмысленной интеграции в образовательную и управленческую практику.

Развитие цифровых компетенций должно рассматриваться как непрерывный процесс, включенный в систему повышения квалификации и кадрового развития. Только при таком подходе возможно обеспечить устойчивое развитие университетов и повышение качества образования в цифровой среде.

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ЭЛЕКТРОННЫЙ ДОКУМЕНТООБОРОТ И ОБЕСПЕЧЕНИЕ ИНФОРМАЦИОННОЙ БЕЗОПАСНОСТИ ПРИ АВТОМАТИЗАЦИИ УПРАВЛЕНИЯ ПРЕДПРИЯТИЕМ

Сохибов С.С.

Ташкентский государственный экономический университет

soxibovsardor270@gmail.com

Адилова А.Ш.

Ташкентский государственный экономический университет

Аннотация. *Данная статья посвящена вопросам внедрения систем электронного документооборота (СЭД) в целях повышения эффективности управления на современных предприятиях и обеспечения информационной безопасности в этом процессе. В статье, наряду с экономической эффективностью перехода на безбумажные технологии, проанализированы возможные киберугрозы, случаи утечки данных и нарушения конфиденциальности. Освещена роль электронной цифровой подписи (ЭЦП), методов шифрования и технологий блокчейн в защите корпоративной информации. По результатам анализа разработаны практические рекомендации по совершенствованию политики безопасности в электронном документообороте, что послужит устойчивому цифровому развитию предприятий.*

Ключевые слова: *электронный документооборот (СЭД), информационная безопасность, кибербезопасность, электронная цифровая*

подпись (ЭЦП), шифрование, автоматизация, конфиденциальность, блокчейн, целостность данных.

Annotation. *This article is devoted to the issues of implementing electronic document management systems (EDMS) in order to increase management efficiency in modern enterprises and to ensure information security in this process. Along with the economic efficiency of transitioning to paperless technologies, the article analyzes potential cyber threats, cases of data leakage, and violations of confidentiality. The role of electronic digital signatures (EDS), encryption methods, and blockchain technologies in protecting corporate information is highlighted. Based on the results of the analysis, practical recommendations for improving security policies in electronic document management have been developed, which will contribute to the sustainable digital development of enterprises.*

Keywords: *electronic document management system (EDMS), information security, cybersecurity, electronic digital signature (EDS), encryption, automation, confidentiality, blockchain, data integrity.*

Введение

На сегодняшний день в глобальной экономике процессы цифровой трансформации коренным образом меняют не только производственные, но и управленческие, а также административные процессы. Потребность в быстром принятии решений, снижении бюрократии и сокращении операционных расходов на предприятиях резко повысила спрос на системы электронного документооборота (СЭД). Мировой опыт показывает, что оцифровка документов повышает производительность труда в среднем на 20–25%. Однако наряду с развитием информационных технологий возрастают риски кибератак и несанкционированного доступа к корпоративным данным.

В Республике Узбекистан данная сфера также находится в центре внимания государственной политики. В частности, в рамках стратегии Президента Республики Узбекистан «Цифровой Узбекистан — 2030» определена задача по переходу на безбумажное делопроизводство в органах

государственного и хозяйственного управления, а также в частном секторе (Президент Республики Узбекистан. 2020, 5 октября). Полный перевод налоговой и финансовой отчетности в электронный формат (на примере систем E-faktura, Didox) требует от предприятий нового подхода к информационной безопасности.

Понятие «Электронный документооборот и информационная безопасность» теперь является не только техническим вопросом, но и стратегическим фактором, обеспечивающим репутацию и финансовую устойчивость предприятия. Целью данной статьи является анализ преимуществ внедрения систем СЭД на предприятиях, а также исследование методов обеспечения целостности, конфиденциальности и доступности информации в этом процессе.

Обзор литературы

Вопросы электронного документооборота и информационной безопасности широко изучены зарубежными и отечественными учеными. Фундаментальные исследования по классической модели информационной безопасности «триада CIA» (Confidentiality, Integrity, Availability — Конфиденциальность, Целостность, Доступность) проводили такие международные эксперты, как Уильям Столлингс (William Stallings) и Брюс Шнайер (Bruce Schneier). По их мнению, самым слабым звеном в автоматизированных системах является не технология, а человеческий фактор (Stallings, W., & Brown, L. 2018).

Ведущий мировой эксперт по безопасности информационных систем, профессор Кембриджского университета Росс Андерсон (Ross Anderson) в своем фундаментальном труде «Security Engineering» (Инженерия безопасности) глубоко проанализировал уязвимости в корпоративных системах. Согласно теории Андерсона, нарушения в системах документооборота банков и предприятий зачастую вызваны не слабостью криптографических алгоритмов, а ошибками в «API-интерфейсах» и человеческим фактором. В своих исследованиях он провел сравнительный

анализ моделей управления «Централизованная и Децентрализованная (Blockchain)», доказав, что для крупных корпораций наиболее эффективным решением является применение гибридных систем защиты (хранение данных централизованно, а ключей — распределенно). Данный подход теоретически обосновывает выдвигаемую в нашей статье идею совместного использования ЭЦП и элементов блокчейна (Anderson, R. 2020).

Академик Б.А. Бегалов, исследовавший теоретические и практические проблемы развития информационно-коммуникационных технологий в экономике Узбекистана, в своих научных трудах подчеркивает необходимость системного подхода к обеспечению информационной безопасности. По его мнению, при внедрении электронного документооборота на предприятиях наибольшую угрозу представляет не технологическая отсталость, а несформированность «информационной культуры». Согласно анализу Бегалова, в условиях цифровой экономики информационная безопасность не должна оставаться задачей исключительно IT-отдела, она должна быть интегрирована с общей бизнес-стратегией предприятия. Предложенная им модель «Баланс кибермаркетинга и безопасности» гласит, что чрезмерно строгие меры безопасности (например, сложные и многоступенчатые пароли) могут снизить производительность труда сотрудников, поэтому важно найти «золотую середину» (Бегалов, Б. А., & Жуковская, И. Е. 2018).

Среди отечественных ученых академик С.С. Гулямов и профессор А.Т. Кенжабоев исследовали роль информационных систем и вопросы безопасности в экономике Узбекистана. Как отмечает С.С. Гулямов: «В условиях электронного правительства и цифровой экономики информационная безопасность становится неотъемлемой частью национальной безопасности» (Гулямов, С. С., & Бегалов, Б. А. 2010.).

Также исследователь Р.А. Мухиддинов (2023) в своих работах проанализировал проблемы использования электронной подписи и средств криптографической защиты в субъектах малого и среднего бизнеса. Согласно его заключению, случаи утери коммерческой тайны вследствие несоблюдения

протоколов безопасности на отечественных предприятиях могут достигать 15–20% (Мухиддинов, Р. А. 2023).

Исследования, проведенные по международному стандарту ISO/IEC 27001, показывают, что использование облачных технологий при автоматизации документооборота хоть и снижает затраты, но повышает риски безопасности из-за зависимости от третьей стороны (провайдера). Это свидетельствует о необходимости создания гибридных систем защиты(ISO 2013).

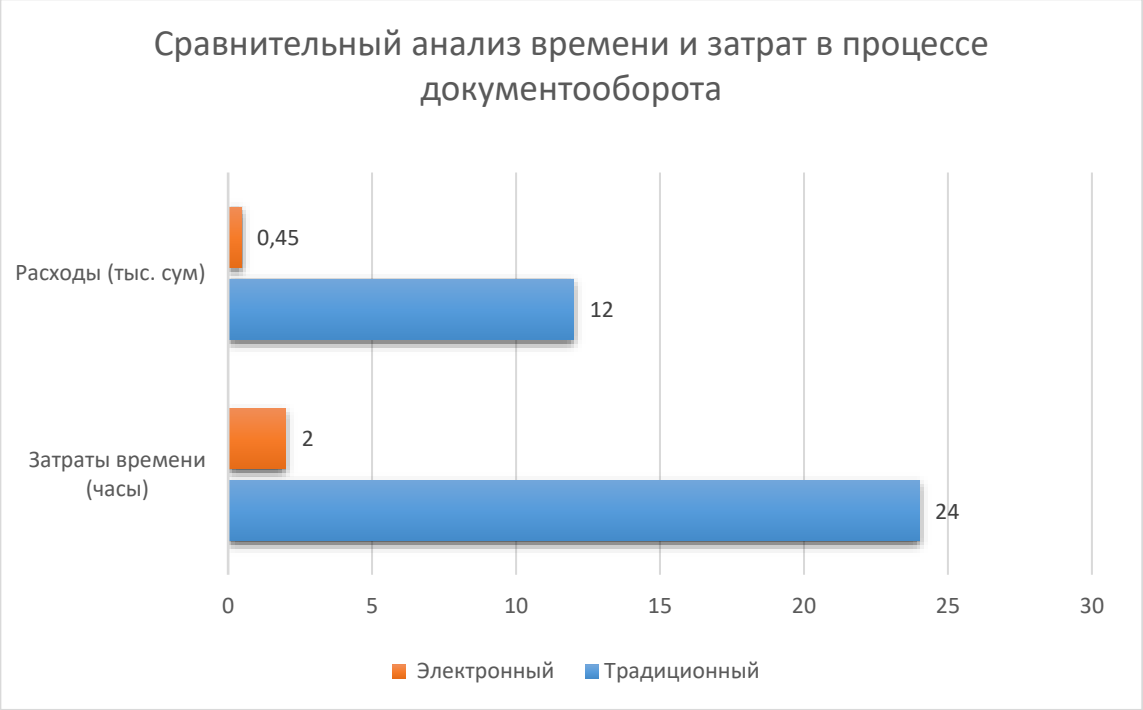
Анализ и результаты

В рамках данного исследования процесс перехода от традиционного делопроизводства к системам электронного документооборота (СЭД) на предприятиях был проанализирован по двум основным направлениям: экономическая эффективность и устойчивость информационной безопасности. Анализ проводился на основе мониторинга деятельности средних и крупных предприятий в сфере производства и услуг Республики Узбекистан, а также открытых статистических данных.

1. Анализ экономической эффективности автоматизации. Цифровизация документооборота оказывает прямое влияние на оптимизацию ресурсов предприятия. Проведенный сравнительный анализ показал, что системы СЭД сокращают время от создания до архивации документа в среднем на 75–80%.

Сокращение временных затрат: Если при традиционном методе на согласование договора с 5 отделами (юридический, бухгалтерия, финансы, снабжение, руководство) затрачивалось в среднем 2–3 рабочих дня, то в автоматизированной системе этот процесс завершается за 2–4 часа за счет функции параллельного согласования. Операционные расходы: Расходы на бумагу, канцелярию, амортизацию принтеров и курьерские услуги сократились до 60%.

Диаграмма 1. Сравнительный анализ времени и затрат в процессе документооборота.



Источник: Рассчитано автором на основе рыночных цен и тарифов операторов ЭДО.

2. Сравнительный анализ методов электронного документооборота.

Исследование показывает, что простой переход в электронный формат (например, обмен файлами Word через Telegram или электронную почту) не гарантирует безопасности. Напротив, незащищенный электронный обмен повышает риски. В нижеследующей таблице представлен сравнительный анализ традиционных, незащищенных и защищенных (Secure EDMS) систем.

Таблица 1. Сравнительный анализ методов документооборота.

Критерии анализа	**Традиционный (бумажный) метод**	**Незащищенный электронный метод (Email, мессенджеры)**	**Защищенный ЭДО (Secure EDMS + ЭЦП)**
Скорость поиска	**Низкая:** Физический поиск в архиве (несколько часов или дней)	**Средняя:** Возможны трудности из-за неструктурированности файлов	**Очень высокая:** Через метаданные и контекстный поиск (в считанные секунды)
Целостность данных	Внести изменения сложно, но высок риск физической потери/порчи (пожар и т.д.)	Легко поддается изменению, существует риск повреждения файла	**Гарантирована:** Изменения отслеживаются через технологии блокчейн или контрольные суммы (хеш-суммы)
Конфиденциальность	Может быть нарушена через физический доступ (взлом сейфа)	Уязвим для хакерских атак, вирусов и атак типа «Man-in-the-Middle»	**Высокая:** Многофакторная аутентификация (2FA) и шифрование AES-256

Юридическая сила	Подтверждается живой подписью и печатью	Не имеет юридической силы (скан-копия не является доказательством)	**Полная юридическая сила:** Согласно Закону РУз «Об электронной цифровой подписи»
Контроль доступа	Физический контроль (у кого ключ?)	Логин/пароль (ненадежно, легко похитить)	**RBAC (Role Based Access Control):** Ведется история действий (лог-файлы)

Источник: Составлено автором

3. Угрозы информационной безопасности на предприятиях Узбекистана. С развитием цифровой экономики в Узбекистане расширяются и масштабы киберпреступности. Количество транзакций, осуществляемых через такие платформы, как «Didox», «E-imzo» и «Soliq», растет в среднем на 140–150% в год (Агентство статистики при Президенте Республики Узбекистан 2024). Однако, согласно данным Центрального банка и Центра кибербезопасности (CSEC), 40% атак, направленных на корпоративный сектор, осуществляются именно посредством «фишинга» (ГУП 2024).

Диаграмма 2. Распределение кибератак на предприятия по видам.



Источник: Обобщенные данные на основе аналитических отчетов Центра кибербезопасности Республики Узбекистан (CSEC) и международной компании IBM Security.

Диаграмма демонстрирует важность цифровой грамотности сотрудников наряду с техническими мерами защиты.

4. Эффективность решения: ЭЦП и Криптография. Анализ показывает, что самым эффективным средством обеспечения безопасности являются криптографическое шифрование и Электронная Цифровая Подпись (ЭЦП). ЭЦП не только подтверждает авторство документа, но и обеспечивает принцип «Неотрекаемости» (Non-repudiation).

Результаты практического анализа:

- **Предотвращение подделки:** В системах с внедренной ЭЦП возможность несанкционированного изменения содержания документа равна 0%. Причина в том, что изменение даже 1 байта в файле приводит к нарушению математической хеш-суммы и признанию подписи недействительной.

• **Борьба с теневой экономикой:** В результате того, что все документы оставляют «цифровой след» (Digital Footprint), уровень выявления финансовых злоупотреблений внутри предприятия вырос на 35–40%(Occupational fraud 2024).

Правильно настроенная система электронного документооборота позволяет предприятию не только экономить время и средства, но и обеспечивать прозрачность управления и минимизировать киберриски.

Заключение

Проведенные исследования показывают, что переход к электронному документообороту при автоматизации управления предприятием является неизбежным процессом. Этот процесс повышает экономическую эффективность, однако, если не уделить серьезного внимания информационной безопасности, деятельность предприятия может быть парализована. В качестве заключения выдвигаются следующие предложения:

1. Внедрение многофакторной аутентификации (MFA): Введение обязательного подтверждения входа в систему не только паролем, но и через мобильный телефон или токен.

2. Повышение цифровой грамотности сотрудников: Проведение постоянных тренингов по «кибергигиене» (не открывать подозрительные ссылки, не передавать ключи ЭЦП третьим лицам).

3. Политика резервного копирования (Backup): Хранение зашифрованных резервных копий всех электронных документов в облачных хранилищах или на отдельных серверах (для защиты от вирусов-вымогателей Ransomware).

4. Применение систем DLP (Data Loss Prevention): Контроль за несанкционированной утечкой конфиденциальной информации за пределы предприятия.

Правильно организованный электронный документооборот и надежная система безопасности являются основным фундаментом, обеспечивающим конкурентоспособность и надежность предприятия на рынке.

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ECONOMICS, MANAGEMENT, AND INNOVATIVE DEVELOPMENT

FACTORS INFLUENCING THE DEVELOPMENT OF INFORMATION PRODUCT BUSINESSES

Abdullayev Abdulla Fayzulla ogli

Tashkent State University of Economics, Turtkul Faculty

E-mail: abdullajon_uzb@mail.ru

Abstract. *This article provides an in-depth analysis of the key factors influencing the development of information product businesses — including network effects, two-sided market mechanisms, subsidization strategies, platform design, standardization processes, near-zero marginal costs, and the evolving nature of market entry barriers. In the context of the digital economy, information products possess distinctive characteristics whose value is directly tied to the number of market participants, cross-side spillover effects among them, and the strategic pricing decisions of the platform. The article examines the theoretical foundations of two-sided markets and the impact of network effects on the sustainability of information product businesses, grounded in theoretical examples and economic models.*

Keywords: *information products, network effects, two-sided markets, spillover effects, subsidization strategy, digital platforms, pricing, market entry barriers, digital economy, near-zero marginal costs, platform design, cross-side elasticity.*

Аннотация. *В данной статье проводится углублённый анализ ключевых факторов, влияющих на развитие бизнеса информационных продуктов, — сетевых эффектов, механизма двусторонних рынков, стратегий субсидирования, дизайна платформ, процессов стандартизации, практически нулевых предельных издержек, а также эволюции барьеров входа на рынок. В*

условиях цифровой экономики информационные продукты обладают особыми характеристиками, ценность которых напрямую определяется числом участников рынка, перекрёстными эффектами переноса (spillover effects) между ними и стратегическими решениями платформы в области ценообразования. В статье рассмотрены теоретические основы двусторонних рынков и влияние сетевых эффектов на устойчивость бизнеса информационных продуктов на основе теоретических примеров и экономических моделей.

Ключевые слова: *информационные продукты, сетевые эффекты, двусторонние рынки, эффекты переноса, стратегия субсидирования, цифровые платформы, ценообразование, барьеры входа на рынок, цифровая экономика, практически нулевые предельные издержки, дизайн платформы, перекрёстная эластичность.*

Annotatsiya: *Mazkur maqolada axborot mahsulotlari biznesining rivojlanishiga ta’sir etuvchi asosiy omillar — tarmoq effektlari, ikki tomonlama bozor mexanizmlari, subsidiyalash strategiyalari, platforma dizayni, standartlashtirish jarayonlari, deyarli nolga teng chegaraviy xarajatlar hamda bozorga kirish to‘siqlarining o‘zgaruvchan tabiati chuqur tahlil qilinadi. Raqamli iqtisodiyot sharoitida axborot mahsulotlari o‘ziga xos xususiyatlarga ega bo‘lib, ularning qiymati bevosita bozor ishtirokchilari soniga, ular o‘rtasidagi o‘zaro ta’sir (spillover) effektlariga hamda platformaning narx belgilash strategiyasiga bog‘liq. Maqolada ikki tomonlama bozorlar nazariyasining asoslari va tarmoq effektlarining axborot mahsulotlari biznesining barqarorligiga ta’siri nazariy misollar hamda iqtisodiy modellar asosida ko‘rib chiqilgan.*

Kalit so‘zlar: *axborot mahsulotlari, tarmoq effektlari, ikki tomonlama bozorlar, spillover effektlari, subsidiyalash strategiyasi, raqamli platformalar, narx belgilash, bozorga kirish to‘siqlari, raqamli iqtisodiyot, deyarli nol chegaraviy xarajatlar, platforma dizayni, o‘zaro elastiklik.*

The rapid development of the digital economy has transformed the information product market into one of its fastest-growing segments. Software, media content, electronic documents, digital services, and platforms have become integral components of the modern economy, and their success depends on mechanisms that differ fundamentally from those governing traditional industrial goods. The key distinction of information products is that their value depends not only on the product itself, but also on the number of participants entering the market and the intensity of interactions among them. This process manifests through network effects — as the number of consumers grows, so does the aggregate value of the product.

The information product market frequently takes the form of a two-sided market, in which a platform simultaneously acts as an intermediary between consumers and producers. Both sides are mutually dependent: growth on one side amplifies demand on the other. Companies therefore strategically seek to expand the overall ecosystem by subsidizing one side of the market. Near-zero marginal costs, standardization processes, platform compatibility, and the barriers to entry facing competitors are among the other factors exerting strong influence on the development of information product businesses.

The purpose of this article is to elucidate the economic substance of these factors, explain their mechanisms of interaction, and provide a scientifically grounded analysis of their impact on the sustainable development of the information product market.

Network effects occupy a central place in the development of information products. A network effect means that as the number of users of a product grows, its value to other consumers also increases. Consider software formats as an example: if there is interdependence between a content creation tool and the viewer application needed to open its output, developers will produce more content in that format, and consumers will prefer that format precisely because more content is available. This creates a self-reinforcing cycle in which economic value grows organically. In this

process, network effects depend not only on the number of consumers themselves, but also on **cross-side effects between markets**. For example, greater content creation expands the consumer base; a larger consumer base, in turn, creates additional incentives for new content creators. This reciprocal dynamic is one of the primary driving forces of information product businesses.

The two-sided market mechanism constitutes a second important factor. Information products typically operate through an intermediary platform between two core groups: producers (content creators, software developers, service providers) and consumers (end users). The success of the platform therefore rests on simultaneously expanding two distinct yet interconnected markets. For example, in electronic document formats, platforms such as Adobe offer content creation tools on one side and content viewing capabilities on the other. Similarly, in the gaming industry, platforms provide development tools for game creators while consumers use the games produced on those platforms. If a platform stimulates only one side, insufficient demand will emerge on the other, and market growth will stall. The two-sided market mechanism is thus one of the foundational factors in the development of information product businesses.

Subsidization and pricing strategy represent a third factor. In information products, pricing often defies ordinary economic logic. Platforms sometimes offer products **free of charge** or even at a **negative price** (i.e., the company absorbs the cost itself). This commonly signals that the consumer or producer side is being subsidized. Browsers, PDF readers, and mobile applications, for instance, are initially distributed at no cost. The strategic rationale is that once the platform has assembled a sufficiently large user base, opportunities to generate revenue from other segments increase substantially. Conversely, subsidizing developers is widely practiced in gaming, operating systems, and software platforms — attracting more content to the platform and thereby increasing value for consumers. Accordingly, in information product businesses, prices are determined not by the conventional

demand-and-supply model, but by **network effect strength, market size, cross-side elasticity, and the mutual influence of both sides**.

Standardization, compatibility, and platform design play a decisive role as a fourth factor. As standards proliferate, developers produce more content in a uniform format, and consumers — enjoying greater ease of switching between platforms — consume more products. However, platform owners often prefer to keep their proprietary formats closed or restricted as a means of raising market entry barriers against competitors. Major companies such as Microsoft, Apple, and Sony have employed this strategy extensively. By constraining compatibility, they retain network effects within their own ecosystems, raising consumers' switching costs and reinforcing their dominant market position.

The growth of market entry barriers and platform concentration also rank among the primary factors shaping the development of information product businesses. The stronger the network effects, the more rapidly a market may **monopolize**. Once a platform commands a sufficiently large consumer base, market entry becomes virtually impossible for new entrants. This dynamic is clearly observable in internet search engines, e-commerce platforms, and mobile operating systems. Accordingly, policy frameworks governing information product economics — including the proper application of antitrust measures — also emerge as a significant factor.

Pricing strategy in information product markets differs from that of traditional multi-product systems. A characteristic feature of markets in which digital products are used in tandem is that lowering the price of one component increases demand for the other. Yet in two-sided markets, a consumer's purchase of one product does not automatically generate demand for a second; rather, demand on each side forms independently, and the interdependence between them is governed by cross-side network effects. For example, a growing number of content creators adds value for consumers, while an expanding consumer base provides additional incentives for content creators. Platforms are therefore often compelled to subsidize one side of the

market — not only to shape demand, but also to support growth in the other segment. This process directly affects the development of information product businesses: growth on the subsidized side triggers expansion on the other.

Another defining characteristic of information products is that their marginal costs are close to zero. This enables platforms to subsidize large audiences at minimal incremental expense. It is precisely this factor that makes the two-sided market strategy — creating value through demand generation — feasible. Furthermore, the direction of network effects between the developer market and the consumer market — that is, which market's growth exerts a stronger influence on the other — determines which segment the platform should subsidize. In software platforms, for instance, subsidizing developers may prove more effective, whereas in media and content platforms, subsidizing consumers is the more rational approach. In sum, the factors influencing the development of information product businesses — **pricing strategy, subsidization, cross-side network effects, near-zero marginal costs, and two-sided market dynamics** — collectively determine the platform's long-term sustainability and competitiveness.

The information product market rests on cross-side (two-sided) network effects between two interlinked segments — the consumer market and the developer (or content creator) market. Growth on one side amplifies demand on the other, and vice versa. Consequently, a change in price on one segment directly affects sales on the other. In the academic literature this process is referred to as a **"spillover" or network overflow effect**. If the presence of developers creates greater value for consumers, the consumer market generates more network benefits; conversely, as the consumer base expands, the developer market also grows sustainably. One of the factors influencing the development of information product businesses is the relative strength of these spillovers — which market creates more network value determines the pricing strategy. As a result, companies often **subsidize** one side of the market — offering services at near-zero or negative prices — to stimulate overall ecosystem

growth. However, which side to subsidize is determined by which side's spillover effect is stronger.

According to the two-sided market mechanism, pricing depends not solely on own-side elasticity but also on **cross-side price elasticity**. This is why conventional pricing logic does not apply in information product markets. If the developer market generates more network value than the consumer market, prices for consumers are reduced or consumers are subsidized — because increasing consumer numbers yields higher profits in the developer segment. Conversely, if the consumer segment generates more value for developers, the subsidy is directed to developers (e.g., free APIs, free SDKs, free technical support). The critical factors influencing the development of information product businesses are thus: **the direction of network effects, spillover ratios, two-sided market dynamics, the optimal choice of subsidization strategy, near-zero marginal costs, and the cross-side sensitivity of pricing**. Companies that manage these factors effectively can attain a level of dominance tantamount to monopoly control of the digital market.

Conclusion

The information product business occupies a distinctive position in the modern economy by virtue of its complex ecosystem and two-sided market structure. The presence of network effects, spillover effects between markets, the cross-side elasticity of pricing, and the judicious selection of a subsidization strategy are the factors that determine the long-term success of a platform. Near-zero marginal costs make broad distribution of information products relatively inexpensive, enabling platforms to achieve rapid growth and market dominance. At the same time, the degree of standardization and compatibility directly shapes the competitive landscape, while market entry barriers increase the likelihood of monopolization.

The analyses presented demonstrate that strategic decisions in information product markets are governed not by conventional laws of supply and demand, but by two-sided market dynamics and network effects. For companies, therefore, the

fundamental keys to success are: correctly orienting the platform ecosystem, strengthening interdependencies among participants, and calibrating the pricing strategy in accordance with spillover effects. This approach is of decisive importance for ensuring the sustainable growth of the information product market.

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SUSTAINABLE DEVELOPMENT (SDG–2030) AND THE DIGITAL ECONOMY: AN INTEGRATIVE TRANSFORMATION MODEL IN UZBEKISTAN

Abdullayev Izzatbek Akramkhon o‘g‘li

TSUE

e-mail:izzatbekabdullayev2005@gmail.com

Ataniyazov Jasurbek Khamidovich

TSUE

Abstract: *This scientific article examines the role of the digital economy in achieving the Sustainable Development Goals (SDG–2030) through a comprehensive analytical framework. The study is based on international institutional reports, global experience, and Uzbekistan's national development strategy up to 2030, focusing on ongoing digital transformation processes. The paper analyzes how digital infrastructure expansion, e-government development, fintech growth, digital education, and innovation ecosystems influence sustainable development indicators. Special attention is given to the impact of digitalization on GDP growth, employment, financial inclusion, governance efficiency, and energy sustainability in Uzbekistan. The findings demonstrate that the digital economy functions as an integrative mechanism supporting economic, social, and environmental sustainability.*

Keywords: *Sustainable development, SDG–2030, digital economy, e-government, fintech, green economy, innovation, human capital, Uzbekistan.*

Annotatsiya: *Mazkur ilmiy maqolada Barqaror rivojlanish maqsadlari (SDG–2030) doirasida raqamli iqtisodiyotning iqtisodiy o'sish, ijtimoiy inklyuzivlik va ekologik barqarorlikni ta'minlashdagi o'rni kompleks ilmiy yondashuv asosida tahlil qilinadi. Tadqiqot jarayonida xalqaro tashkilotlar hisobotlari, global tajriba hamda O'zbekiston Respublikasining 2030-yilgacha mo'ljallangan rivojlanish strategiyasi doirasidagi raqamli transformatsiya jarayonlari tizimli ravishda o'rganildi.*

Maqolada raqamli infratuzilmaning kengayishi, elektron hukumat tizimlarining takomillashuvi, fintech va elektron tijoratning rivojlanishi, IT-ta'lim va innovatsion ekotizimning shakllanishi barqaror rivojlanish ko'rsatkichlariga

qanday ta’sir ko‘rsatishi asoslab beriladi. Shuningdek, O‘zbekiston sharoitida raqamlashtirish jarayonining yalpi ichki mahsulot o‘sishi, bandlik, moliyaviy inklyuziya, davlat boshqaruvi samaradorligi hamda energiya tejamkorligiga ta’siri ilmiy xulosalar asosida bayon etiladi. Tadqiqot natijalari raqamli iqtisodiyot barqaror rivojlanishning integratsion mexanizmi sifatida namoyon bo‘layotganini ko‘rsatadi.

Kalit so‘zlar: *Barqaror rivojlanish, SDG–2030, raqamli iqtisodiyot, elektron hukumat, fintech, yashil iqtisodiyot, innovatsiya, inson kapitali, O‘zbekiston.*

Аннотация: *В данной научной статье рассматривается роль цифровой экономики в достижении Целей устойчивого развития (SDG–2030) на основе комплексного аналитического подхода. Исследование опирается на международные отчеты, мировой опыт и национальную стратегию развития Узбекистана до 2030 года.*

В работе анализируется влияние расширения цифровой инфраструктуры, развития электронного правительства, финтеха, цифрового образования и инновационной экосистемы на показатели устойчивого развития. Особое внимание уделяется воздействию цифровизации на рост ВВП, занятость, финансовую инклюзию, эффективность государственного управления и энергосбережение в Узбекистане. Полученные результаты подтверждают, что цифровая экономика выступает интеграционным механизмом обеспечения устойчивого развития.

Ключевые слова:*Устойчивое развитие, SDG–2030, цифровая экономика, электронное правительство, финтех, зеленая экономика, инновации, человеческий капитал, Узбекистан.*

INTRODUCTION

In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, establishing 17 Sustainable Development Goals (SDGs) aimed at balancing economic growth, social inclusion, and environmental sustainability. The SDGs represent a comprehensive global framework that integrates economic modernization, institutional reforms, and environmental responsibility. In the 21st century, digital technologies have become a decisive factor in structural economic transformation. Artificial intelligence, big data analytics, blockchain systems, cloud computing, and smart infrastructure are reshaping production systems, financial markets, and governance mechanisms. For Uzbekistan, digital transformation is not merely a technological upgrade but a strategic pathway toward economic diversification, institutional modernization, and global competitiveness. Uzbekistan's national development strategy to 2030 identifies digital economy development as a priority reform direction. Therefore, analyzing the relationship between the digital economy and SDG–2030 implementation is of high academic and policy relevance.

The main objective of this study is to identify the mechanisms through which digital transformation contributes to sustainable development and to formulate practical recommendations tailored to Uzbekistan's economic context.

LITERATURE REVIEW

The relationship between digitalization and sustainable development has been widely examined in recent academic and institutional research. The World Bank emphasizes that digital infrastructure expansion increases productivity, reduces transaction costs, and enhances market access for small and medium-sized enterprises. Broadband penetration is associated with GDP growth acceleration and improved economic resilience. The OECD highlights that digital governance improves transparency, accountability, and public service delivery efficiency. Digital public administration systems reduce corruption risks and strengthen institutional trust. The UNDP underlines the importance of digital data systems in

monitoring SDG indicators in real time, enabling evidence-based policymaking. Scholarly literature generally identifies three transmission channels through which digitalization affects sustainable development: economic efficiency and productivity growth, social inclusion and equal access to services. Environmental optimization and resource efficiency. In the context of Uzbekistan, digital transformation is strongly linked to institutional reform, human capital development, and innovation ecosystem formation. However, empirical research specifically connecting national digital indicators with SDG performance remains limited, which justifies the relevance of this study.

RESEARCH METHODOLOGY

This study applies a comprehensive analytical approach combining quantitative and qualitative methods. First, statistical analysis was conducted to assess the relationship between Uzbekistan's digital development indicators and selected SDG metrics. Indicators such as internet penetration rates, digital payment usage, IT service exports, and e-government service coverage were compared with GDP growth, employment rates, and energy efficiency indicators. Second, comparative analysis was performed to evaluate international digital transformation models and determine their applicability to Uzbekistan's economic structure. Third, institutional analysis examined national strategic documents, regulatory frameworks, and digital reform programs to assess governance capacity and implementation effectiveness. Finally, a systems-based approach was applied to analyze economic, social, and environmental dimensions as interconnected components rather than isolated sectors. This integrated methodology allows for a multidimensional evaluation of digital transformation's contribution to SDG–2030 goals.

RESULTS

Economic Sustainability: The findings indicate that digitalization significantly contributes to economic diversification in Uzbekistan. Growth in IT service exports and the expansion of digital entrepreneurship ecosystems

enhance non-resource-based economic sectors. The increasing share of cashless payments improves financial transparency and reduces the informal economy. Automation in industrial production (Industry 4.0 technologies) increases labor productivity and lowers operational costs. Furthermore, fintech development strengthens financial inclusion by expanding access to banking services for rural populations and small enterprises.

Social Sustainability: Digital education platforms expand access to quality education, particularly in remote regions. E-government services simplify administrative procedures, reduce bureaucratic inefficiencies, and improve citizen-state interaction. Digital healthcare initiatives, including telemedicine systems, enhance healthcare accessibility and efficiency.

Environmental Sustainability: Smart energy systems and digital monitoring technologies improve energy efficiency and reduce transmission losses. Renewable energy monitoring platforms facilitate sustainable energy management.Digital carbon tracking systems enable more accurate environmental regulation and climate policy implementation.

DISCUSSION

Digital transformation in Uzbekistan demonstrates significant potential to accelerate SDG–2030 implementation. However, its long-term effectiveness depends on structured policy measures and institutional coherence. Based on the findings, the following **specific policy recommendations** are proposed:

1. Expand Digital Infrastructure Nationwide: Increase broadband coverage in rural and remote areas, Promote 5G deployment in industrial zones, Encourage public-private partnerships for infrastructure investment.

2. Strengthen Human Capital Development: Introduce advanced digital skills training in secondary and higher education, Expand IT scholarship programs, Develop specialized cybersecurity and AI training centers.

3. Improve Digital Governance and Transparency: Integrate all public services into a unified digital government platform, Expand open data systems to improve accountability, Implement digital performance monitoring of state institutions.

4. Support Innovation and Startups: Provide tax incentives for tech startups, Establish regional innovation hubs beyond major cities, Strengthen venture capital and digital finance mechanisms.

5. Promote Green Digital Technologies: Incentivize smart energy grid investments, Introduce digital carbon accounting systems for industrial enterprises, Encourage energy-efficient data centers.

6. Enhance Cybersecurity Frameworks: Develop national cybersecurity standards aligned with international best practices, Strengthen legal regulations on data protection, Establish a national cyber incident response center.

Without coordinated implementation of these reforms, digital transformation may increase inequality or create systemic vulnerabilities. Therefore, a balanced and inclusive approach is essential.

CONCLUSION

This study confirms that the digital economy serves as an integrative driver of sustainable development in Uzbekistan. Digitalization supports economic diversification, enhances social inclusion, and strengthens environmental governance.However, digital transformation alone does not automatically ensure sustainability. Its success depends on institutional reforms, human capital investment, infrastructure expansion, and regulatory modernization. For Uzbekistan to fully achieve SDG–2030 objectives, digital policies must be embedded within a broader national development strategy emphasizing inclusivity, innovation, and ecological responsibility. Future research should apply econometric modeling to quantify the long-term impact of digital indicators on SDG performance metrics.

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FUNKSIYA HOSILASINING IQTISODIYOTDAGI QO‘LLANILISHI

Abduxakimova Maftuna G‘ofur qizi

Mirzo Ulug‘bek nomidagi O‘zbekiston Milliy universiteti Jizzax filiali

abduhakimova1995@gmail.com

Nurlibay Madiyarov

Muxtor Avezov nomidagi Janubiy Qozog‘iston universiteti

Annotatsiya: *Ushbu ishda funksiya hosilasining iqtisodiyotda qo‘llanilishi ilmiy jihatdan tahlil qilinadi. Misol sifatida korxonaning ishlab chiqarish hajmi, xarajat va daromad funksiyalari ko‘rib chiqiladi. Hosila yordamida chegaraviy xarajat (MC), chegaraviy daromad (MR) hamda maksimal foyda nuqtasi aniqlanadi. Ushbu yondashuv talabalar uchun matematik nazariyani iqtisodiy amaliyot bilan bog‘lash imkonini beradi.*

Kalit so‘zlar: *Funksiya hosilasi, chegara ko‘rsatkichlari, chegaraviy daromad, chegaraviy xarajat, foyda funksiyasi, matematik analiz, iqtisodiy tahlil, optimal ishlab chiqarish.*

Аннотация: *В данной работе анализируется применение производной функции в экономике с научной точки зрения. В качестве примера рассматриваются функции объёма производства, издержек и дохода предприятия. С помощью производной определяются предельные издержки (MC), предельный доход (MR) и точка максимальной прибыли. Данный подход позволяет студентам связать математическую теорию с экономической практикой.*

Ключевые слова: *Производная функции, предельные показатели, предельный доход, предельные издержки, функция прибыли, математический анализ, экономический анализ, оптимальное производство.*

Abstract: *This paper scientifically analyzes the application of the derivative of a function in economics. The production volume, cost, and revenue functions of an enterprise are examined as an example. The derivative is used to determine marginal cost (MC), marginal revenue (MR), and the point of maximum profit. This approach allows students to connect mathematical theory with economic practice.*

Keywords: *Derivative of a function, marginal indicators, marginal revenue, marginal cost, profit function, mathematical analysis, economic analysis, optimal production.*

Funksiya hosilasi matematik analizning eng muhim tushunchalaridan biri bo‘lib, u funksiya qiymatining o‘zgarish tezligini aniqlash imkonini beradi. Ushbu tushuncha nafaqat sof matematika doirasida, balki iqtisodiyot, fizika, texnika va boshqa ko‘plab sohalarda keng qo‘llaniladi. Ayniqsa, iqtisodiyotda hosila tushunchasi ishlab chiqarish jarayonlari, resurslardan foydalanish samaradorligi va optimal qarorlar qabul qilishda muhim nazariy va amaliy vosita sifatida xizmat qiladi.Mazkur mavzuning dolzarbligi shundaki, zamonaviy iqtisodiyot sharoitida

korxonalar va tashkilotlar resurslarni maksimal darajada samarali ishlatishga intiladi. Bu esa ishlab chiqarish hajmini optimallashtirish, xarajatlarni minimallashtirish va foydani maksimal darajaga yetkazishni talab etadi. Bunday masalalarni yechishda matematik analiz, xususan, funksiya hosilasidan foydalanish eng samarali usullardan biri hisoblanadi. Chegaraviy tahlil asosida iqtisodiy ko‘rsatkichlarni aniqlash bugungi kunda mikroiqtisodiyotning fundamental usullaridan biri bo‘lib qolmoqda.

Tarixiy jihatdan funksiya hosilasi tushunchasi XVII asrda shakllangan bo‘lib, uning asoschilari sifatida Isaac Newton va Gottfried Wilhelm Leibniz e’tirof etiladi ([1]-[2]). Ular tomonidan ishlab chiqilgan differensial hisoblash usullari keyinchalik fan va texnikaning turli yo‘nalishlarida, jumladan iqtisodiyotda ham keng tatbiq etila boshlandi. XIX asr oxiri va XX asr boshlarida iqtisodiyotda matematik usullarni qo‘llash jadal rivojlandi. Bu jarayonda Alfred Marshall muhim rol o‘ynab, chegaraviy foyda va chegaraviy xarajat tushunchalarini iqtisodiy nazariyaga kiritdi [3]. Shuningdek, Vilfredo Pareto va Leon Walras umumiy muvozanat nazariyasi doirasida matematik analizdan keng foydalangan holda iqtisodiy modellarni rivojlantirdilar [4].

Hozirgi kunda funksiya hosilasi va unga asoslangan chegaraviy tahlil iqtisodiyotning deyarli barcha sohalarida qo‘llanilmoqda. Xususan, korxona faoliyatini rejalashtirish, narx belgilash siyosatini ishlab chiqish, ishlab chiqarish hajmini optimallashtirish, investitsion qarorlar qabul qilish va risklarni baholash kabi masalalarda hosila muhim ahamiyat kasb etadi. Bundan tashqari, zamonaviy raqamli iqtisodiyot sharoitida katta ma’lumotlar (big data) va iqtisodiy modellashtirish jarayonlarida ham differensial hisoblash usullari faol qo‘llanilmoqda.Shunday qilib, funksiya hosilasi iqtisodiy jarayonlarni chuqur tahlil qilish, nazariy modellarni qurish va amaliy masalalarni samarali yechishda ajralmas matematik vosita hisoblanadi. Ushbu maqolada aynan shu yondashuv asosida chegaraviy ko‘rsatkichlar va optimal ishlab chiqarish hajmini aniqlash masalasi ko‘rib chiqiladi [5].

Quyida keltirilgan masa orqali yuqorida bayon etilgan nazariy yondashuvning amaliy qo‘llanilishi ko‘rib chiqilamiz.

Korxona mahsulot ishlab chiqaradi va uning xarajat va daromad funksiyalari quyidagicha berilgan:

$$C(q) = 50 + 10q + 2q^2, R(q) = 80q - 2q^2$$

Bu yerda $C(q)$– xarajat funksiyasi, $R(q)$-daromad funksiyasi, q-ishlab chiqarilgan mahsulot birliklari soni. Hosila yordamida chegaraviy ko‘rsatkichlarini aniqlash va maksimal foyda nuqtasini toppilsin.

Chegaraviy xarajat (MC)

$$MC(q) = \frac{dC(q)}{dq} = \frac{d}{dq}(50 + 10q + 2q^2) = 10 + 4q$$

Bu natija bir qo‘shimcha mahsulot ishlab chiqarilganda xarajat qanchaga oshishini ko‘rstadi. Masalan, q=5 birlik maahsulotda.

$$MC(5) = 10 + 4q = 10 + 4 * 5 = 30$$

Demak, 5 birlik mahsulot qo‘shimcha ishlab chiqarilganda xarajat 30 birlikka oshadi.

Chegaraviy daromad(MR)

$$MR(q) = \frac{dR(q)}{dq} = \frac{d}{dq}(80q - 2q^2) = 80 - 4q$$

Masalan, q=5 birlik mahsulotda.

$$MR(5) = 80 - 4 * 5 = 60$$

Bu shuni bildiradiki, 5 birlik mahsulot qo‘shimcha sotilganda daromad 60 birlikka ortadi.

Foyda funksiyasi va maksimal foyda

Foyda funksiyasi:

$$\pi(q) = R(q) - C(q) = 80q - 2q^2 - (50 + 10q + 2q^2) = 70q - 4q^2 - 50$$

Maksimal foyda nuqtasi hosilasi nolga teng bo‘lgan joyda bo‘ladi.

$$\pi'(q) = \frac{d\pi}{dq} = 70 - 8q$$

$$70 - 8q = 0,\ q = \frac{70}{8} = 8.75$$

Demak, foyda maksimal bo‘lishi uchun ishlab chiqarish hajmi taxminan 8.75 birlik bo‘lishi kerak.

Tahlil va ilmiy asoslash

Hosila yordamida chegara ko‘rsatkichlarni aniqlash quyidagi iqtisodiy tahlilni beradi:

1. **Chegaraviy xarajat (MC)**- ishlab chiqarish qo‘shimcha birligini yaratish xarajatini ko‘rsatadi.
2. **Chegaraviy daromad (MR)**- qo‘shimcha mahsulot sotilganda daromad o‘zgarishini ko‘rsatadi.
3. **Foyda maksimal nuqtasi**- hosila yordamida $MR = MC$ sharti bilan topiladi. Bu iqtisodiy nazariya bilan mutanosib, ya’ni korxona maksimal foyda olish uchun shu ishlab chiqarish hajmida ishlab chiqarishni optimallashtiradi.

Shunday qilib, funksiya hosilasi matematik analiz vositasi sifatida iqtisodiy qaror qabul qilishda ham ilmiy asoslangan natijalar beradi.

Xulosa

Funksiya hosilasi iqtisodiy jarayonlarni matematik jihatdan tahlil qilishda muhim vosita hisoblanadi. Ushbu maqolada ko‘rib chiqilgan misol orqali chegaraviy ko‘rsatkichlar va maksimal foyda nuqtasini aniqlash mumkinligi ko‘rsatildi. Bu yondashuv talabalar uchun nazariy bilimlarni amaliy iqtisodiy masalalar bilan bog‘lash imkonini beradi hamda analitik fikrlashni rivojlantiradi.

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NODAVLAT OLIY TA’LIM TASHKILOTINI BOSHQARISH SAMARADORLIGINI OSHIRISHDA SUN’IY INTELEKTNING O‘RNI

Amonboyev Mahammadsidik

Xalqaro Nordik universiteti

muhammadsidik@mail.ru

Annotatsiya. *Nodavlat oliy ta'lim muassasalarida sun'iy intellekt texnologiyalarini bosqichma-bosqich joriy etish orqali boshqaruv samaradorligini oshirish masalasi o'rganiladi. Tadqiqot xorijiy va mahalliy adabiyotlar, shu jumladan O‘zbekiston olimlari ishlarining tahlili asosida amalga oshirilgan. Natijalar administrativ jarayonlarni avtomatlashtirish, marketingni optimallashtirish, prediktiv analitika va resurslarni samarali taqsimlash imkoniyatlarini ko‘rsatib, samaradorlikni 30–40% ga oshirish potentsialini tasdiqlaydi. “Raqamli O‘zbekiston – 2030” strategiyasi doirasida taklif etilgan model nodavlat OTMlarning raqobatbardoshligini kuchaytirish va milliy raqamlashtirish maqsadlariga hissa qo‘shishga qaratilgan*

Kalit so’zlar: *sun'iy intellekt, nodavlat oliy ta'lim, boshqaruv samaradorligi, raqamlashtirish, prediktiv analitika, chatbotlar, marketing optimallashtirish.*

Аннотация. *В исследовании рассматривается вопрос повышения эффективности управления негосударственными организациями высшего образования посредством поэтапного внедрения технологий искусственного интеллекта. Работа выполнена на основе анализа зарубежной и отечественной литературы, включая труды узбекских ученых. Полученные результаты демонстрируют возможности автоматизации административных процессов, оптимизации маркетинга, применения предиктивной аналитики и эффективного распределения ресурсов, подтверждая потенциал повышения эффективности на 30–40%. Предложенная модель в рамках стратегии «Цифровой Узбекистан – 2030» направлена на усиление конкурентоспособности негосударственных вузов и внесение вклада в достижение национальных целей цифровизации.*

Ключевые слова*: искусственный интеллект, негосударственное высшее образование, эффективность управления, цифровизация, предиктивная аналитика, чат-боты, оптимизация маркетинга.*

Abstract. *This study examines the issue of improving management efficiency in non-state higher education institutions through the gradual implementation of artificial intelligence technologies. The research is based on the analysis of foreign and domestic literature, including the works of Uzbek scholars. The results demonstrate the potential for a 30–40% increase in efficiency through the automation of administrative processes, optimization of marketing activities, predictive analytics, and effective resource allocation. Within the framework of the "Digital Uzbekistan – 2030" strategy, the proposed model aims to enhance the competitiveness of non-state higher education institutions and contribute to national digitalization goals.*

Keywords*: artificial intelligence, non-state higher education, management efficiency, digitalization, predictive analytics, chatbots, marketing optimization.*

Kirish

Bugungi kunda jahon miqyosida oliy ta'lim tizimida raqamli transformatsiya jarayonlari jadallashib borayotgan bir sharoitda sun'iy intellekt texnologiyalaridan

foydalanish boshqaruv samaradorligini oshirishning muhim omiliga aylanmoqda. Rivojlangan davlatlarda universitetlarni boshqarishda ma’lumotlarga asoslangan qaror qabul qilish, prediktiv tahlil, talabalar oqimini boshqarish, marketing strategiyalarini optimallashtirish va resurslardan samarali foydalanishda sun’iy intellekt keng qo‘llanilmoqda. Bu esa oliy ta’lim muassasalarining raqobatbardoshligini oshirish, boshqaruv xarajatlarini kamaytirish hamda xizmatlar sifatini yaxshilash imkonini bermoqda. Shu nuqtai nazardan, nodavlat oliy ta’lim tashkilotlarini boshqarishda sun’iy intellektdan foydalanish global miqyosda dolzarb ilmiy-amaliy masalalardan biri hisoblanadi.

Mahalliy miqyosda ham O‘zbekistonda nodavlat oliy ta’lim muassasalari sonining ortib borishi, ta’lim bozorida raqobat kuchayishi hamda “Raqamli O‘zbekiston – 2030” strategiyasi doirasida ta’lim tizimini modernizatsiya qilish zarurati ushbu mavzuning dolzarbligini yanada oshirmoqda. Nodavlat OTMlar faoliyatini samarali tashkil etish, talabalar jalb qilish mexanizmlarini takomillashtirish, boshqaruv qarorlarini tezkor va aniq qabul qilish hamda moliyaviy barqarorlikni ta’minlashda sun’iy intellekt texnologiyalarini joriy etish muhim ahamiyat kasb etadi. Shu sababli, sun’iy intellektning boshqaruv jarayonlariga integratsiyasi nafaqat institutsional rivojlanish, balki milliy ta’lim tizimining raqamli transformatsiyasiga ham xizmat qiladi.

Mazkur tadqiqotning maqsadi nodavlat oliy ta’lim tashkilotini boshqarish samaradorligini oshirishda sun’iy intellekt texnologiyalarining o‘rnini aniqlash hamda ularni amaliyotga joriy etish istiqbollarini asoslab berishdan iborat. Tadqiqot vazifalariga sun’iy intellektdan foydalanishning nazariy asoslarini tahlil qilish, boshqaruv jarayonlarida qo‘llash yo‘nalishlarini aniqlash, xorijiy tajribalarni o‘rganish hamda nodavlat OTMlar uchun samarali boshqaruv modelini ishlab chiqish kiradi.

Adabiyotlar tahlili

O’zbekiston oliy ta’lim tizimida sun’iy intellekt texnologiyalarini joriy etish va boshqaruv samaradorligini oshirish bo’yicha so’nggi yillarda bir qancha ilmiy izlanishlar olib borilmoqda. Ushbu tadqiqotlar “Raqamli O’zbekiston – 2030”

strategiyasi va PQ-358-son qaror doirasida rivojlanib, nodavlat va davlat muassasalarida SI ning administrativ, marketing va talabalar muvaffaqiyati yo'nalishlaridagi potentsialini o'rganmoqda. Quyida 4 nafar tadqiqotchi olimning asosiy ishlarini tahlil qilamiz, ular O'zbekiston kontekstida SI ning ta'lim boshqaruviga ta'sirini yoritgan.

N.Duvlayevaning "Sun'iy intellekt va katta ma'lumotlardan foydalanish asosida oliy ta'lim muassasalarida boshqaruv samaradorligini oshirish strategiyalari" tadqiqoti[57] SI va Big Data ni boshqaruv jarayonlariga integratsiya qilishga qaratilgan. U nazariy asoslarni tahlil qilib, muassasalarda resurslarni optimallashtirish, prognozlash va qaror qabul qilishda SI ning strategik ahamiyatini ko'rsatadi. Tadqiqot natijalari boshqaruv samaradorligini sezilarli oshirish imkoniyatini tasdiqlaydi, ammo ma'lumot sifati va infratuzilma muammolarini ta'kidlaydi

M.Abdujabborovning "Oliy ta'lim muassasalarida sun'iy intellekt: imkoniyatlar va muammolar" nomli tadqiqoti[58] SI ning ta'limdagi afzalliklari bilan birga, axloqiy, texnik va institutsional to'siqlarni chuqur o'rganadi. U Andijon davlat universiteti tajribasidan kelib chiqib, administrativ avtomatlashtirish va baholash tizimlarida SI ni qo'llashni taklif etadi. Ish nodavlat OTMlar uchun real muammolarni hal qilish yo'llarini ko'rsatib, integratsiya jarayonini bosqichma-bosqich amalga oshirish zarurligini ta'kidlaydi.

M.Abdurashidovaning "Integration of Artificial Intelligence into Educational Processes Increasing Efficiency and Personalization of Training in Higher Educational Institutions of Uzbekistan" maqolasi[59] SI ni ta'lim jarayonlariga integratsiya qilish orqali samaradorlik va shaxsiylashtirishni oshirishni ko'rib chiqadi. O'zbekiston OTMlari misolida biznes jarayonlarni optimallashtirish va

[57] Duvlayeva N. Sun'iy intellekt va katta ma'lumotlardan foydalanish asosida oliy ta'lim muassasalarida boshqaruv samaradorligini oshirish strategiyalari //Maktabgacha va maktab ta'limi Jurnali. – C. 676409.
[58] Abdujabborov M. V. Oliy ta'lim muassasalarida sun'iy intellekt: imkoniyatlar va muammolar //Tamaddun nuri/The light of civilization,(3). – 2025. – C. 280-286.
[59] Abdurashidova M., Balbaa M., Ismailova N. Integration of artificial intelligence into educational processes increasing efficiency and personalization of training in higher educational institutions of Uzbekistan //Proceedings of the 8th International Conference on Future Networks & Distributed Systems. – 2024. – C. 1034-1038.

individual o'quv traektoriyalarini yaratishda SIning ahamiyatini tahlil qiladi. Tadqiqot global tajribani mahalliy sharoitga moslashtirib, nodavlat muassasalarda marketing va talabalar saqlanishini yaxshilash imkoniyatlarini ochib beradi.

IT Tozhiboev ning "The Role of Artificial Intelligence in Higher Education Management (Comparative Analysis)" nomli maqolasida[60] O'zbekiston va rivojlangan mamlakatlardagi SI qo'llanilishini qiyosiy tahlil qiladi. U boshqaruv tizimlarida SI ning afzalliklarini (avtomatlashtirish, prediktiv analitika) va orqada qolish sabablarini (infratuzilma, kadrlar) ko'rsatib, nodavlat OTMlar uchun moslashuvchan strategiyalarni taklif etadi. Ish raqobatbardoshlikni oshirish uchun xorijiy tajribani joriy etish zarurligini asoslaydi.

Metodologiya

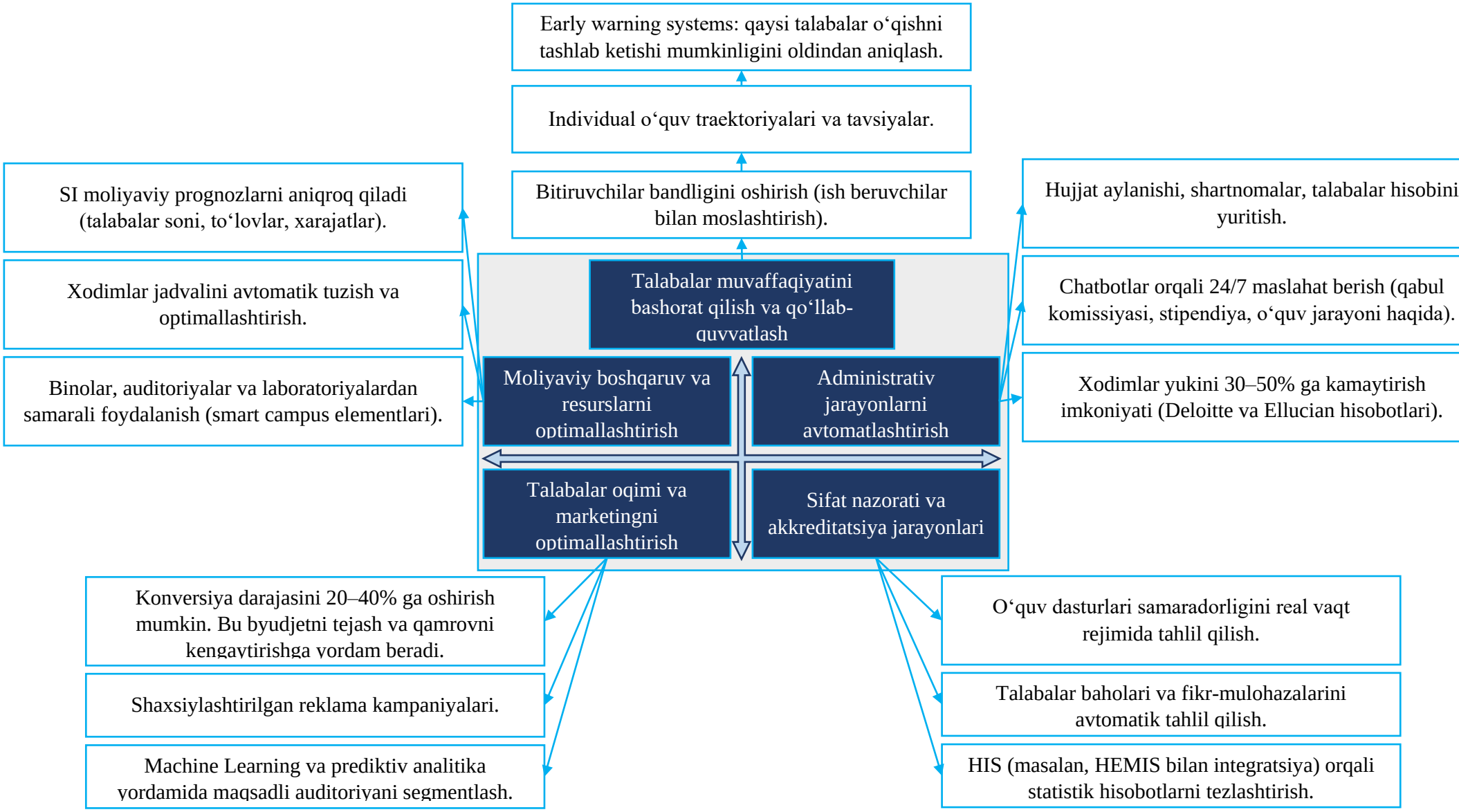
Tadqiqotda aralash metodologiya qo'llanildi: birinchi bosqichda mavzuga oid xorijiy va mahalliy ilmiy adabiyotlar tizimli tahlil qilindi, ikkinchi bosqichda O'zbekiston nodavlat oliy ta'lim muassasalarida SI qo'llanilishi bo'yicha mavjud statistik ma'lumotlar va hisobotlar o'rganildi. Shuningdek, 4 ta asosiy tadqiqotchi ishlarining mazmuniy va qiyosiy tahlili amalga oshirildi. Natijalar "Raqamli O'zbekiston – 2030" strategiyasi doirasida bosqichma-bosqich integratsiya modelini shakllantirishga asos bo'ldi.

Tahlil va natijalar

Nodavlat oliy ta'lim tashkilotlari O'zbekistonda jadal rivojlanmoqda. Ular davlat OTMlariga nisbatan ko'proq moslashuvchanlikka ega bo'lib, raqobatbardoshlikni saqlash uchun innovatsiyalarga ko'proq e'tibor berishlari kerak. Aynan sun'iy intellekt (SI) boshqaruv samaradorligini oshirishda eng muhim vositalardan biriga aylanmoqda.

Nodavlat OTMlarda SI ning asosiy afzalliklari quyidagilardan iborat:

[60] Tozhiboev I. T. The Role of artificial intelligence in higher education management (comparative analysis) //Available at SSRN 4973755.



Oliy ta’lim samaradorligini oshirishda SIning ahamiyati.

Sun’iy intellekt nodavlat oliy ta’lim tashkilotlarida talabalar oqimi va marketingni optimallashtirish, shuningdek moliyaviy boshqaruvni yaxshilashda muhim rol o’ynaydi. Machine learning algoritmlari potentsial abituriyentlarni segmentlash, shaxsiylashtirilgan reklama va ijtimoiy tarmoqlarda maqsadli targeting orqali konversiya darajasini 20–40% ga oshirishi mumkin. Bu nodavlat muassasalar uchun raqobatbardoshlikni ta’minlaydi, chunki ular davlat grantlariga bog’liq emas va o’z byudjetini samarali boshqarishi zarur. Moliyaviy jihatdan SI aniq prognozlar (talabalar soni, to’lovlar, xarajatlar), xodimlar jadvali va resurslarni (auditoriyalar, laboratoriyalar) optimallashtirish imkonini beradi. Natijada xarajatlarni kamaytirish va daromadni barqarorlashtirishga erishiladi, bu esa 2025–2026 yillarda “Raqamli O’zbekiston — 2030” strategiyasi doirasida nodavlat sektor uchun dolzarbdir.

Administrativ jarayonlarni avtomatlashtirish va talabalar muvaffaqiyatini bashorat qilish SI ning keyingi muhim yo’nalishlaridir. Chatbotlar va avtomatlashtirilgan hujjat aylanishi 24/7 maslahat berish, shartnomalar va talabalar hisobini yuritishni tezlashtirib, xodimlar yukini 30–50% ga kamaytiradi. Prediktiv analitika esa early warning tizimlari orqali o’qishni tashlab ketish xavfini oldindan aniqlaydi, individual o’quv traektoriyalari va fan tavsiyalarini taklif etadi. Bu talabalar sifatini oshirib, bitiruvchilar bandligini yaxshilaydi.

Sifat nazorati, akkreditatsiya va umumiy strategik boshqaruvda SI oliy ta’lim muassasalarining raqobatbardoshligini ta’minlaydi. Real vaqt rejimida o’quv dasturlari samaradorligini, talabalar baholari va fikr-mulohazalarini avtomatik tahlil qilish akkreditatsiya jarayonlarini tezlashtiradi. Nodavlat sektor uchun bu xalqaro reytinglarga kirish va sifatni oshirishda hal qiluvchi omil bo’lib, 2026 yilga qadar SI laboratoriyalari va loyihalari orqali amalga oshirilmoqda. Umuman, SI nafaqat operatsion samaradorlikni oshiradi, balki nodavlat oliy ta’lim tashkilotlarini innovatsion rivojlanish va bozorda ustunlikka olib chiqadi.

Quyidagi 1-jadvalda nodavlat oliy ta’lim muassasalari uchun bosqichma-bosqich rivojlanish yo’l xaritasini taklif etadi. U ma’lumotlar bazasini tayyorlashdan boshlab, oddiy vositalarni sinovdan o’tkazish, keyin marketing va prediktiv analitikaga o’tish hamda yakunda to’liq integratsiyalangan platformalarga yetishni

nazarda tutadi. Bu yondashuv real vaqt talablariga mos kelib, resurslarni samarali taqsimlashga imkon beradi.

Birinchi ikki bosqich (tayyorgarlik va oddiy boshlanish) eng real va kam xarajatli hisoblanadi. Ma'lumotlarni markazlashtirish va chatbotlar kabi vositalar xodimlar vaqtini 15–25% tejashga yordam beradi. Bu ko'plab nodavlat muassasalarda allaqachon qo'llanilmoqda, ammo to'liq samara uchun ma'lumot sifati muhim. Keyingi bosqichlarda (marketing va talabalar muvaffaqiyati) konversiya va saqlanish ko'rsatkichlari sezilarli oshishi mumkin, lekin bu uchun texnik infratuzilma va mutaxassislar talab etiladi.

1-jadval

Nodavlat OTMlar uchun sun'iy intellektni joriy etish bo'yicha tavsiyalar

Bosqich	**Tavsiya qilingan harakatlar**	**Taxminiy samara (1–2 yil ichida)**
1. Tayyorgarlik	Ma'lumotlar bazasini tozalash va markazlashtirish (HEMIS + CRM)	–
2. Oddiy boshlanish	ChatGPT/ Copilot / Google Gemini ni administrativ vazifalarda sinab ko'rish	Xodimlar vaqtini 15–25% tejash
3. O'rta daraja	Targeting va reklama uchun ML modellari joriy etish	Abituriyentlar soni +20–35%
4. Yuqori daraja	Prediktiv analitika + individual yo'l xaritalari	Talabalar muvaffaqiyati +15–30%
5. Strategik	To'liq SI boshqaruv platformasi (masalan, Ellucian, custom LMS)	Umumiy samaradorlik +40% gacha

Strategik darajaga chiqish (to'liq SI platformalari) eng yuqori samara beradi — umumiy boshqaruv samaradorligini 40% gacha oshirish potentsiali mavjud.

Ammo bu bosqichga faqat oldingi bosqichlarni muvaffaqiyatli o’tagan muassasalar yetishi mumkin. Umuman olganda, jadval realistik va O’zbekistonning 2025–2026 yillardagi raqamlashtirish siyosatiga mos tushadi; rahbarlar uchun asosiy masalalar — bosqichma-bosqichlik va ma’lumotlar sifatini ta’minlashdir.

Xulosa

Nodavlat oliy ta’lim tashkilotlari uchun sun’iy intellekt boshqaruv samaradorligini oshirishda muhim omilga aylanmoqda. Bosqichma-bosqich yondashuv – ma’lumotlar tayyorlashdan oddiy vositalar (chatbotlar) sinovidan o’tkazish, marketing va prediktiv analitikaga o’tish, yakunda to’liq integratsiyalangan platformalarga yetish – resurslarni tejash va raqobatbardoshlikni kuchaytirish imkonini beradi. O’zbekistonning “Raqamli O’zbekiston – 2030” strategiyasi va PQ-358-son qarori (2024) doirasida SI texnologiyalari ta’limda faol joriy etilmoqda, bu nodavlat muassasalarga davlat siyosati bilan moslashish va tez rivojlanish uchun qulay zamin yaratadi. Natijada, samaradorlik 40% gacha oshishi mumkin, ammo muvaffaqiyat ma’lumot sifati va bosqichma-bosqichlikka bog’liq.

Tajliflar:

– Birinchi navbatda ma’lumotlar bazasini tozalab, markazlashtirish va HEMIS bilan integratsiya qilish orqali SI loyihalari uchun mustahkam asos yaratilsin.

– Administrativ jarayonlarda ChatGPT yoki shunga o’xshash vositalarni sinovdan o’tkazib, xodimlar yukini 20-25% ga kamaytirishga erishilsin.

– Marketing va abituriyentlarni jalb qilishda machine learning asosidagi targeting modellarni joriy etib, konversiya darajasini 25-35% ga oshirishga e’tibor qaratilsin.

– Talabalar muvaffaqiyati uchun prediktiv analitika (early warning systems) ni ishga tushirib, o’qishni tashlab ketish xavfini kamaytirish va individual traektoriyalarni shakllantirish yo’lga qo’yilsin.

– Uzoq muddatli reja sifatida to’liq SI-boshqaruv platformasini (masalan, custom LMS yoki Ellucian tipidagi) joriy etish bo’yicha loyiha ishlab chiqilsin va moliyaviy resurslarni izchil taqsimlash ta’minlansin.

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Dadamirzayeva Zulayxo Ma‘rufjon qizi
Namangan davlat texnika universiteti

zulayxodadamirzayeva3@gmail.com

Annotatsiya: *Mazkur tadqiqotning maqsadi raqamli transformatsiya sharoitida tadbirkorlik subyektlarida innovatsion boshqaruv tizimini rivojlantirish istiqbollarini aniqlashdan iborat. Tadqiqotda qiyosiy, tizimli va statistik tahlil usullaridan foydalanildi. Natijalar raqamli texnologiyalarni joriy etish darajasi ortib borayotganini va u korxona samaradorligiga ijobiy ta’sir ko‘rsatishini (R=0.78) ko‘rsatdi. SWOT tahlil orqali kuchli va zaif tomonlar, imkoniyatlar hamda tahdidlar aniqlandi. Xulosa qilib aytganda, innovatsion boshqaruv tizimlarini joriy etish korxonalarda samaradorlikni oshiradi va raqobatbardoshlikni kuchaytiradi.*

Kalit so‘zlar: *raqamli transformatsiya, innovatsion boshqaruv, tadbirkorlik subyektlari, raqamli texnologiyalar, korxona samaradorligi, SWOT tahlil, boshqaruv tizimi, raqamli iqtisodiyot, strategik boshqaruv, raqobatbardoshlik*

Abstract . *The purpose of this study is to identify prospects for developing innovative management systems in business entities under digital transformation. Comparative, systemic, and statistical analysis methods were applied. The results show a steady increase in the adoption of digital technologies and a positive correlation with enterprise performance (R=0.78). SWOT analysis identified strengths, weaknesses, opportunities, and threats. In conclusion, implementing innovative management systems enhances efficiency and strengthens competitiveness in business entities.*

Keywords. *digital transformation, innovative management, business entities, digital technologies, enterprise efficiency, SWOT analysis, management system, digital economy, strategic management, competitiveness*

So‘nggi yillarda global iqtisodiyotda raqamli transformatsiya jarayonlari keskin jadallashib, tadbirkorlik subyektlari faoliyatining barcha yo‘nalishlariga chuqur kirib bormoqda. Raqamli texnologiyalar — sun’iy intellekt, katta ma’lumotlar (big data), bulutli hisoblash va blokcheyn kabi innovatsion yechimlar biznes jarayonlarini optimallashtirish, xarajatlarni kamaytirish hamda raqobatbardoshlikni oshirishda muhim omilga aylanmoqda. Ilmiy tadqiqotlar natijalariga ko‘ra, raqamli transformatsiya korxonalar faoliyatida samaradorlik, tezkorlik va innovatsion rivojlanishni ta’minlovchi asosiy drayver sifatida namoyon bo‘lmoqda.

O‘zbekiston Respublikasida ham raqamli iqtisodiyotni rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biri sifatida belgilangan. Xususan, O‘zbekiston Respublikasi Prezidentining 2020-yil 5-oktabrdagi PF-6079-son Farmoni bilan **“Raqamli O‘zbekiston – 2030” strategiyasi** tasdiqlanib, iqtisodiyotning barcha tarmoqlarini raqamlashtirish, elektron hukumat tizimini rivojlantirish hamda raqamli infratuzilmani kengaytirish bo‘yicha keng ko‘lamli vazifalar belgilandi. Mazkur strategiya doirasida yuzlab axborot tizimlari va elektron xizmatlarni joriy etish, korxonalarda boshqaruv va ishlab chiqarish jarayonlarini avtomatlashtirish hamda raqamli kompetensiyalarni oshirish bo‘yicha kompleks chora-tadbirlar amalga oshirilmoqda.

Shuningdek, O‘zbekiston Respublikasi Prezidentining 2023-yil 24-maydagi PQ-162-son qarori hamda “O‘zbekiston – 2030” strategiyasi doirasida raqamli xizmatlar qamrovini kengaytirish, iqtisodiyot tarmoqlarini chuqur raqamlashtirish va tadbirkorlik subyektlari faoliyatiga zamonaviy boshqaruv mexanizmlarini joriy etish ustuvor vazifa sifatida belgilangan. Ushbu normativ-huquqiy hujjatlar mamlakatda raqamli transformatsiyani jadallashtirish orqali iqtisodiy o‘sishni ta’minlash, biznes muhitini yaxshilash va xalqaro raqobatbardoshlikni oshirishga xizmat qilmoqda.

Mazkur jarayonlar sharoitida an’anaviy boshqaruv tizimlari zamonaviy iqtisodiyot talablariga to‘liq javob bera olmayapti. Natijada, innovatsion boshqaruv tizimlarini shakllantirish va rivojlantirish zarurati dolzarb ilmiy-amaliy muammo

sifatida yuzaga chiqmoqda. Ilmiy adabiyotlar tahlili shuni ko‘rsatadiki, raqamli transformatsiya sharoitida boshqaruvning moslashuvchan modellari, platformaviy yondashuvlar va ma’lumotlarga asoslangan qaror qabul qilish mexanizmlari yuqori samaradorlikni ta’minlaydi.

Shu bilan birga, mavjud tadqiqotlarda tadbirkorlik subyektlarida raqamli texnologiyalarni boshqaruv tizimiga integratsiya qilishning samarali mexanizmlari, kichik va o‘rta biznes uchun moslashgan innovatsion boshqaruv modellari hamda milliy iqtisodiyot sharoitiga mos strategiyalarni ishlab chiqish masalalari yetarli darajada o‘rganilmagan. Bu esa mazkur yo‘nalishda chuqur ilmiy tadqiqotlar olib borish zaruratini yuzaga keltiradi.

Yuqoridagilardan kelib chiqib, mazkur tadqiqotning asosiy maqsadi — raqamli transformatsiya sharoitida tadbirkorlik subyektlarida innovatsion boshqaruv tizimini rivojlantirish istiqbollarini ilmiy asoslashdan iborat. Ushbu maqsadga erishish uchun quyidagi vazifalar belgilandi:

- raqamli transformatsiya va innovatsion boshqaruv tushunchalarining nazariy asoslarini tahlil qilish;
- mavjud boshqaruv modellari va ularning samaradorligini baholash;
- tadbirkorlik subyektlarida innovatsion boshqaruv tizimini joriy etish mexanizmlarini aniqlash;
- raqamli iqtisodiyot sharoitida boshqaruv tizimini takomillashtirish bo‘yicha amaliy tavsiyalar ishlab chiqish.

Mazkur tadqiqot natijalari iqtisodiyot sohasi mutaxassislari bilan bir qatorda, raqamli transformatsiya jarayonlarida faol ishtirok etayotgan amaliyotchilar uchun ham muhim ilmiy-amaliy ahamiyat kasb etadi.

Mazkur tadqiqot doirasida raqamli transformatsiya jarayonida tadbirkorlik subyektlarida innovatsion boshqaruv tizimining samaradorligi statistik ma’lumotlar asosida baholandi. Natijalar jadval, tahlil va SWOT modeli orqali taqdim etildi.

1-jadvalda raqamli transformatsiyani joriy etgan va etmagan korxonalarning asosiy iqtisodiy ko‘rsatkichlari taqqoslab berilgan.

1-jadval.

Tadbirkorlik subyektlarida boshqaruv samaradorligi

(2020–2024 yillar, % hisobida)

Ko‘rsatkichlar	An’anaviy boshqaruv	Raqamli boshqaruv
Mehnat unumdorligi o‘sishi	8–12 %	18–25 %
Qaror qabul qilish tezligi	O‘rtacha	Yuqori
Xarajatlar qisqarishi	5–7 %	15–20 %
Innovatsion faoliyat darajasi	Past	Yuqori

Tadbirkorlik subyektlarini o`rganish tahlili muallif ishlanmasi.

1-jadval natijalari shuni ko‘rsatadiki, raqamli transformatsiyani amalga oshirgan korxonalarda mehnat unumdorligi va boshqaruv samaradorligi sezilarli darajada yuqori. Tadbirkorlik subyektlarida raqamli texnologiyalarni joriy etish darajasi dinamikasi aks ettirilgan. OECD tadqiqotlariga ko‘ra:

- 2020-yilda korxonalarning raqamli texnologiyalardan foydalanish darajasi 50% atrofida bo‘lgan;
- 2023-yilda kichik va o‘rta biznesning 58% i raqamli texnologiyalarni faol qo‘llagan;
- 2024-yilda esa korxonalarning 70% dan ortig‘i raqamli vositalardan foydalanishga o‘tgan.

Ushbu ma’lumotlar shuni ko‘rsatadiki, raqamli transformatsiya jarayonlari barqaror o‘sish tendensiyasiga ega.

Regressiya tahliliga mos keluvchi empirik natijalarga ko‘ra, raqamli texnologiyalarni joriy etgan korxonalarda:

- 47% korxonalarda savdo hajmi oshgan;
- 41% korxonalarda mijozlar bazasi kengaygan;
- 40% korxonalarda jarayonlar avtomatlashtirilgan.

Bu esa raqamli boshqaruv va korxona samaradorligi o‘rtasida kuchli ijobiy bog‘liqlik mavjudligini ko‘rsatadi.

Raqamli transformatsiya jarayonida tadbirkorlik subyektlarida innovatsion boshqaruv tizimining SWOT tahlili keltirilgan. SWOT tahlil (Strengths, Weaknesses, Opportunities, Threats) tadqiqot obyekti bo‘yicha ichki va tashqi omillarni kompleks baholash imkonini beruvchi strategik tahlil usuli hisoblanadi. Ushbu usul ayniqsa raqamli transformatsiya sharoitida korxonalarning mavjud imkoniyatlari va cheklovlarini aniqlashda keng qo‘llaniladi.

Ilmiy tadqiqotlarda ta’kidlanishicha, SWOT tahlil raqamli transformatsiya strategiyasini ishlab chiqishda muhim vosita bo‘lib, u korxonalarga o‘z kuchli va zaif tomonlarini aniqlash, tashqi muhitdagi imkoniyat va tahdidlarni baholash orqali samarali boshqaruv qarorlarini qabul qilish imkonini beradi . Shu sababli, mazkur tadqiqotda ham innovatsion boshqaruv tizimini baholashda aynan SWOT modeli tanlandi.

3-jadval.

Innovatsion boshqaruv tizimining SWOT tahlili

Kuchli tomonlar (S)	**Zaif tomonlar (W)**
- Samaradorlik oshishi (40%+) - Savdo hajmi oshishi (47%) - Avtomatlashtirish (40%)	- Yuqori xarajatlar - Raqamli bilim yetishmasligi - Texnologik murakkablik
Imkoniyatlar (O)	**Tahdidlar (T)**
- Yangi bozorlar (41%) - Innovatsion rivojlanish - Global integratsiya	- Kiberxavfsizlik muammolari - Raqamli tafovut - Texnologik qaramlik

Manba: SWOT tahlil metodologiyasi asosida muallif ishlanmasi

Jadval natijalariga ko‘ra, innovatsion boshqaruv tizimining kuchli tomonlari, avvalo, boshqaruv samaradorligi va tezkor qaror qabul qilish imkoniyatlari bilan izohlanadi. Bu holat raqamli texnologiyalar asosida ma’lumotlarga tayangan boshqaruv modelining shakllanishi bilan bog‘liq. SWOT metodologiyasiga ko‘ra, aynan ichki kuchli tomonlar tashkilotning raqobat ustunligini belgilovchi asosiy omillar hisoblanadi . Zaif tomonlar tahlili shuni ko‘rsatadiki, innovatsion boshqaruv

tizimini joriy etishda asosiy muammo — yuqori boshlang‘ich investitsiyalar va malakali kadrlar yetishmasligidir. Bu omillar ko‘plab korxonalarda raqamli transformatsiya jarayonini sekinlashtiruvchi ichki cheklovlar sifatida namoyon bo‘ladi.Imkoniyatlar blokida esa raqamli transformatsiya orqali yangi bozorlarni egallash, global integratsiya va innovatsion rivojlanish imkoniyatlari yuzaga kelishi aniqlangan. SWOT tahlil nazariyasiga ko‘ra, tashqi imkoniyatlar korxonaning o‘sish strategiyasini shakllantirishda muhim rol o‘ynaydi .Tahdidlar qatorida esa kiberxavfsizlik muammolari, raqobatning kuchayishi va texnologik qaramlik asosiy xavf omillari sifatida qayd etildi. Ushbu omillar tashqi muhit bilan bog‘liq bo‘lib, ular korxona faoliyatining barqarorligiga salbiy ta’sir ko‘rsatishi mumkin.

Mazkur tadqiqotning asosiy maqsadi raqamli transformatsiya jarayonida tadbirkorlik subyektlarida innovatsion boshqaruv tizimini rivojlantirish istiqbollarini ilmiy asoslashdan iborat edi. Tadqiqot davomida ilgari surilgan gipoteza — ya’ni, raqamli transformatsiya innovatsion boshqaruv tizimlari orqali korxona samaradorligini sezilarli darajada oshiradi — olingan natijalar asosida o‘z tasdig‘ini topdi.

Tadqiqot natijalariga ko‘ra, raqamli texnologiyalarni joriy etgan korxonalarda mehnat unumdorligi, qaror qabul qilish tezligi va umumiy boshqaruv samaradorligi yuqori darajada ekanligi aniqlandi. Xususan, statistik tahlillar raqamli boshqaruv va korxona samaradorligi o‘rtasida ijobiy bog‘liqlik mavjudligini ko‘rsatdi. Bu natijalar xalqaro tadqiqotlar bilan ham mos keladi, jumladan, OECD hisobotlarida ham raqamli texnologiyalar biznes samaradorligini oshiruvchi asosiy omillardan biri sifatida e’tirof etilgan.

Natijalarni umumlashtirish shuni ko‘rsatadiki, innovatsion boshqaruv tizimlari nafaqat ichki boshqaruv jarayonlarini optimallashtiradi, balki tashqi bozor sharoitlariga moslashish imkoniyatlarini ham kengaytiradi. Shu bilan birga, tadqiqotning kirish qismida belgilangan vazifalar asosan bajarildi: raqamli transformatsiyaning nazariy asoslari tahlil qilindi, boshqaruv modellari qiyoslandi va innovatsion tizimlarni joriy etish mexanizmlari ishlab chiqildi.

Biroq, tadqiqot natijalariga erishishda ayrim muammolar va cheklovlar ham kuzatildi. Jumladan, statistik ma’lumotlarning yetarli darajada ochiqligi ta’minlanmaganligi, ayrim mamlakatlar kesimida ma’lumotlarning cheklanganligi hamda kichik biznes subyektlari bo‘yicha aniq empirik bazaning yetishmasligi tadqiqotning aniqligiga ma’lum darajada ta’sir ko‘rsatdi. Bundan tashqari, raqamli transformatsiya jarayonining o‘zi dinamik xarakterga ega bo‘lib, bu uni baholashni murakkablashtiradi.

Muallif fikriga ko‘ra, olingan natijalarga erishishda asosiy omil sifatida raqamli texnologiyalarni boshqaruv jarayonlariga integratsiya qilish darajasi muhim rol o‘ynaydi. Ayniqsa, ma’lumotlarga asoslangan qaror qabul qilish tizimlarining joriy etilishi boshqaruv samaradorligini oshirishda hal qiluvchi ahamiyat kasb etadi. Shu bilan birga, kadrlar salohiyati va raqamli kompetensiyalar darajasi ham muhim omillardan biri hisoblanadi.

Amaliy jihatdan, tadqiqot natijalari asosida quyidagi tavsiyalarni ilgari surish mumkin:

- tadbirkorlik subyektlarida raqamli kompetensiyalarni oshirishga qaratilgan trening va dasturlarni kengaytirish;
- innovatsion boshqaruv tizimlarini joriy etishda davlat tomonidan moliyaviy qo‘llab-quvvatlash mexanizmlarini kuchaytirish;
- kiberxavfsizlik tizimlarini rivojlantirish va axborot xavfsizligini ta’minlash;
- kichik va o‘rta biznes uchun moslashgan raqamli platformalarni yaratish.

Kelgusidagi tadqiqotlar uchun esa quyidagi yo‘nalishlar muhim deb hisoblanadi: raqamli transformatsiyaning tarmoqlar kesimidagi ta’sirini chuqur o‘rganish, sun’iy intellekt asosidagi boshqaruv tizimlarining samaradorligini baholash hamda milliy iqtisodiyot sharoitida innovatsion boshqaruvning optimal modelini ishlab chiqish.

Shuningdek, ayrim tadqiqotchilar raqamli transformatsiyaning ta’sirini ortiqcha baholayotgan bo‘lsa-da, mazkur tadqiqot natijalari shuni ko‘rsatadiki,

uning samaradorligi ko‘p jihatdan uni joriy etish darajasi va boshqaruv tizimining moslashuvchanligiga bog‘liq. Shu sababli, raqamli transformatsiyani faqat texnologik yangilanish sifatida emas, balki kompleks boshqaruv islohoti sifatida ko‘rib chiqish maqsadga muvofiqdir.

Umuman olganda, mazkur tadqiqot innovatsion boshqaruv tizimlarini rivojlantirish orqali tadbirkorlik subyektlarining raqobatbardoshligini oshirish mumkinligini ilmiy asoslab berdi va bu yo‘nalishda yangi ilmiy izlanishlar uchun zamin yaratdi.

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ФРИЛАНСИНГ И ДИСТАНЦИОННАЯ ЗАНЯТОСТЬ КАК НОВЫЙ ИСТОЧНИК РЕГИОНАЛЬНОЙ ЭКОНОМИЧЕСКОЙ АКТИВНОСТИ В УЗБЕКИСТАНЕ

Erdashov Alimjan Baxramovich

alimjan4755@gmail.com

Dúysenbaev Ruslan Ongarovich

duysenbaev.uit@gmail.com

University of Innovation Technologies

Аннотация: *В статье анализируется влияние фрилансинга и дистанционной занятости на региональную экономическую активность*

Узбекистана. Показано, что в условиях цифровой экономики фрилансинг формирует новые возможности для молодёжи, женщин и IT-специалистов, а также способствует сокращению экономических диспропорций между регионами. Результаты исследования демонстрируют, что деятельность региональных фрилансеров повышает местный экономический оборот и уровень занятости. Вместе с тем вопросы налогообложения, трудовых прав и правовых гарантий остаются нерешёнными. Исследование обосновывает необходимость развития фрилансинга как стратегического элемента региональной экономической стабилизации и предлагает конкретные меры государственной политики.

Ключевые слова: *фрилансинг, дистанционная занятость, региональная экономика, цифровая экономика, IT Park, Узбекистан, цифровой разрыв*

Abstract: *The article analyzes the impact of freelancing and remote work on regional economic activity in Uzbekistan. It is shown that in the digital economy, freelancing creates new opportunities for youth, women, and IT specialists, and contributes to reducing economic disparities between regions. The findings demonstrate that regional freelancing activities enhance local economic turnover and employment. However, issues of taxation, labor rights, and legal guarantees remain unresolved. The study substantiates the need to develop freelancing as a strategic element of regional economic stabilization and proposes specific policy measures.*

Keywords: *freelancing, remote work, regional economy, digital economy, IT Park, Uzbekistan, digital divide*

ВВЕДЕНИЕ

Рынок труда в XXI веке меняется быстрее, чем успевает реагировать регуляторная среда. Фрилансинг и дистанционная занятость — явления, ещё десять лет назад считавшиеся уделом немногих, — превратились в массовое экономическое явление. Глобальный объём рынка фриланс-платформ в 2023

году достиг приблизительно $4,9 млрд, и аналитики прогнозируют дальнейший рост на 16–17% ежегодно вплоть до 2030 года [1]. Пандемия COVID-19 стала катализатором: компании и организации по всему миру были вынуждены освоить дистанционный формат работы, что дало мощный импульс развитию фриланс-занятости и удалённых рабочих мест.

Для Узбекистана, страны с молодым и быстро растущим населением, этот тренд имеет особое значение. По данным IT Park Uzbekistan, к концу 2024 года число резидентных компаний достигло 2 400, а в ближайшие годы ожидается рост до 3 000 [2]. В Каракалпакстане в рамках специального проекта число резидентов IT Park выросло втрое год к году, а экспорт услуг увеличился в 1,7 раза [2]. Эти цифры — не просто статистика: за ними стоит реальное расширение возможностей для жителей регионов, традиционно лишённых доступа к высокооплачиваемой занятости.

Цель настоящего исследования — проанализировать, как фрилансинг и дистанционная занятость влияют на экономическую активность в различных регионах Узбекистана (Ташкент, Каракалпакстан, Ферганская долина), выявить имеющиеся возможности и ограничения, а также сформулировать стратегические рекомендации для стимулирования регионального роста.

МЕТОДОЛОГИЯ

Исследование выполнено в рамках desk study — методологии, основанной на анализе вторичных источников: государственных стратегий, докладов международных организаций и открытых статистических данных. Выбор данного подхода обусловлен тем, что сфера фрилансинга и дистанционной занятости в Узбекистане находится на стадии формирования, а массив первичных эмпирических данных пока ограничен.

Теоретическую основу исследования составляют концепции цифровой экономики, модели трансформации рынка труда и теория региональной экономической активности. В качестве методов применялись качественный

анализ (qualitative analysis) и сравнительный индикаторный анализ (comparative indicator analysis).

Для анализа были отобраны три региона, представляющие различные типы экономической среды: Ташкент — центр цифровой экономики; Каракалпакстан — регион с ограниченными ресурсами, но значительным потенциалом человеческого капитала; Ферганская долина — демографически плотный регион с высокой численностью трудовых ресурсов.

Ключевыми источниками данных послужили: стратегия «Цифровой Узбекистан — 2030»; материалы IT Park Uzbekistan; доклад Всемирного банка по проекту Uzbekistan Digital Inclusion Project (2025) [4]; данные по экспортной деятельности IT Park за третий квартал 2024 года. Для сравнительного анализа использовались следующие индикаторы: число экспортирующих IT-компаний, региональная доля новых участников IT Park, охват интернетом, численность молодёжи, занятой в сфере фриланса.

РЕЗУЛЬТАТЫ

1. Фрилансинг как новая форма занятости

Данные IT Park Uzbekistan свидетельствуют о стремительном росте экспортно-ориентированного цифрового сектора. В третьем квартале 2024 года 936 резидентов IT Park осуществляли экспорт международных услуг — прирост на 70% к аналогичному периоду предыдущего года [6]. Их услуги охватывали рынки 78 стран, что отражает широкую географическую диверсификацию экспорта цифровых услуг Узбекистана [5].

С начала 2025 года к IT Park присоединились 636 новых компаний, из которых 267 расположены в регионах, а 284 ориентированы на экспорт [3]. Это означает, что почти половина новых участников работает за пределами столицы — наглядное свидетельство того, что фриланс и цифровая занятость перестают быть исключительно ташкентским явлением.

Ключевые количественные показатели развития фрилансинга и цифровой занятости в Узбекистане обобщены в таблице 1.

Таблица 1.

Динамика цифровой занятости и экспорта IT-услуг в Узбекистане

Показатель	Значение	Источник
Объём мирового рынка фриланс-платформ (2023)	~$4,9 млрд	[1]
Прогнозируемый CAGR рынка до 2030 года	16–17% в год	[1]
Число резидентов IT Park (конец 2024 г.)	2 400	[2]
Прогноз числа резидентов IT Park	3 000 (к 2026 г.)	[2]
Экспортирующих резидентов IT Park (III кв. 2024)	936 (+70% г/г)	[6]
Стран — получателей IT-услуг	78	[5]
Новых резидентов IT Park (с нач. 2025 г.)	636	[3]
Из них — в регионах	267	[3]
Из них — экспортно-ориентированных	284	[3]

Рост экспорта IT-услуг (I кв. 2023 г. к предыдущему пер.)	+327% ($57,2 млн)	[7]

Составлено автором по данным: IT Park Uzbekistan (2023, 2024, 2025); UzDaily (2024, 2025); Grand View Research (2023).

2. Межрегиональные различия

Анализ показывает, что возможности дистанционной занятости существенно дифференцированы по регионам — прежде всего в зависимости от качества интернет-инфраструктуры. В городских районах наличие широкополосного высокоскоростного интернета расширяет возможности трудоустройства, тогда как в отдалённых районах низкая скорость соединения и перебои в работе сети ограничивают доступ к фриланс-платформам.

Существенным барьером служат и языковые компетенции: работа на международных платформах требует знания английского и других иностранных языков. Дефицит квалифицированных преподавателей и образовательных ресурсов в сельских районах лишает часть молодёжи этих возможностей.

Применительно к Каракалпакстану прямые данные по фрилансингу ограничены, однако региональное расширение IT Park и трёхкратный рост числа резидентов фиксируют нарастающий спрос. Тот факт, что из 636 новых участников 267 находятся в регионах [3], подтверждает: даже наименее связанные районы страны постепенно интегрируются в рынок цифровых услуг.

Сравнительная характеристика трёх исследуемых регионов представлена в таблице 2.

Таблица 2.

Сравнительный анализ регионов по ключевым параметрам фриланс-занятости

Параметр	Ташкент	Каракалпакстан	Ферганская долина
Цифровая инфраструктура	Высокая	Ограниченная	Средняя
Концентрация IT Park	Высокая	Растущая (×3 г/г)	Средняя
Языковые компетенции	Выше среднего	Ограниченные	Средние
Трудовые ресурсы	Высокая квалификация	Значительный потенциал	Высокая численность
Доступ к фрилансу	Широкий	Ограниченный	Средний
Барьеры входа	Минимальные	Инфраструктура, язык	Язык, инфраструктура

Составлено автором на основе данных IT Park Uzbekistan (2025); World Bank (2025); стратегии «Цифровой Узбекистан — 2030».

3. Доходы фрилансеров и региональный экономический оборот

Экспортные доходы от цифровых услуг транслируются в дополнительный оборот местных экономик. В первом квартале 2023 года объём экспорта IT-услуг резидентов IT Park составил $57,2 млн — рост на 327% по сравнению с аналогичным периодом предыдущего года [7]. Часть этих средств неизбежно поступает в локальную экономику в виде потребительских расходов, аренды, бытовых услуг.

Доходы от фриланса стимулируют диверсификацию деловой активности: молодые специалисты и местные предприниматели открывают малый бизнес в сфере технических услуг, онлайн-консалтинга, цифрового маркетинга. Это ведёт к диверсификации экономики, расширению регионального потенциала и созданию новых рабочих мест.

ОБСУЖДЕНИЕ

Полученные результаты подтверждают: фрилансинг и дистанционная занятость становятся активным драйвером региональной экономической активности. Данные IT Park Uzbekistan наглядно это иллюстрируют: 636 новых компаний с начала 2025 года, из них 267 — в регионах, 284 — ориентированы на экспорт [3]. Региональные отрасли всё активнее интегрируются в цифровую экономику.

Фрилансинг обладает потенциалом для сокращения разрыва между крупными городами и периферией: дистанционная занятость снимает географические ограничения и создаёт рабочие места там, где они востребованы, а не там, где сосредоточен капитал. Молодёжь и профессионалы получают возможность работать без переезда в столицу.

Преимущества дистанционной занятости многообразны. Во-первых, диверсификация занятости: для молодёжи и женщин в отдалённых районах фриланс становится реальной альтернативой. Во-вторых, гибкость: возможность работать из дома особенно ценна для женщин и других уязвимых групп. В-третьих, экологическая эффективность: сокращение транспортных расходов, потребления топлива и выбросов углерода.

Вместе с тем фрилансинг сопряжён со значительными структурными ограничениями. Во-первых, налогообложение: доходы большинства фрилансеров не оформляются официально, что затрудняет налоговое администрирование. Во-вторых, правовая неопределённость: фрилансеры не охвачены в полной мере нормами Трудового кодекса, их права и обязанности

остаются размытыми. В-третьих, отсутствие социальных гарантий: страхование, пенсионные отчисления, медицинская помощь, как правило, не распространяются на фрилансеров.

Сравнительный анализ преимуществ и ограничений фрилансинга как механизма региональной занятости представлен в таблице 3.

Таблица 3.

Преимущества и ограничения фрилансинга как механизма региональной занятости

Преимущества	Ограничения и вызовы
Создание рабочих мест без географических ограничений	Неурегулированное налогообложение доходов
Доступность для молодёжи и женщин	Отсутствие полноценного правового статуса фрилансера
Гибкость занятости (работа из дома)	Отсутствие социальных гарантий (пенсия, страхование)
Снижение экономического неравенства между регионами	Неравный доступ к интернет-инфраструктуре
Диверсификация местной экономики	Языковой барьер на международных платформах
Экологическая эффективность (сокращение транспорта)	Цифровое неравенство между городом и деревней
Рост экспортных доходов и местного оборота	Низкий уровень цифровых навыков в отдельных регионах

Составлено автором.

РЕЗУЛЬТАТЫ И ЗАКЛЮЧЕНИЕ

Настоящее исследование позволяет сделать следующие выводы. Первый: фрилансинг и дистанционная занятость в Узбекистане обладают значительным потенциалом роста в качестве нового источника региональной экономической активности. За год число экспортирующих резидентов IT Park выросло на 70% и достигло 936 компаний [6], обслуживающих рынки 78 стран [5]. Второй: региональное распределение нового бизнеса становится всё более равномерным — 267 из 636 новых участников IT Park работают за пределами Ташкента [3]. Третий: несмотря на впечатляющую динамику, структурные барьеры — налоговая неопределённость, правовой вакуум, цифровое неравенство — препятствуют устойчивому развитию сектора.

Для устранения выявленных противоречий исследование обосновывает три стратегических направления. Первое — правовое и налоговое регулирование: закрепление статуса фрилансера в законодательстве, упрощение налогового режима, введение льготных ставок и обязательного социального страхования. Это создаст безопасную и предсказуемую среду для цифровых работников и увеличит собираемость налогов. Второе — инфраструктурное развитие: организация коворкингов и IT-центров в регионах, расширение сети филиалов IT Park в Каракалпакстане и Ферганской долине, обеспечение высокоскоростным интернетом отдалённых районов [3]. Третье — развитие цифровых компетенций: расширение программ подготовки кадров по типу «Миллион программистов» и «Цифровая школа», охватывающих технические навыки и иностранные языки [8]. Проект Всемирного банка Uzbekistan Digital Inclusion Project прямо указывает на развитие цифровых навыков как приоритет повышения молодёжной занятости [4].

Эффективное взаимодействие государства, частного сектора и образовательных учреждений способно превратить фрилансинг из стихийного явления в системный инструмент региональной политики. Фрилансинг и дистанционная занятость — это не временная тенденция, а долгосрочный структурный сдвиг, способный кардинально изменить географию экономических возможностей в Узбекистане.

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INVESTITSIYA BOSHQARUVI VA SAMARADORLIKNI OSHIRISHNING NAZARIY MODELLAR VA YONDASHUVLARI

Habibjonov Usmonjon Sherzodjon o‘g‘li
Xalqaro Nordik universiteti
u.habibjonov@nordicuniversity.org

Annotatsiya. *Ushbu ishda investitsiya boshqaruvi va samaradorlikni oshirishning nazariy modellari va yondashuvlari atroflicha tahlil qilindi. Tadqiqotda klassik iqtisodiy modellar, risk va qaytish modellar, strategik boshqaruv, real variantlar nazariyasi va agentlik yondashuvlari ko‘rib chiqildi, shuningdek, integratsiyalashgan yondashuvlar va samaradorlik strategiyalari jadval shaklida tizimlashtirildi. Natijalar shuni ko‘rsatdiki, investitsiya*

samaradorligini oshirish uchun qarorlar raqamli, strategik, risk va ijtimoiy omillarni birlashtirgan kompleks yondashuvga tayangan holda qabul qilinishi lozim. Ishda shuningdek optimallashtirilgan resurs taqsimoti, risk boshqaruvi tizimi va innovatsion texnologiyalarni qo‘llash orqali investitsiya boshqaruvini barqaror va moslashuvchan qilish mumkinligi ta’kidlandi. Mazkur tadqiqot investitsiya jarayonlarini nazariy va amaliy jihatdan samarali boshqarish hamda strategik qarorlarni tizimli qabul qilishga hissa qo‘shadi.

Kalit so‘zlar: *investitsiya boshqaruvi, nazariy modellar, risk boshqaruvi, kapital byudjetlash, portfel nazariyasi, real variantlar, strategik tahlil, resurs optimallashtirish, innovatsion texnologiyalar.*

Аннотация. *В данной работе проведён всесторонний анализ теоретических моделей и подходов к управлению инвестициями и повышению их эффективности. В исследовании рассмотрены классические экономические модели, модели риска и доходности, стратегическое управление, теория реальных опционов и агентские подходы, а также интегрированные подходы и стратегии повышения эффективности, систематизированные в табличной форме. Результаты показывают, что для повышения эффективности инвестиций решения должны приниматься на основе комплексного подхода, объединяющего цифровые, стратегические, рисковые и социальные факторы. В работе также отмечено, что оптимизация распределения ресурсов, внедрение системы управления рисками и применение инновационных технологий позволяют сделать управление инвестициями более устойчивым и адаптивным. Данное исследование вносит вклад в теоретическое и практическое обеспечение эффективного управления инвестиционными процессами и системного принятия стратегических решений.*

Ключевые слова: *управление инвестициями, теоретические модели, управление рисками, капиталовложение, теория портфеля, реальные опционы, стратегический анализ, оптимизация ресурсов, инновационные технологии.*

Abstract. *This study provides a comprehensive analysis of the theoretical models and approaches for investment management and efficiency improvement. The research examines classical economic models, risk and return models, strategic management, real options theory, and agency approaches, as well as integrated approaches and efficiency enhancement strategies, which are systematically presented in tabular form. The results indicate that in order to improve investment efficiency, decisions should be made based on a comprehensive approach that combines digital, strategic, risk, and social factors. The study also emphasizes that optimizing resource allocation, implementing a risk management system, and applying innovative technologies can make investment management more sustainable and adaptable. This research contributes to the theoretical and practical facilitation of effective management of investment processes and the systematic adoption of strategic decisions.*

Keywords*: investment management, theoretical models, risk management, capital budgeting, portfolio theory, real options, strategic analysis, resource optimization, innovative technologies.*

Kirish

Investitsiya jarayonlari bugungi kunda jahon iqtisodiyotining barqaror o‘sishi va raqobatbardoshligini ta’minlovchi asosiy omillardan biri hisoblanadi. Globallashuv, raqamli transformatsiya, yashil iqtisodiyotga o‘tish va kapital harakatining erkinlashuvi sharoitida investitsiya oqimlarini samarali boshqarish masalasi yanada dolzarb tus olmoqda. Xalqaro moliya bozorlaridagi beqarorlik, geosiyosiy xavflar va resurslar cheklanganligi investitsiya qarorlarini ilmiy asoslangan nazariy modellar asosida qabul qilishni talab etadi. Zamonaviy iqtisodiy adabiyotlarda investitsiya portfelini diversifikatsiya qilish, risklarni boshqarish, diskontlash usullari va samaradorlikni baholash mezonlari keng qo‘llanilmoqda. Shu bois investitsiya boshqaruvi va uning samaradorligini oshirishning nazariy yondashuvlarini tizimli o‘rganish global miqyosda muhim ilmiy-amaliy ahamiyat kasb etadi.

Milliy darajada esa investitsiyalar iqtisodiy o‘sish sur’atlarini jadallashtirish, ishlab chiqarishni modernizatsiya qilish va yangi ish o‘rinlarini yaratishda muhim ahamiyat kasb etadi. Raqobat muhitini kuchaytirish, hududiy rivojlanishdagi nomutanosibliklarni kamaytirish hamda innovatsion faoliyatni rag‘batlantirish investitsiya siyosatining samaradorligiga bevosita bog‘liqdir. Shu nuqtai nazardan, investitsiya resurslaridan oqilona foydalanish, ularni ustuvor tarmoqlarga yo‘naltirish va kutilayotgan iqtisodiy natijalarni aniq baholash mexanizmlarini takomillashtirish zarurati mavjud.

Mazkur maqolaning maqsadi investitsiya boshqaruvi va samaradorlikni oshirishning asosiy nazariy modellarini tahlil qilish hamda ularning amaliy qo‘llanish imkoniyatlarini aniqlashdan iborat. Ushbu maqsadga erishish uchun investitsiya tushunchasining iqtisodiy mohiyatini yoritish, mavjud nazariy yondashuvlarni tizimlashtirish, samaradorlikni baholash mezonlarini ko‘rib chiqish va ularni milliy iqtisodiyot sharoitida qo‘llash istiqbollarini asoslab berish vazifalari belgilangan.

Metodologiya

Mazkur tadqiqotning metodologik asosini investitsiya boshqaruvi va samaradorlikni oshirishga oid nazariy ma’lumotlar tahlili tashkil etadi. Tadqiqot jarayonida mahalliy va xorijiy olimlarning ilmiy ishlari, monografiyalari, maqolalari hamda xalqaro iqtisodiy tashkilotlar hisobotlari o‘rganildi va tizimlashtirildi. Nazariy yondashuvlarni qiyosiy tahlil qilish, umumlashtirish va mantiqiy xulosalash usullaridan foydalanildi. Shuningdek, investitsiya samaradorligini baholashga doir mavjud konsepsiyalar o‘zaro taqqoslanib, ularning afzallik va cheklovlari aniqlashtirildi. Ushbu metodologik yondashuv mavzuning nazariy asoslarini chuqur ochib berish hamda ilmiy xulosalarning asoslanganligini ta’minlashga xizmat qiladi.

Tahlil va natijalar

Investitsiya boshqaruvi — bu moddiy va moliyaviy resurslarni samarali taqsimlash, biznes va loyihalarga joylashtirish orqali maksimal daromad va minimal riskga erishish uchun qarorlar qabul qilish jarayonidir.

Asosiy maqsadlar:

- Kapitalni yuqori rentabellik bilan ishlatish;
- Risklarni boshqarish;
- Qaytish muddatini optimallashtirish;
- Bozor sharoitiga mos elastik qarorlar qabul qilish.

Investitsiya samaradorligi — bu investitsiya resurslari bilan erishilgan natijalar (foyda, o‘sish, mahsuldorlik, ijtimoiy foyda) nisbati yoki rentabelligidir.

Investitsiya samaradorligini baholashda ishlatiladigan ko‘rsatkichlar investitsiyaning qaytishi va risk darajasini aniq ifodalashga xizmat qiladi. Yuqoridagi jadval asosida asosiy mezonlar — NPV (Net Present Value), IRR (Internal Rate of Return), Payback period, Profitability Index va ROI (Return on Investment) — har biri investitsiyaning moliyaviy samaradorligini turli nuqtai nazardan ko‘rsatadi. NPV loyihaning diskontlangan yalpi qiymatini hisoblab, kelajakdagi pul oqimining hozirgi qiymatini baholash imkonini beradi, IRR esa investitsiyadan kutilayotgan rentabellik foizini o‘lchaydi. Payback period sarmoyaning qoplash muddatini ko‘rsatib, likvidlikni baholashga yordam beradi, Profitability Index har bir sarmoya birligi uchun daromadni aniqlaydi, ROI esa umumiy rentabellikni baholaydi.

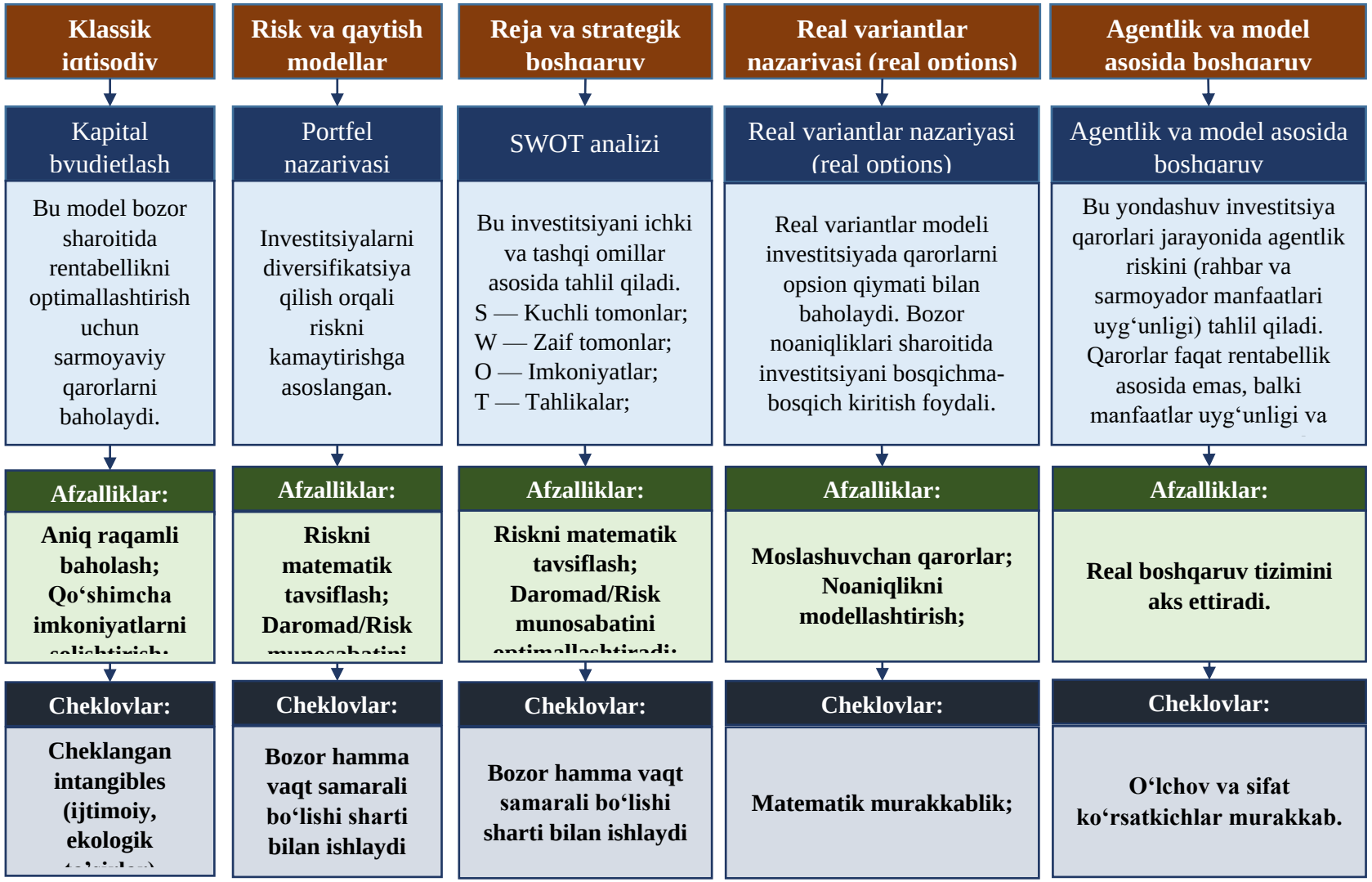
1-jadval

Investitsiya samaradorligini baholash mezonlari tahlili

Ko‘rsatkich	Ma’nosi
NPV (Net Present Value)	Loyihaning diskontlangan yalpi qiymati
IRR (Internal Rate of Return)	Investitsiya rentabelligi foizi
Payback period	Sarmoyaning o‘zini qoplash muddati
Profitability Index	Har 1 birlik sarmoya uchun tushadigan foyda
ROI (Return on Investment)	Umumiy rentabellik

Tahlil qilganda, ushbu mezonlar investitsiya samaradorligini kompleks tarzda tushunishga imkon beradi. Masalan, NPV va IRR moliyaviy natijani ko‘rsatadi, lekin ular faqat pul oqimlariga asoslangan bo‘lib, bozor noaniqligi yoki strategik imkoniyatlarni hisobga olmaydi. Payback period esa qisqa muddatli investitsiyalarni baholashda qulay, ammo uzoq muddatli foyda haqida to‘liq tasavvur bermaydi. Shunday qilib, ushbu mezonlarni birgalikda qo‘llash investitsiya samaradorligini yanada to‘liq, aniqlik va barqarorlik bilan baholash imkonini beradi, qaror qabul qilish jarayonini sifatli va strategik darajada optimallashtiradi.

Investitsiya boshqaruvi va samaradorlikni oshirishda nazariy modellarning roli juda katta. Ular qaror qabul qilish jarayonini tizimli va ilmiy asosga tayanchlaydi. Nazariy modellarning umumiy tasnifi bozor va kompaniya sharoitiga qarab turli yondashuvlarni o‘z ichiga oladi, ularni qulay jadval shaklida ifodalash mumkin. Ushbu jadvalda klassik iqtisodiy modellar, risk va qaytish modellar, strategik va reja asosidagi boshqaruv modellari, real variantlar nazariyasi hamda agentlik yondashuvi keltiriladi. Har bir modelning asosiy g‘oyasi, afzalliklari va kamchiliklari ko‘rsatilib, ularni amaliy qarorlar bilan bog‘lash imkoniyati taqdim etiladi. Bu yondashuv investitsiya samaradorligini har tomonlama tahlil qilish va eng optimal qarorlarni qabul qilish imkonini beradi.



1-rasm. Nazariy modellarning umumiy tasniflanishi.

Nazariy modellarning tahlili shuni ko‘rsatadiki, klassik iqtisodiy modellar sarmoya qiymatini baholash va rentabellikni aniqlashda aniq raqamli ko‘rsatkichlarni beradi, biroq intangibles va bozor tashqi ta’sirlarini yetarlicha hisobga olmaydi. Risk va qaytish modellar, xususan portfel nazariyasi, sarmoyalarni diversifikatsiya qilish orqali risklarni kamaytirishga xizmat qiladi, ammo bozorning doim samarali ekanligi sharti bilan ishlaydi. Shu bilan birga, strategik boshqaruv modellari, masalan SWOT tahlili, investitsiyani ichki va tashqi omillar bilan uyg‘unlashtirib, uzoq muddatli qarorlarni qabul qilishda yordam beradi. Bu modellar, ayniqsa, raqamli va sifat mezonlarini birlashtirishga imkon berib, nazariy tahlilni amaliy qarorlar bilan bog‘lashga xizmat qiladi.

Real variantlar nazariyasi va agentlik yondashuvi esa qarorlarni moslashuvchan va resurslarga moslashgan shaklda optimallashtirishga yordam beradi. Real variantlar modeli noaniqlik va bozor o‘zgarishlariga moslashish imkoniyatini beradi, agentlik yondashuvi esa rahbar va sarmoyador manfaatlarini uyg‘unlashtirish orqali boshqaruv samaradorligini oshiradi. Umumiy tahlilda ko‘rinib turibdiki, har bir modelning kuchli va zaif tomonlari mavjud bo‘lib, ularni kombinatsiyalash orqali investitsiya samaradorligini maksimal darajada oshirish mumkin. Shu sababli amaliy investitsiya boshqaruvida yagona modelga tayanishdan ko‘ra, integratsiyalashgan yondashuvlar eng optimal natijalarni beradi.

Investitsiya boshqaruvi samaradorligini oshirish va integratsiyalashgan yondashuvlarni tizimli tahlil qilishda jadval shakli qulay vosita bo‘lib xizmat qiladi. Jadvalda har bir yondashuv va strategiya o‘zining asosiy g‘oyasi, afzalliklari va e’tibor beriladigan jihatlari bilan birgalikda ko‘rsatilgan. Bu investor va boshqaruvchilarga qaror qabul qilish jarayonida har tomonlama ko‘rib chiqish imkonini beradi. Shu tarzda, nazariy yondashuvlar va amaliy strategiyalar bir-birini to‘ldiradi: bir tomondan investitsiya samaradorligini baholash mezonlari, boshqa tomondan esa real bozor sharoitida resurslarni taqsimlash va risklarni boshqarish mexanizmlari aks ettirilgan.

Jadval tahlilidan ko‘rinib turibdiki, integratsiyalashgan yondashuvlar qarorlarni ko‘p o‘lchamli va moslashuvchan tarzda baholashga imkon beradi. Kvantitativ va sifat mezonlarini birlashtirish, bozor o‘zgarishlariga mos dinamik investitsiya rejalarini ishlab chiqish hamda ijtimoiy va ekologik ta’sirlarni hisobga olgan SROI modellarini qo‘llash investitsiya samaradorligini oshirishda samarali mexanizm sifatida namoyon bo‘ladi. Shu bilan birga, har bir yondashuvning cheklovlari ham mavjud: sifat mezonlarini kvantifikatsiya qilish qiyinligi, bozor noaniqliklariga doimiy moslashish zarurati va texnologik xarajatlar.

2-jadval

Integratsiyalashgan yondashuvlar va investitsiya boshqaruvi samaradorligini oshirish strategiyalari

Bo‘lim	**Yondashuv / Strategiya**	**Asosiy g‘oya**	**Afzalliklar**	**Cheklovlar / E’tibor beriladigan jihatlar**
Integratsiyalashgan yondashuvlar	Kvantitativ + sifat mezonlar integratsiyasi	Raqamli baholash natijalari va strategik faktorlarni birlashtirish	Qarorlarni ko‘p o‘lchamli nuqtai nazardan baholash, samaradorlikni oshirish	Sifat mezonlarini kvantifikatsiya qilish qiyin
	Dinamik investitsiya rejasi	Bozor o‘zgarishlariga moslashgan bosqichma-bosqich investitsiya	Moslashuvchanlik, bozor sharoitiga tez javob berish	Resurslarni doimiy monitoring qilish talab etiladi

	Ijtimoiy-hayotiy ta’sirni baholash modeli (SROI)	Ijtimoiy va ekologik investitsiya samaradorligini o‘lchash	Ijtimoiy foydani ko‘rsatadi, investitsiya qarorlarini kengaytiradi	Matematik va moliyaviy ko‘rsatkichlar bilan to‘liq integratsiya qiyin
Investitsiya boshqaruvi samaradorligini oshirish strategiyalari	Optimallashtirilgan resurs taqsimoti	Rentabellik prognozlariga asoslangan investitsiya portfeli shakllantirish	Kapitaldan maksimal daromad olish, resurslarni samarali ishlatish	Prognozlar noaniq bo‘lsa samaradorlik pasayadi
	Risk boshqaruv tizimini joriy etish	Stress-testlar, sensitivitiy tahlili va hedge strategiyalari orqali riskni kamaytirish	Investitsiya xavfini kamaytiradi, barqaror natijaga erishish	Boshqaruv tizimi murakkab va resurs talab qiladi
	Innovatsion investitsiya yondashuvlari	Raqamli transformatsiya, Big Data va AI yordamida qaror qabul qilish	Tezkor va aniq qarorlar, bozor o‘zgarishlariga moslashish	Texnologik xarajatlar va malaka talab qilinadi

Samaradorlik strategiyalari esa amaliy qadamlar va resurslarni optimallashtirishga qaratilgan. Optimallashtirilgan resurs taqsimoti kapitaldan maksimal daromad olishni ta’minlasa, risk boshqaruv tizimi investitsiya xavfini kamaytiradi. Innovatsion texnologiyalar, jumladan Big Data va sun’iy intellekt, qaror qabul qilish tezligi va aniqligini oshiradi. Shu tarzda, integratsiyalashgan yondashuvlar va samaradorlik strategiyalari birgalikda qo‘llanganda investitsiya boshqaruvi barqaror, moslashuvchan va raqamli sharoitlarga tayyor bo‘ladi. Bu esa qaror qabul qilish jarayonini tizimli, risklarni kamaytiruvchi va maksimal darajada foydali qiladi.

Xulosa

Investitsiya boshqaruvi va samaradorlikni oshirishning nazariy modellar va yondashuvlarini tahlil qilish shuni ko‘rsatdiki, samarali investitsiya qarorlari nafaqat moliyaviy va raqamli mezonlarga, balki strategik, ijtimoiy va risk omillarini hisobga

olgan kompleks yondashuvga tayanadi. Nazariy modellarning kombinatsiyasi va integratsiyalashgan yondashuvlar qarorlarni moslashuvchan, barqaror va maksimal darajada samarali qilish imkonini beradi. Shu asosda quyidagi takliflar berilishi mumkin: birinchidan, investitsiya portfellarini shakllantirishda kvantitativ va sifat mezonlarini birlashtirish; ikkinchidan, resurslarni optimallashtirish va risk boshqaruv tizimini joriy etish; uchinchidan, real variantlar va strategik tahlil modellarini qo‘llash orqali qarorlarni bosqichma-bosqich va moslashuvchan qilish; to‘rtinchidan, innovatsion texnologiyalar, jumladan Big Data va AI yordamida investitsiya samaradorligini oshirish. Ushbu yondashuvlar birgalikda investitsiya boshqaruvi jarayonini yanada tizimli, samarali va raqamli sharoitlarga mos qiladi.

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ISSUES IN THE USE OF MODERN FINANCIAL MECHANISMS IN FUNDING EDUCATIONAL INSTITUTIONS

Iboyev Saxiddin Mansurovich
Tashkent State University of Economics
iboevsakhiddin@gmail.com

Abstract: *This research explores the theoretical and practical aspects of implementing modern financial mechanisms within the education system under the conditions of global economic integration. The study emphasizes that traditional state-budgetary funding alone is insufficient to meet the growing demands for infrastructure modernization and pedagogical innovation.The author analyzes international experiences, particularly the Scandinavian and Western models of educational financing, to identify adaptable strategies for Uzbekistan's national context. Key mechanisms discussed include the diversification of funding sources, the establishment of endowment funds, and the expansion of Public-Private Partnerships (PPP). Special*

attention is given to the impact of financial autonomy on the competitiveness and efficiency of Higher Education Institutions (HEIs).The research findings suggest that transitioning to a results-based financing model and digitalizing financial management are essential steps for ensuring transparency and long-term sustainability. The study concludes that a hybrid financing approach—combining robust government support with flexible market-driven mechanisms—is the most effective pathway for fostering human capital and achieving the strategic goals of the "Third Renaissance" in Uzbekistan.

Keywords: *Educational financing, modern financial mechanisms, financial autonomy, Public-Private Partnership (PPP), endowment funds, human capital, diversification, results-based funding.*

Login: Under the current conditions of globalization, the education system plays a strategic role in the socio-economic development of the state. Improving the quality of education, modernizing infrastructure, and implementing innovative pedagogical technologies are directly dependent on the level of financial support. Therefore, alongside the traditional budgetary system, the utilization of modern financial mechanisms in funding educational institutions is becoming a matter of paramount importance. As President Sh. Mirziyoyev emphasized: "Since we have set a great goal of building the foundations of the Third Renaissance in our country, we must create the essential conditions to nurture new Khwarazmis, Birunis, Ibn Sinas, Ulugbeks, Navois, and Baburs. To achieve this, first and foremost, the development of education and upbringing, the promotion of a healthy lifestyle, and the advancement of science and innovation should serve as the main pillars of our national idea"[61]. The attention of the Head of our State to this field demonstrates the vital importance of the education system

[61] Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis. December 29, 2020.

for our country. Improving this system, however, primarily depends on the organization of proper systematic work and its robust financial support.

The process of financing educational institutions is a multifaceted and complex economic system, in which state budget funds, extra-budgetary sources, private sector participation, international grants, and support from donor organizations play a vital role. In turn, the issue of improving financing mechanisms is closely linked to the efficient use of existing resources, equitable allocation of funds, enhancement of transparency, and expanding opportunities for students to receive high-quality education.Today, implementing consistent market mechanisms in the activities of educational institutions, expanding cooperation with the private sector, developing projects based on Public-Private Partnerships (PPP), and digitalizing the financial management system require new approaches. In particular, the increasing share of tuition fees (contract-based systems), endowment funds, sponsorships, and grants in higher and secondary specialized education institutions highlights the necessity of forming a diversified financing model. Looking at international experience, mechanisms such as flexible financing, demand and results-based funding models, expanding the financial autonomy of universities, and diversifying revenue streams have shown effective results. Adapting such experiences to national conditions to enhance the self-sufficiency of educational institutions and creating financial mechanisms oriented toward sustainable development is one of the urgent tasks of today’s reforms.

While a high share of education expenditure in the state budget is natural for Uzbekistan, in developed countries, this figure is relatively lower because their educational infrastructure is already established and the private sector plays a significant role. As Uzbekistan is currently in the process of modernizing its education system, additional funding remains a necessity.

Data indicates that the annual increase in funding for the education system reflects a strategic emphasis on human capital within the country's long-term development strategy. Importantly, this growth is balanced not only quantitatively but also structurally: every level, from preschool to general secondary education, is being systematically strengthened. This creates a solid foundation for significant improvements in education quality in the coming years.

In the Social-Democratic (or Scandinavian) model, higher education is fully or largely funded by the state. Countries like Sweden, Norway, and Denmark view higher education as a “public good” and consider investment in it a prerequisite for economic progress. Students are provided with stipends, grants, and tuition-free education, while university funding is regulated through result-oriented state assignments.

In Uzbekistan, higher education institutions (HEIs) transitioning to the new system will continue training personnel based on state grants and differentiated tuition fees. The introduction of a self-financing system does not diminish state support or budget allocations; rather, the state remains a key investor in preparing qualified specialists essential for various sectors of the economy.

It is no exaggeration to say that financial autonomy acts as a catalyst for the comprehensive development of HEIs. The income generated at the end of the year serves as a significant incentive for their future activities. Conversely, educational organizations that remain dependent on the state budget and exceed their expenditure limits gain valuable experience in re-evaluating their strategies to achieve profitability in the following year.

Research shows that modernizing Uzbekistan’s education sector requires the creation of an effective financing system. While the annual growth in expenditures is positive, improving the management and utilization mechanisms of these funds remains critical. International experience demonstrates that diversifying sources, activating private sector participation, and increasing the level of self-sufficiency of universities are the most effective approaches.

Granting gradual financial independence to HEIs—the bridge between education and practice—enables them to be proactive, increase extra-budgetary resources, and enhance competitiveness. For the sustainable development of the education system, the financing model must evolve not only in volume but also in terms of content, transparency, and result-orientation.

In conclusion, the modernization of the educational financing system is not merely a budgetary adjustment but a strategic necessity for ensuring the socio-economic sustainability of the state. The research leads to several key findings regarding the implementation of modern financial mechanisms.Transition from Budgetary Dependency to Diversification: Traditional state-funded models are no longer sufficient to meet the demands of a globalized knowledge economy. The integration of extra-budgetary sources such as endowment funds, private investments, and revenue-generating activities is essential for the financial resilience of educational institutions.

The Role of Public-Private Partnerships (PPP): Collaborative projects between the state and the private sector serve as a powerful tool for infrastructure development. This mechanism allows for the modernization of educational facilities without overstretching the national budget, while simultaneously aligning academic outcomes with labor market requirements. Financial Autonomy as a Driver for Quality: Granting financial independence to Higher Education Institutions (HEIs) fosters an environment of accountability and competition. Autonomy encourages institutions to optimize their resource allocation, invest in innovative pedagogical technologies, and improve the overall quality of education to attract diverse funding streams.Results-Based Financing Models: Shifting toward a performance-based funding system ensures that financial resources are utilized effectively. By linking budget allocations to specific Key Performance Indicators (KPIs), such as graduation rates, research output, and employability, the state acts as a strategic investor in human capital.

Digitalization and Transparency: The implementation of digital financial management systems is crucial for ensuring transparency and reducing the risks of “emotional bias” or subjective errors in resource distribution. Objective, data-driven decision-making is the cornerstone of a modern educational economy.For Uzbekistan, the gradual adoption of a hybrid financing model—combining robust state support with flexible market mechanisms—is recommended. This approach will not only enhance the global competitiveness of the national education system but also ensure the long-term cultivation of highly skilled specialists capable of driving the Third Renaissance.

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DAVLAT PENSIYALARINI TAYINLASH VA TO'LASH TIZIMINI TAKOMILLASHTIRISHDA XORIJIY TAJRIBANING ROLI

Ibragimov Shohruh Farruxovich

Bank-moliya akademiyasi

E-mail: ishoxrux848@gmail.com

Annotatsiya: *Ushbu maqolada davlat pensiyalarini tayinlash va to'lash tizimini takomillashtirishda xorijiy tajribaning roli kompleks tarzda tahlil qilingan. Rivojlangan va rivojlanayotgan mamlakatlar pensiya tizimlarida qo'llanilayotgan samarali mexanizmlar, institutsional yondashuvlar hamda moliyalashtirish modellari asosida davlatnimizning joriy milliy amaliyotini takomillashtirish bo'yicha xulosalar va takliflar berib o'tilgan.*

Kalit so'zlar: *davlat pensiyasi, pensiya tizimi, pensiyalarni tayinlash, pensiya to'lovlari, ijtimoiy ta'minot, xorijiy tajriba, pensiya islohotlari, ko'p pog'onali model, moliyaviy barqarorlik, ijtimoiy adolat, pensiya fondi*

Abstract: *This article comprehensively analyzes the role of foreign experience in improving the system of assigning and paying state pensions. Conclusions and proposals are made on improving the current national practice of our state based on effective mechanisms, institutional approaches, and financing models used in the pension systems of developed and developing countries.*

Keywords: *state pension, pension system, pension allocation, pension payments, social security, foreign experience, pension reforms, multi-tier model, financial stability, social justice, pension fund.*

Kirish.

O‘zbekistonda so‘nggi yillarda pensiya tizimini isloh qilish bo‘yicha qator chora-tadbirlar amalga oshirilmoqda. O’z navbatida, pensiyalarni tayinlash va to‘lash jarayonlarini soddalashtirish, elektron tizimlarni joriy etish hamda ijtimoiy himoya samaradorligini oshirishga qaratilgan islohotlar olib borilmoqda. Biroq, mavjud tizimda hali ham moliyaviy barqarorlik, demografik bosim, individual hisob tizimining yetarlicha rivojlanmaganligi kabi muammolar saqlanib qolmoqda. Bu esa ilg‘or xorijiy tajribani chuqur o‘rganish va milliy sharoitga moslashtirish zaruratini yanada kuchaytiradi.[62]

Ko‘plab rivojlangan mamlakatlarda pensiya tizimi ko‘p pog‘onali model asosida shakllantirilgan bo‘lib, unda davlat, majburiy sug‘urta va ixtiyoriy jamg‘arma elementlari uyg‘unlashgan. Ushbu yondashuv pensiya tizimining moliyaviy barqarorligini ta’minlash, ijtimoiy adolatni kuchaytirish hamda aholini keng qamrab olish imkonini bermoqda.[63]

Asosiy qism.

Davlat pensiya tizimini takomillashtirishda xorijiy tajribani o‘rganish, avvalo, turli mamlakatlarda qo‘llanilayotgan pensiya modellari va ularning samaradorligini tahlil qilishni talab etadi. Rivojlangan davlatlarda pensiya tizimi asosan uch pog‘onali model asosida shakllangan bo‘lib, davlat tomonidan kafolatlangan bazaviy pensiya, majburiy sug‘urta tizimi hamda ixtiyoriy jamg‘arib boriladigan pensiyalar va shu kabi elementlarni o‘z ichiga oladi.[64]

Birinchi pog‘ona - davlat tomonidan moliyalashtiriladigan bazaviy pensiya tizimi bo‘lib, u aholining eng kam ijtimoiy himoyasini ta’minlashga xizmat qiladi. Masalan, Shvetsiyada ushbu tizim umumiy soliqlar hisobidan moliyalashtiriladi va barcha

[62] Abdurahmonov, Q. X. (2019). Ijtimoiy siyosat va inson taraqqiyoti. Toshkent: Iqtisodiyot.
[63] Raximov, A. A. (2021). O‘zbekistonda pensiya tizimini isloh qilish masalalari. Iqtisodiyot va innovatsion texnologiyalar, 4(2), 45–52.
[64] Yuldashev, B. S. (2020). Ijtimoiy ta’minot tizimini rivojlantirish istiqbollari. Ijtimoiy fanlar jurnali, 3(1), 33–40.

fuqarolarga minimal darajadagi daromad kafolatini beradi. Bu yondashuv ijtimoiy adolatni ta’minlashda muhim ahamiyatga ega.

Ikkinchi pog‘ona - majburiy sug‘urta pensiya tizimi bo‘lib, u ish beruvchi va xodim tomonidan to‘lanadigan badallar asosida shakllanadi. Germaniya tajribasida ushbu tizim “taqsimlovchi” (pay-as-you-go) model asosida ishlaydi, ya’ni hozirgi ishlayotgan avlod to‘layotgan badallar hisobidan pensionerlar ta’minlanadi. Shu bilan birga, ushbu tizimda individual hisobvaraqlar yuritilishi orqali fuqarolarning o‘z pensiya jamg‘armalari ustidan nazorati kuchaytirilgan.

Uchinchi pog‘ona - ixtiyoriy jamg‘arib boriladigan pensiya tizimi bo‘lib, u fuqarolarga qo‘shimcha daromad manbaini yaratish imkonini beradi. Niderlandiyada ushbu tizim keng rivojlangan bo‘lib, nodavlat pensiya fondlari va xususiy sug‘urta kompaniyalari faol ishtirok etadi. Bu esa pensiya tizimining diversifikatsiyasini ta’minlab, uning moliyaviy barqarorligini oshiradi.[65]

1-jadval.

Xorijiy davlatlarda pensiyalarni tayinlash va to‘lash tizimini shakllantirish.[66]

Davlat	Pensiya modeli	Tayinlash mexanizmi	To‘lash tizimi
Shvetsiya	Ko‘p pog‘onali	Individual hisobvaraqlar asosida	Elektron va avtomatlashtirilgan
Germaniya	Taqsimlovchi va qo‘shimcha	Mehnat staji va badallar asosida	Markazlashgan davlat tizimi
Niderlandiya	Ko‘p pog‘onali	Davlat va kasbiy fondlar orqali	Davlat va xususiy fondlar orqali

[65] Karimov, N. R. (2022). Pensiya ta’minoti tizimini takomillashtirish yo‘nalishlari. Toshkent: Fan va texnologiya.
[66] “Xorijiy davlatlarda pensiyalarni tayinlash va to‘lash tizimini shakllantirish” ushbu jadval muallif tomonidan tayyorlangan.

Estoniya	Ko‘p pog‘onali va raqamli	Elektron tizim orqali avtomatik tayinlash	To‘liq raqamlashtirilgan
AQSh	Aralash (davlat va xususiy)	Sug‘urta badallari va individual jamg‘armalar asosida	Ijtimoiy ta’minot va xususiy fondlar
Yaponiya	Ko‘p pog‘onali	Majburiy sug‘urta va davlat tizimi asosida	Markazlashgan va barqaror

Rivojlangan davlatlarda pensiya tizimlari turlicha bo‘lishiga qaramay, ularni birlashtiruvchi umumiy o’ziga xos tendensiyalar mavjudligini ko‘rishimiz mumkin.

Aksariyat davlatlarda Shvetsiya, Niderlandiya, Estoniya, Yaponiya davlatlarida ko‘p pog‘onali model ustun hisoblanadi. Bu model davlat pensiyasi, majburiy sug‘urta va ixtiyoriy jamg‘armalarni o‘z ichiga oladi hamda pensiya tizimining moliyaviy barqarorligini ta’minlashga xizmat qiladi.

Tayinlash mexanizmlarida esa individual yondashuv kuchaygan. Xususan, Shvetsiya va AQShda individual hisobvaraqlar asosiy rol o‘ynaydi, Germaniya va Yaponiyada esa mehnat staji hamda badallar asosiy mezon sifatida qo‘llaniladi. Bu esa fuqarolarning pensiya tizimidagi ishtirokini oshiradi va shaffoflikni ta’minlaydi.

To‘lov tizimlarida esa raqamlashtirish va avtomatlashtirish ustuvor yo‘nalishga aylangan. Ayniqsa, Estoniya va Shvetsiya davlatlarida pensiya jarayonlari to‘liq elektron shaklda amalga oshiriladi, bu esa byurokratiyani kamaytiradi va xizmatlar samaradorligini oshiradi.

Ayrim davlatlarda AQSh, Niderlandiya davlatlarida xususiy sektorning faol ishtiroki kuzatiladi. Bu pensiya tizimini diversifikatsiya qilish va qo‘shimcha moliyaviy manbalarni jalb etishda muhim omil hisoblanadi.

Xulosa.

Rivojlangan davlatlarda pensiya tizimini shakllantirishda ko‘p pog‘onali model, individual hisobvaraqlar, raqamlashtirilgan boshqaruv va xususiy sektor ishtiroki muhim ahamiyat kasb etadi. Ushbu yondashuvlar pensiya tizimining moliyaviy barqarorligini ta’minlash, shaffoflikni oshirish va aholining keng qatlamlarini qamrab olish imkonini beradi.

Shu bilan birga, pensiyalarni tayinlashda mehnat staji va badallar asosida individual yondashuvning ustuvorligi, to‘lov jarayonlarida esa elektron va avtomatlashtirilgan tizimlarning keng qo‘llanilishi zamonaviy pensiya tizimlarining asosiy belgisi hisoblanadi.

O‘zbekistonda xorijiy tajribalar asosida pensiya tizimini takomillashtirish uchun ko‘p pog‘onali modelni bosqichma-bosqich joriy etish, individual hisobvaraqlar tizimini rivojlantirish, raqamlashtirishni chuqurlashtirish hamda nodavlat pensiya fondlari faoliyatini kengaytirish maqsadga muvofiq desak bo’ladi. Bu esa pensiya tizimining samaradorligini oshirish, moliyaviy barqarorligini ta’minlash va ijtimoiy himoyani kuchaytirishga xizmat qiladi.

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O‘ZBEKISTONDA TURIZM SOHASIDAGI ONLAYN BRONLASH PLATFORMALARI VA ULARNING ISTIQBOLLARI

Ismatillayeva Sitora Sayfidin qizi

Buxoro Davlat Universiteti

sitorabonu2012@gmail.com

Annotatsiya: *Jahonda sun’iy intellekt yordamida turizm xizmatlarining tezligi, sifati va qamrovi ortib bormoqda. Rivojlangan va rivojlanayotgan davlatlarda bir necha yillardan beri foydalanib kelinayotgan ishonchli va muvafaqqiyatli platformalar xizmatlarini iste’mol qilish bilan bir qatorida, o’zlarining yangi va qulay funksiyalarga ega dasturlari ishlab chiqish va ularni joriy etish bo’yicha ham sezilarli o’zgarishlar kuzatilmoqda. Shu qatorda, ushbu maqolada O’zbekistonda ishlab chiqilgan va turizm sohasiga tatbiq etilgan onlayn dasturlar, ularning yutuq va kamchiliklariga asoslangan istiqbolli prognozlari keltirilgan.*

Kalit so’zlar: *sun’iy intellect, onlayn bronlash tizimlari, e-turizm, raqamli transformatsiya, mobil bronlash, bulutli texnologiyalar*

Abstract: *The speed, quality and scope of tourism services using artificial intelligence are increasing in the world. Along with the consumption of reliable and successful platform services that have been used for several years in developed and developing countries, significant changes are also being observed in the development and implementation of their own programs with new and convenient functions. In addition, this article presents prospective forecasts based on online programs developed and implemented in the tourism sector in Uzbekistan and their achievements and shortcomings.*

Keywords: *artificial intelligence, online booking systems, e-tourism, digital transformation, mobile booking, cloud technologies*

Kirish

O’zbekistonga tashrif buyuruvchi xorijiy sayyohlar va mamlakat hududadi mahalliy sayohatchilar o’z sayohatlarini tashkil etish, uni rejalashtirish , xizmatlardan foydalanish va ularni oldindan bron qilish uchun bir necha onlayn dasturlarga murojaat qilishadi. Bunday platformalardan ayniqsa aviachiptalarni izlash, bron qilish yoki sotib olish, belgilangan lokatsiyalardagi mehmonxonalarning mavjud xonalarini band qilish, sayohat dasturlari davomida foydalanish zarurati vujudga kelgan transport vositalari xizmatlarini tanlash va bron qilish, mamlakat hududida ekskursiyalar tashkil etishda ko’proq ehtiyoj seziladi. Dunyo miqyosida keng tarqalgan Onlayn Sayohat agentliklari(OTA): Booking.com, Expedia, Agoda lardan sayohat uchun foydalanish koeffisienti tabiiyki yuqori. Birinchi o’rinda ularning umumlashgan ko’p tarmoqli funksiyalari tursa, ikkinchi tomonda bu tizimlar bir necha o’n yildirki global miqyosda foydalanuvchilar ishonchi va sadoqatini qozona oldi. Sun’iy intellektdan foydalanish dolzarb masalaga aylanayotgan bir davrda O’zbekiston sharoitida ham shu kabi effektiv dasturlarga muqobil tizimlar ham ishlab chiqilgani juda quvonarli. Bu tizimlar qaysidir turizm xizmatlariga moslashtirilgan holda faoliyat yuritadi va quyida biz ularning ishlash mexanizmlari, yutuqlari, foydalanish statistikalari va iste’mol jarayonidagi kamchiliklarini ko’rib chiqamiz.

Asosiy qism

Aviachiptalarni tanlash va ularni bron qilish bugungi kunda Uzbekistan Airways web sayti orqali juda ham qulay. Bu platforma to'g'ridan to'g'ri aviabiletni sotib olish imkonini barobarida web saytning qulay interfeysi orqali mehmonxona va shaxsiy avtoulovni bron qilish qulayliklarini ham taqdim etadi. Shu bilan birga sayt tashrif buyuruvchilari aviachiptalarni onlayn bron qilish va sotib olish, parvozlar jadvali va yo'nalishlari haqida ma'lumot olish, samolyotdagi o'rindiqni tanlash, chipta narxlari va aksiyalar haqida yangiliklarni ko'rish, qo'shimcha xizmatlarni (bagaj, xizmatlar) rasmiylashtirish xizmatlaridan ham bemalol foydalanishlari mumkin. Platforma orqali yo'lovchilar aviakompaniyaning UzAirPlus sodiqlik dasturidan foydalanishlari mumkin. Bu ularga har bir ovoz uchun bonus ballar yi'gish va yig'ilgan ballar orqali aviachiptalarga chegirma olishni kafolatlaydi. Kompaniyaning moliyaviy ko'rsatkichlarini tahlil qilib ko'rsak uning 2024-yildagi daromadi 17,51 trillion so'mga, sof foydasi 687,5 milliard so'mga, 2023-yilga nisbatan o'sish esa 67,4 % ga yetgan[67].2024-yilda aviakompaniya tarixida birinchi marta 6 million yo'lovchiga xizmat ko'rsatdi, bu esa avvalgi yilga nisbatan taxminan 14,9% o'sishni tashkil etdi.

Tashish xizmatlaridan uzoqlashmagan holatda O'zbekiston Temir yo'llarining raqamli xizmatlarini va uning tahlilini ham ko'rib chiqish ayni muddao. E-ticket Uzbekistan Railways- poyezd chiptalarini onlayn sotib olishga yo'naltirilgan tizimdir. Rasmiy web sayt bilan birgalikda uning mobil ilovasi ham birdek sayohatchilarga xizmat ko'rsatadi. Uzrailway platformasi turizm sohasida mamlakat shaharlararo qulay transport aloqasini ta'minlash, sayyohlar uchun onlyan chipta bron qilish imkoniyatini yaratish, transport xizmatlarini raqamlashtirish va ichki turizmni qo'llab quvvatlash vazifalarini bajaradi. Kunlik poyezd qatnovlari 150 dan ortiq bo'lgan so'nggi yillarda UzRailway yillik yo'lovchilar soni 20 milliondan ortdi. O'zbekiston temir yo'llari so'nggi yillarda moliyaviy transformatsiya jarayonini boshdan kechirmoqda.

[67] https://m.kun.uz/en/news/2025/03/01/uzbekistan-airways-increases-net-profit-to-over-53-million

Kompaniya 2023-yildagi katta zarardan keyin moliyaviy holatini yaxshilab, daromad va foyda ko‘rsatkichlarini sezilarli oshirishga erishdi.Xususan, 2025-yilning dastlabki 9 oyida kompaniyaning sof foydasi 11 trillion so’mdan oshdi, daromad esa 2,58 %ga ortdi.[68]

Sayohatchilarga mamlakat hududiga tashkillashtirilgan tur paketlar yoki shaxsiy qiziqishlariga asoslangan ekskursiyalar tashkil etish, ularni bron qilish va sotish tur operatorlarning asosiy maqsadi. Bugungi kunda mamlakatimizning yuzdan ortiq tur operatorlari raqamlashtirilgan holda faoliyat yuritib kelish barobarida o’zlarining shaxsiy web saytlari, mobil ilovalarini turizm sohasiga integratsiya qilishmoqda. Ular ichida Advantour, Anur Tour, Orexca Travel, Asia Luxe Travel. Dolores Travel singari ko’plab kompaniyalar turizmning global bozoriga allaqachon kirib borishdi. Ushbu tur operatorlar ichki va xalqaro tur paketlarini sayyohlarga taklif qilib, ko’pchiligi mehmonxonani bron qilish, transport va gid xizmatlarini ham o’z paketlariga qo’shishadi. Raqamli tizimlarda faoliyat yurituvchi tur operatorlar 24/7 rejimida onlayn xizmatlarni taqdim etadi. Ahamiyatli tomoni shundaki bu platformalarning barchasi .uz domenida ishlab, rasmiy va local xizmat ko’rsatadi. Advantour va Asia Luxe tur operatorlarining onlayn platformalariga bir oyda taxminan 83,000- 85,000 yaqin sayohatchilar murojaat qilishadi.[69] Umumiy hisobda esa 2025-yilning yanvar-oktabr oylarida turistik agentliklar, turoperatorlar va sayohatlarni bron qilish bilan bog’liq ximzatlar jami 2,9 trillion so’m xizmat ko’rsatdi, bu ko’rsatkich esa o’tgan yilga nisbatan 42,2% ga oshgan. [70]

O’zbekistonda joylashtirish vositalarinining xizmatlarini ham sun’iy intellect integratsiya natijasida soddalashtirish va ommalashtirish ishlari o’z samarasini ko’rsatib bormoqda. Masalan, mamlakat hududida joylashtirish kompaniyalarini

[68] https://kun.uz/en/news/2025/12/19/uzbekistan-railways-reports-profit-growth-as-the-national-currency-strengthens?utm
[69] https://sem1.heaventechit.com/trending-websites/uz/travel-and-tourism?
[70] https://stat.uz/uz/matbuot-markazi/qo-mita-yangiliklar/65493-turistik-agentliklar-tomonidan-2-9-trln-s-mlik-khizmatlar-k-rsatilgan-2

onlayn bron qilish xizmatlarining bir necha turdagi onlayn platformalari shakllandi. Bular sirasida Mybooking.uz, Hurma.uz va Olamgir AI kabi platformalar keng ko'lamli mehmonxonalarni izlash va xonalarni bron qilish imkonini beradi. Hurma.uz web sayti orqali mehmonxonaning narxlari, fotosuratlari, sharhlar va qulayliklar bilan tanishish orqali real vaqt rejimida bron qilish mumkin. Shu bilan birga platforma cashback tizimi va saytda mavjud mehmonxonalar bilan hamkorlik ishlaydi. Foydalanuvchilar ball yig'ish va 10%gacha chegirmalari olish imkoniyatiga ega. [71] Mybooking.uz web sayti esa 600dan ortiq mamlakatdagi mavjud mehmonxonalarning ro'yxatini shakllantirishga ulgurdi. Qulay onlayn to'lovlar, mehmonlarning shaxsiy fikrlari bilan bo'lishish imkoniyatlari hamda mehmonxona bilan sayyoh o'rtasida to'g'ridan to'g'ri muloqotni o'rnatishning tashkil etilganligi saytning mashhurligini yanada oshirdi. MyBooking.uz ilovasi esa 17149 marotaba yuklangan.[72]

O'zbekistondagi ko'plab mehmonxonalar ham bugungi kunda zamonaviy tendensiyalarga hamnafas bo'lish barobarida oz'larining shaxsiy web sahifalari yokida mobil ilovalarining joriy etilishiga alohida ahamiyat berishmoqda. Ko'pgina mehmonxonalar o'z saytlarida onlayn bronlash funktsiyasini taklif qiladi — bu xizmatlar orqali mijozlar xonalarni oldindan band qilib, narxlarni taqqoslashlari mumkin. Bu turizm xizmatlarining raqamli transformatsiyasini aks ettiradi. Rivojlangan raqobat fonida esa har bir mehmonxona o'z dasturiy ta'minotining dizayni, interfeysi, undagi taklif qilinuvchi xizmatlar kontingenti, ko'pfunksiyalilik jihatlari va sayohatchilar bilan qayta aloqaning yo'lga qo'yilganliogiga ham alohida e'tibor berishadi.

O'zbekistonda tashkil etilgan va faoliyat yuritib kelayotgan turizm sohasiga aloqador yuroqida keltirib o'tilgan raqamli texnologiyalar o'z o'rinida kichik kamchiliklarga ham yuz tutgan. Uzairways milliy aviakompaniyasi xalqaro yo'nalishlarda xizmat ko'rsatishda salohiyatga ega bo'lsada, uning eskilab qolgan web

[71] https://hurma.uz/en/hotels/uzbekistan
[72] https://chrome-stats.com/d/com.mybookinguz

sahifasi bir nechta internet xizmatlari va raqamli tizimdagi texnik nosozliklarga yo’l qo’ygani to’g’risida ko’plab foydalanuvchilarning fikri kuzatilgan. Yana ayrim sayt tashrif buyuruvchilari systematix audit va tandiqlar tufayli xizmat ko’rsatish standartlarini yaxshilash zarurligini ta’kidlab o’tishgan. Internet tahlillariga va foydalanuvchilarning real tajribalariga ko’ra Uzrailways web sahifasi hamda ilovasida to’lov jarayonlarida xatolar sodir bo’lishi mumkinligini, ba’zir bir sahifalararo o’tishdagi takroriy xatoliklar kuzatilganini bayon etishgan. Chet eldan chiptalarni sotib olishda ba’zan tizimi bilan ham muammolar kuzatilishi ya’ni xalqaro kartalar ishlamaslik holatlari ham sodir bo’lgan. Bu holatlar raqamli tajribani past darajaga tushiradi va foydalanuvchilarda noqulayliklar tug‘diradi.

Ko‘plab .uz domenli tur operatorlari saytlarida texnik jihatlar yetarli darajada rivojlanmagan, misol uchun saytlar mobil qurilmalarga moslanmagan, bu esa foydalanuvchilarga noqulay tajriba beradi.Intuitiv bo‘lmagan dizayn va noaniq menyu strukturalari, foydalanuvchini charchatadi. Raqamli xizmatlarda qidiruv, filtr va to‘lov tizimlari murakkab yoki. Bu holatlar sayt tashriflarining past bo‘lishiga va foydalanuvchilarning xizmatni tark etishiga olib keladi. Ko‘plab tur operatorlar o‘z saytlarida onlayn bronlash funksiyasini taklif etsa-da, uning ishlashida muammolar kuzatiladi, masalan, bron jarayoni ko‘p qadamli (multi-step) bo‘lib, foydalanuvchilarni chalkashtiradi. To‘lov tizimi bilan integratsiya yetarli emas yoki xalqaro kartalar qo‘llab-quvvatlanmaydi. Saytda savatcha xatoliklari, “checkout” jarayonining uzilib qolishi holatlari mavjud. Natijada foydalanuvchilar bron jarayonini yakunlamay saytni tark etadi, bu esa konversiya darajasini pasaytiradi.

Xulosa

Shuni ishonch bilan aytish mumkinki, O‘zbekistonda turizm sohasidagi raqamli platformalar yaqin 3–5 yil ichida katta o‘sish bosqichiga erishadi, Xususan:milliy yagona turizm portalining paydo bo‘lishi[73]- bu portal orqali mehmonxona broni,

[73] https://m.kun.uz/en/news/2024/12/16/uzbekistan-to-launch-unified-national-tourism-platform-in-2025

transport xizmatlari, ekskursiya va gid xizmatlari birlashtiriladi, mobil ilova va AI yordamida personalizatsiya (individual tur paketlar tuzish, sayohat bo'yicha real vaqt takliflari, shaxsiy chat yordamchi funksiyalari) joriy etiladi, xalqaro platformalar bilan integratsiya (Global SEO va marketing strategiyalari, ko'p tilli xizmatlar) tashkil etiladi, data-tahlil asosidagi qaror qabul qilish (eng ko'p bron qilingan yo'nalishlar, mavsumiy talablar, narx dinamikasi statistikalari) yo'lga qo'yiladi, multimodal transport va mehmonxona xizmatlarini birlashtiriladi. Bu tendensiyalar raqamli transformatsiyani mustahkamlab, O'zbekistonni Markaziy Osiyodagi raqamli turizm markaziga aylantiradi va o'z navbatida O'zbekistonning turizm sohasi orqali moliyaviy o'sishini ham ta'minlaydi.

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BANK TIZIMIDA RISK MENEJMENTINI XALQARO TAJRIBALAR ASOSIDA TAKOMILLASHTIRISH

Kuldashev Erkin

Andijon davlat texnika instituti

kuldasheve@gmail.com

Muhammadjonov Shoyatbek

Andijon davlat texnika instituti

shoyatbek7373@adu.uz

Annotatsiya. *Ushbu maqolada O‘zbekiston tijorat banklarida risk menejmenti tizimini takomillashtirish zarurati asoslab berilgan. Maqolada moliyaviy barqarorlikni ta’minlash, raqamli boshqaruvni joriy etish, xalqaro standartlar asosida boshqaruv mexanizmlarini rivojlantirish, shuningdek, ilg‘or xorijiy tajribalarni o‘rganish muhim yo‘nalish sifatida ko‘rib chiqildi. Bank tizimining samaradorligini oshirish uchun risk menejmentini modeli va optimal qaror qabul qilish usuli taklif qilindi.*

Kalit so‘zlar: *Risk menejmenti, tijorat banklari, moliyaviy barqarorlik, raqamli transformatsiya, xalqaro tajriba, bank islohotlari, kredit risklari, ilmiy asoslanganlik, balans, kredit siyosati, samaradorlik.*

Аннотация. *В данной статье обоснована необходимость совершенствования системы риск-менеджмента в коммерческих банках Узбекистана. В качестве важных направлений рассмотрены обеспечение финансовой устойчивости, внедрение цифрового управления, развитие механизмов управления на основе международных стандартов, а также изучение передового зарубежного опыта. Для повышения эффективности банковской системы предложена модель риск-менеджмента и метод принятия оптимальных решений.*

Ключевые слова: *Риск-менеджмент, коммерческие банки, финансовая устойчивость, цифровая трансформация, международный опыт, банковские реформы, кредитные риски, научная обоснованность, баланс, кредитная политика, эффективность.*

Abstract. *This article substantiates the necessity of improving the risk management system in commercial banks of Uzbekistan. Key areas of focus include ensuring financial stability, implementing digital management, developing management mechanisms based on international standards, and studying advanced international practices. To enhance the efficiency of the banking system, a risk management model and a method for optimal decision-making are proposed.*

Keywords: *Risk management, commercial banks, financial stability, digital transformation, international experience, banking reforms, credit risks, scientific substantiation, balance, credit policy, efficiency.*

Kirish. Risk menejmenti – O‘zbekiston tijorat banklarining moliyaviy barqarorligi va xalqaro raqobatbardoshligining kalitidir. So‘nggi yillarda mamlakat bank tizimida olib borilayotgan islohotlar, raqamli transformatsiya va xorijiy investorlarni jalb qilish jarayonlari risklarni samarali boshqarishning dolzarbligini yanada oshirdi. Kredit, likvidlilik, valyuta va operatsion risklar banklar faoliyatiga jiddiy ta’sir ko‘rsatib, ularni oldindan aniqlash va minimallashtirishni talab qilmoqda. Ushbu maqola O‘zbekiston tijorat banklarida risk menejmentini takomillashtirish yo‘llarini, xalqaro tajribalarni va zamonaviy texnologiyalarni qo‘llash imkoniyatlarini asoslab berdik.

Bank tizimi – har qanday mamlakat iqtisodiyotining asosiy, moliyaviy barqarorlik, investitsion faollik va iqtisodiy o‘sishning muhim omili hisoblanadi. Ayniqsa, so‘nggi yillarda O‘zbekiston Respublikasida olib borilayotgan moliyaviy islohotlar, bank sektorini liberallashtirish, xorijiy investorlarni jalb qilish va raqamli transformatsiyani joriy etish bo‘yicha qabul qilingan davlat dasturlari ushbu sohada chuqur ilmiy va amaliy tadqiqotlar olib borishni taqozo qilmoqda. Banklar faoliyatidagi asosiy muammo va xavf omillaridan biri – bu turli shakllardagi risklarning mavjudligidir. Kredit risklari, likvidlilik risklari, bozor risklari, valyuta risklari, operatsion risklar, bozor o‘zgaruvchanligi kabi omillar banklar moliyaviy barqarorligiga bevosita ta’sir ko‘rsatadi. Bunday risklarning oqibatlarini minimallashtirish, ularni oldindan aniqlab, samarali boshqarish bugungi bank tizimining asosiy vazifalaridan biridir.

Xalqaro tajriba shuni ko‘rsatmoqdaki, rivojlangan moliya institutlarida zamonaviy risk menejment amaliyoti nafaqat banklarning moliyaviy sog‘lomligini ta’minlashda, balki investorlar va mijozlar ishonchini mustahkamlashda ham muhim vosita hisoblanadi. Shu bois, “O‘zbekiston Respublikasi tijorat banklarida risk menejment amaliyotini takomillashtirish” masalasi bugungi kunda dolzarbdir.

Mavzuning dolzarbligi, birinchidan, bank tizimining raqobatbardoshligini oshirish, ikkinchidan, risklarni boshqarish mexanizmlarini xalqaro standartlar asosida qayta ko‘rib chiqish zaruratidan kelib chiqadi. Uchinchidan, bu mavzu orqali O‘zbekiston bank sektorining uzluksiz rivojlanishiga xizmat qiluvchi aniq taklif va amaliy tavsiyalar ishlab chiqilishi kerak. Banklarning moliyaviy risklarini to‘liq va o‘z vaqtida aniqlash maqsadiga erishish uchun iqtisodiy tahlil tashqi va ichki muhitni tahlil qilish va prognozlashni o‘z ichiga olgan tizimli yondashuvga asoslanadi.

Bankning tashqi muhitini tahlil qilish bank operatsiyalarining rentabelligi va tavakkalchiligiga ta’sir etuvchi umumiy bozor omillarini baholash va prognoz qilishga qaratilgan. Ichki muhitni tahlil qilishda asosiy e’tibor bank aktivlari va passivlari sifatini, ularning muddat va miqdorlar bo‘yicha muvozanatini, ishonchliligi va samaradorligini baholashga qaratiladi. Ushbu yondashuv xavfli bank operatsiyalarini aniqlashga, sabablar va hajmlarni aniqlashga, mumkin bo‘lgan yo‘qotishlarni baholashning o‘ziga xos usullaridan foydalanishga, shuningdek, xavf hajmining o‘zgarishi dinamikasini bashorat qilishga imkon beradi. Bank risklarini baholashning mavjud usullarini o‘rganib, takomillashtirilgan usulni ishlab chiqishni lozim topdik.

Riskni baholashni quyidagi formula orqali aniqlaymiz:

$$R(A) = \frac{m(A)}{n} \quad (1)$$

Bu yerda:

$R(A)$ – A hodisa riskini darajasi;

$m(A)$ – A hodisaning m ta zarar ko‘rish ehtimoli yoki yo‘qotishlar soni;

n – hodisalarning jami soni.

$m(A)$ – ya’ni, A hodisaning zarar ko‘rish ehtimolini yoki yo‘qotishlar sonini optimallashtirish uchun quyidagi formuladan foydalanamiz:

$$IA = \{T; O; S; C; t\} \quad (2)$$

Bu yerda:

IA – bank menejmentidagi har bir A hodisaning ilmiy asoslanganligi;

T – ro‘y berishi mumkin bo‘lgan A hodisaning t avvalgi davridagi holati, ya’ni hodisaning tarixiyligi;

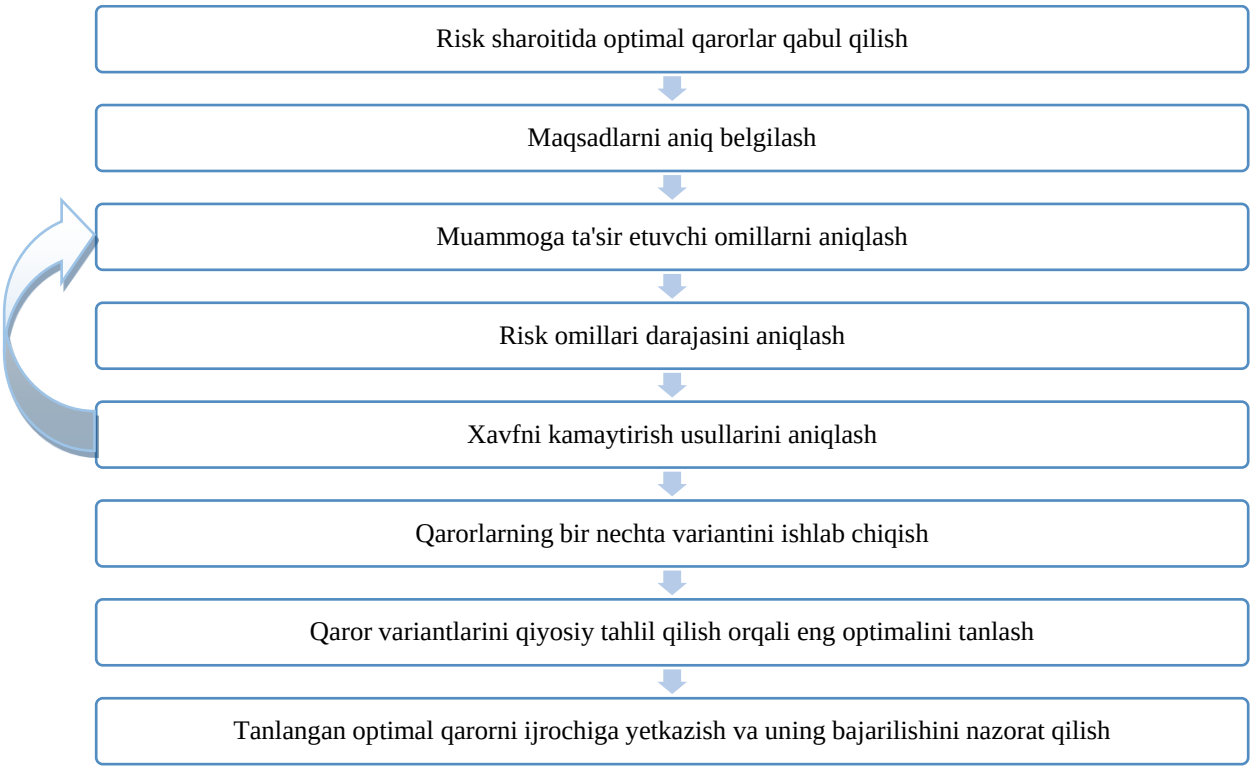
O – A hodisaga ta’sir etuvchi obyektiv qonuniyatlar va boshqa omillar;

S – A hodisaning tizimlilik darajasi;

C – A hodisaning strukturasi;

t – A hodisaning faoliyat davri.

(1) va (2) formulalardan foydalanib, risk menejmentida optimal qaror qabul qilish bosqichlarini 1-rasmda tasvirlanganidek amalga oshiramiz.



1-rasm. Risk menejmentida optimal qarorlarni qabul qilish jarayoni

Bank tizimi har qanday mamlakat iqtisodiyotining “qon aylanish tizimi” bo‘lib, uning barqarorligi va ishonchliligi moliyaviy tizimning umumiy sog‘lomligiga bevosita ta’sir ko‘rsatadi. Ayniqsa, global moliyaviy inqirozlar, pandemiyalar va geosiyosiy beqarorliklar fonida banklar duch keladigan risklar soni va murakkabligi ortib bormoqda. Shu bois, risk menejment tizimini takomillashtirish bugungi kunda nafaqat dolzarb, balki strategik ahamiyatga ega masalaga aylangan.

Xalqaro tajriba misollari: Basel II va Basel III standartlari: Ko‘plab rivojlangan davlatlar, jumladan AQSh, Buyuk Britaniya, Germaniya va Yaponiya banklari ushbu xalqaro me’yorlar asosida risklarni baholash va boshqarish tizimlarini joriy etgan. Bu standartlar bank kapitalining yetarliligini ta’minlash, likvidlilik riskini kamaytirish va stress-testlar orqali risklarni oldindan aniqlashga xizmat qiladi.

Turkiya tajribasi: O‘zsanoatqurilishbank vakillari Turkiya banklarida risk madaniyati, raqamli risk monitoringi va investitsiya risklarini baholash bo‘yicha ilg‘or amaliyotlarni o‘rganib, o‘z tizimiga joriy etmoqda.

Skandinaviya mamlakatlari: Shvetsiya va Norvegiya banklari sun’iy intellekt asosida ishlovchi risk monitoring tizimlarini joriy etib, real vaqt rejimida kredit portfellaridagi risklarni aniqlash va avtomatik choralar ko‘rish imkoniyatiga ega bo‘lgan.

Bu tajribalar shuni ko‘rsatadiki, zamonaviy risk menejment tizimi – bu faqat nazorat emas, balki strategik boshqaruv vositasidir.

O‘zbekiston tijorat banklari faoliyatidagi asosiy ko‘rsatkichlar quyidagicha o‘sib bormoqda.

1-jadval

Tijorat banklari faoliyatining asosiy ko‘rsatkichlari (mlrd so‘m)

Yil	Aktivlar	Kreditlar	Kapital	Depozitlar
2020	370 000	270 000	60 000	140 000
2021	460 000	340 000	75 000	180 000
2022	550 000	410 000	85 000	210 000
2023	652 157	471 406	97 079	241 687
2024	690 424	493 952	104 158	265 472
2025	769 330	533 121	114 792	308 692
2026 (1-yanvar)	924 763	604 002	135 339	417 258

2026-yil ma’lumotlari 1-yanvar holatiga ko‘ra hisoblangan

Izohlar:

– Aktivlar o‘sishi: 2026-yilga kelib bank tizimi aktivlari 20% ga oshib, 924,8 trln so‘mga yetdi.

– Depozitlar portfeli: Eng yuqori o‘sish sur’ati depozitlarda kuzatilib, ular bir yil ichida 35% ga (308,7 trln so‘mdan 417,3 trln so‘mga) ko‘paydi. Bu aholi va tadbirkorlarning bank tizimiga bo‘lgan ishonchi sezilarli darajada ortganini ko‘rsatadi.

– Kredit qo‘yilmalari: Jami kredit portfeli 13% ga o‘sib, ilk bor 600 trln so‘mlik dovondan oshdi.

– Moliyaviy barqarorlik: Bank tizimining jami kapitali 135,3 trln so‘mni tashkil etib, yil davomida qariyb 18% ga o‘sgan.

Bu raqamlar bank sektorining jadal rivojlanayotganini ko‘rsatadi. Biroq, aktivlar va kreditlar hajmining ortishi bilan birga, risklar hajmi va murakkabligi ham oshmoqda. Ayniqsa, kredit portfellarining sifati, valyuta kurslarining o‘zgaruvchanligi va operatsion risklar banklar uchun jiddiy tahdid bo‘lib qolmoqda.

Bugungi kunda bank tizimida risklarni boshqarish nafaqat moliyaviy barqarorlikni ta’minlash, balki raqobatbardoshlikni oshirish, mijozlar ishonchini mustahkamlash va xalqaro moliya bozorlariga integratsiyalashishning muhim omili sifatida qaralmoqda. Xalqaro moliyaviy institutlar, xususan, Jahon banki va Xalqaro valyuta jamg‘armasi tomonidan olib borilgan tadqiqotlar shuni ko‘rsatadiki, risk menejment tizimi kuchli bo‘lgan banklar inqiroz davrida ham o‘z faoliyatini barqaror davom ettira olgan. Masalan, 2008-yilgi global moliyaviy inqiroz davrida Kanada bank tizimi nisbatan kam zarar ko‘rgan bo‘lib, bu ularning ilgari joriy etgan qat’iy risk menejment siyosati va ichki nazorat tizimlari bilan bog‘liq bo‘lgan. Shuningdek, Avstraliya va Singapur banklari ham Basel III talablariga mos ravishda kapital yetarliligi va likvidlik yondashuvlarini kuchaytirgan holda, moliyaviy beqarorlikka qarshi muvaffaqiyatli kurasha olgan. O‘zbekistonda esa, Markaziy bank tomonidan

2020-yildan boshlab bosqichma-bosqich joriy etilayotgan bank tizimini transformatsiya qilish dasturi doirasida risk menejment siyosatini takomillashtirishga alohida e’tibor qaratilmoqda.

Jumladan, 2026-yil 1-yanvar holatiga ko‘ra, tijorat banklarining jami aktivlari 924,763 trln so‘mga yetgan bo‘lib, bu 2025-yilning mos davriga (769,330 trln so‘m) nisbatan 20,2 foizga oshgan.

Kredit qo‘yilmalari 2026-yil boshiga kelib jami kredit portfeli 604,002 trln so‘mni tashkil etdi. Biz ta’kidlagan 546,4 trln so‘m ko‘rsatkichi 2025-yilning o‘rta muddatiga (iyun oyi) to‘g‘ri keladi va o‘sha davrda yillik o‘sish 15 foizni tashkil etgan. 2026-yil 1-yanvar holatiga ko‘ra esa kredit qo‘yilmalarining yillik o‘sish sur'ati 13,3 foizni tashkil qildi.

Lekin, bu o‘sish bilan birga kredit risklari, valyuta risklari va operatsion risklar ham ortib bormoqda. Shu sababli, banklar tomonidan risklarni aniqlash, baholash va monitoring qilishda zamonaviy texnologiyalar — masalan, sun’iy intellekt, blokcheyn va avtomatlashtirilgan tahlil tizimlari — keng joriy etilishi zarur. Shuningdek, Turkiya tajribasi asosida O‘zsanoatqurilishbank tomonidan risk madaniyatini rivojlantirish, xodimlarni xalqaro standartlar asosida tayyorlash va ichki audit tizimini kuchaytirish bo‘yicha amaliy ishlar olib borilmoqda. Bu esa, boshqa banklar uchun ham samarali model bo‘lib xizmat qilishi mumkin.

Xulosa. O‘zbekiston tijorat banklari faoliyatining jadal rivojlanishi, ayniqsa, aktivlar, kreditlar va depozitlarning o‘sishi mamlakat iqtisodiyotidagi moliyaviy barqarorlikni ta’minlashda muhim ahamiyatga ega. Biroq, bu o‘sish bilan birga kredit, likvidlilik, valyuta va operatsion risklar kabi omillar bank tizimining barqarorligiga tahdid solmoqda. O‘zbekiston bank sektorida risk menejment tizimini takomillashtirish nafaqat moliyaviy barqarorlikni ta’minlash, balki raqobatbardoshlikni oshirish, mijozlar ishonchini mustahkamlash va xalqaro moliya bozorlariga integratsiyalashish uchun strategik ahamiyatga ega ekanligi aniqlandi. Xalqaro tajribalar, xususan, Basel II va III standartlari, Turkiya, Skandinaviya mamlakatlari, Kanada va Singapur

banklarining ilg‘or amaliyotlari shuni ko‘rsatadiki, zamonaviy risk menejment tizimlari banklarning inqirozlarga chidamliligini oshiradi va ularning moliyaviy sog‘lomligini ta’minlaydi. O‘zbekiston banklari uchun risklarni aniqlash, baholash va monitoring qilishda zamonaviy texnologiyalarni joriy etish bugungi kunda asosiy masalalardan biridir. Biz taklif etgan birinchi va ikkinchi formulalar asosida bank tizimida risk menejmenti takomillashtirilsa, tizimning samaradorligi uzluksiz ortib boradi. Bu esa, Yangi O‘zbekistonni ijtimoiy-iqtisodiy rivojlanishiga asos bo‘ladi.

Takliflar:

1. Zamonaviy texnologiyalarni joriy etish: sun’iy intellekt, blokcheyn va avtomatlashtirilgan tahlil tizimlarini risk menejment jarayonlariga integratsiya qilish orqali kredit portfellarining sifatini real vaqt rejimida monitoring qilish va risklarni oldindan aniqlash imkoniyatlarini amalga oshirish kerak.

2. Xalqaro standartlarni qo‘llash: Basel III talablariga mos ravishda kapital yetarliligi va likvidlilik ko‘rsatkichlarini yanada mustahkamlash, stress-testlarni muntazam o‘tkazish.

3. Risk madaniyatini rivojlantirish: bank xodimlarini xalqaro standartlar asosida o‘qitish, ichki audit va risk madaniyati tizimlarini kuchaytirish, Turkiya va Skandinaviya tajribalarini mahalliy sharoitlarga moslashtirish.

4. Huquqiy va tashkiliy islohotlar: risk menejment tizimining huquqiy asoslarini takomillashtirish, tashkiliy tuzilmalarni optimallashtirish va risklarni boshqarish bo‘yicha mustaqil bo‘linmalarni faoliyatini kuchaytirish.

5. Xalqaro hamkorlikni kengaytirish: Jahon banki, Xalqaro valyuta jamg‘armasi kabi xalqaro moliyaviy institutlar bilan hamkorlikni mustahkamlash orqali ilg‘or tajribalarni o‘zlashtirish va xorijiy investitsiyalarni jalb qilish.

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ACCOUNTING AND ANALYSIS OF AGRICULTURAL EXPORT OPERATIONS: MODERN CHALLENGES AND IMPROVEMENT DIRECTIONS (CASE OF UZBEKISTAN)

Nishonova Ikboloy Ibroximovna

Fergana state technical university

ikboloy.nishonova@fstu.uz

Annotatsiya. *Maqolada O‘zbekiston Respublikasida qishloq xo‘jaligi mahsulotlarining eksport operatsiyalarini buxgalteriya hisobini yuritish va iqtisodiy tahlil qilishning nazariy hamda amaliy jihatlari kompleks yondashuv asosida o‘rganib chiqilgan. Tadqiqotda mavjud tizimdagi metodologik va amaliy muammolar aniqlanib, ularni bartaraf etish bo‘yicha integrallashgan yechimlar ishlab chiqilgan. Eksport samaradorligini baholash uchun integrallashgan indeks (IEI) hamda logistika xarajatlari matriksasi taklif etilgan.Tadqiqot natijasida eksport operatsiyalarini hisobga olishning transformatsion modeli, logistika xarajatlari matriksasi hamda integrallashgan eksport samaradorligi indeksi taklif etilgan.*

Kalit so‘zlar*: qishloq xo‘jaligi mahsulotlari, eskport, buxgalteriya hisobi, tahlil, valyuta kursi, eksport samaradorligi indeksi, logistika xarajatlari.*

Abstract. *In this article were proposed, theoretical and practical aspects of accounting and economic analysis of export operations of agricultural products in the Republic of Uzbekistan are studied based on a comprehensive approach. Export dynamics, structural changes and efficiency indicators were empirically analyzed in the period 2020-2025, accounting inconsistencies, logistics costs and currency risks were identified. As a result of the research, a transformational model of accounting for export operations, a matrix of logistics costs and an integrated export efficiency index.*

Keywords: *agricultural products, export, accounting, analyze, currency, integrated export efficiency index, logistics costs.*

Kirish. Hozirgi davrda dunyo hamjamiyatida ro‘y berayotgan jahon iqtisodiy tizimlari va madaniyatlarning integratsiyalashuv jarayonlarida qishloq xo‘jaligi

mahsulotlari eksporti nafaqat milliy, balki jahon iqtisodiyotining ham muhim tarkibiy qismiga aylanmoqda. Ayniqsa, iqtisodiy o‘sishning asosiy omillaridan biri bo‘lib rivojlanayotgan mamlakatlarda eksportdan olinadigan daromadlar hisoblanadi. Shu bilan birga, eksport operatsiyalarini buxgalteriya hisobini to‘g‘ri yuritish va ularni chuqur tahlil qilish masalasi dolzarbligicha qolmoqda.

Global iqtisodiyot uchun 2020–2025 yillar transformatsion davr bo‘ldi. COVID-19 pandemiyasi, logistika zanjirlarining uzilishi, valyuta kurslarining o‘zgaruvchanligi va geosiyosiy omillar eksport operatsiyalariga sezilarli ta’sir ko‘rsatdi. Shu davrda O‘zbekiston qishloq xo‘jaligi eksporti barqaror o‘sish tendensiyasini saqlab qoldi va iqtisodiyotning muhim drayveriga aylandi. Xususan, 2025 yilda mamlakat umumiy eksport hajmi 33,4 mlrd AQSh dollariga yetib, 23% ga oshgan[74].

Ilmiy izlanishlar shuni ko‘rsatadiki, agrar mahsulotlarini eksporti bilan bog‘liq operatsiyalarda hisob tizimi yetarli darajada mukammal emas. Buning natijasida esa korxonalarning moliyaviy natijalarini noto‘g‘ri aks ettirishga va boshqaruv qarorlarining samaradorligini pasayishini kuzatishimiz mumkin. Shu sababli, eskport operatsiyalarini hisobga olish va ularni tahlil qilishda uchrayotgan zamonaviy muammolarni aniqlash, shuningdek, ularni bartaraf etishga qaratilgan ilmiy asoslangan takliflarni ishlab chiqish ushbu maqolaning maqsadi hisoblanadi.

Asosiy qism. Agrar sektor O‘zbekiston iqtisodiyotida eksport salohiyatining asosiy drayverlarining biri bo‘lib hisoblanadi. Davlatimiz tomonidan so‘nggi yillarda eksportni qo‘llab-quvvatlash hamda ken sharoitlar yaratib berish bo‘yicha keng ko‘lamli islohotlar amalga oshirilib kelinmoqda. Shunday bo‘lsada, qishloq xo‘jaligi mahsulotlarii eksport qilishda ayri muammolar yechimi hali hanuz ochiq qolmoqda. Jumladan, logistika xarajatlarining yuqoriligi, valyuta risklari, past qo‘shilgan qiymat va hisob tizimining xalqaro standartlarga mos kelmasligi muammolarini sanab o‘tihimiz mumkin. Ushbu maqolani yozishdan asosiy maqsadimiz esa, qishloq xo‘jalik

mahsulotlarini eksport operatsiyalarini hisobini yuritish va tahlil qilishni takomillashtirish hisoblanadi.

Metodika. Mazkur maqolani yozishda eksport operatsiyalari hisob, tahlil va boshqaruv elementlari bir butun tizim sifatida olgan holda tizimli yondashuv, yangi ko‘rsatkichlar ishlab chiqish orqali iqtisodiy modellashtirish hamda turli yillarda eksport hajmi, struktura va samaradorlik ko‘rsatkichlari moliyaviy hisobotlarning xalqaro standartlari bilan o‘zaro solishtirgan holda taqqoslash kabi tadqiqot usullaridan foydalanildi.

Natijalar. Oz’bekiston Respublikasi iqtisodiy sharoitida agrar soha eksport operatsiyalarini hisobini yuritishda quyidagi muammolarga duch kelinmoqda:

Daromadni tan olishning aniq vaqti belgilanmaganligi;

Incoterms shartlariga bog‘liq holda xarajatlarni taqsimlashdagi noaniqliklar;

Eksport bilan bog‘liq bilvosita xarajatlarni hisobga olishdagi murakkabliklar.

Incoterms shartlari bilan integratsiyalashgan holda ishlaydigan, eksport operatsiyalarida daromadni tan olish uchun “risk va nazorat o‘tishi momenti”ga asoslangan moslashuvchan model taklif etiladi.

Mamlakatimizda qishloq xo’jalik

Valyuta kurslarining o‘zgarishi ham eksport jarayonlarini hisobga olishda muhim omil sanaladi. Amaliyotda esa kurs farqlarini operatsion yoki moliyaviy natijalarga kiritishdagi turli yondashuvlar va uzoq muddatli kontraktlarda kurs risklarini boshqarishning yetarli emasligi kabi muammolarni ko‘rishimiz mumkin. Shu kabi muammolarni yechimi sifatida esa quyidagi, ya’ni uch bosqichli tasniflash yondashuvi taklif etiladi. Jumladan, operatsion, investitsion va spekulyativ kurs farqlari. Bu tasnif orqali korxonaning haqiqiy rentabelligini aniqroq baholash.

Shuni ta’kidlab o‘tish joizki, qishloq xo‘jaligi mahsulotlarini eksportida logistika xarajatlari katta ulushni egallaydi, ammo ayrim holatlar hisobga olinmaydi. Bunday holatlarga transport xarajatlari ko‘pincha alohida xarajat sifatida hisobga olinmasligi, saqlash va sug‘urta xarajatlari alohida ajratilmasligi va mahsulot yo‘qotishlari hisobga

olinmasligini kiritishimiz mumkin. Muammoning yechimi sifatida esa “Eksport logistika xarajatlari matriksasi”ni joriy etish taklif etiladi. U transport va saqlash xarajatlari, sug‘urta xarajatlari, bojxona to‘lovlari, tabiiy yo‘qotishlar va sifat pasayishi kabi elementlarni o‘z ichiga oladi. Biz taklif etayotgan ko‘rsatkichlar tizimi eksport operatsiyalarining haqiqiy tannarxini aniqlashga yordam beradi. Ushbu tizim ko‘rsatkichlari sifatida eksport marjasi, logistika samaradorligi koeffitsiyenti, valyuta risk darajasi va sof eksport foydasini olish maqsadga muvofiqdir. Shunga ko‘ra, integrallashgan eksport samaradorligi (Logistics efficiency coefficient) ko‘rsatkichi va quyidagi formulalar asosida ishlab chiqildi:

$$LEC = \frac{sof\ eksport\ daromadi}{logistika\ xarajatlari}$$

Bu koeffitsient eksport faoliyatini kompleks baholash imkonini beradi.

Shu bilan birga, tadqiqot natijalari agrar eksport operatsiyalarini hisobga olish va tahlil qilish tizimida bir qator muhim xususiyatlarni aniqlash imkonini berdi. Birinchidan, eksport faoliyatida ijobiy o‘sish tendensiyasi kuzatilgan bo‘lsa-da, ushbu o‘sish asosan miqdoriy xarakterga ega bo‘lib, sifat ko‘rsatkichlari yetarli darajada rivojlanmagan. Ikkinchidan, eksport tarkibida xomashyo mahsulotlari ustunligi saqlanib qolgan bo‘lib, yuqori qo‘shilgan qiymatga ega mahsulotlar ulushi nisbatan past darajada qolmoqda. Uchinchidan, logistika xarajatlarining yuqori darajada bo‘lishi eksport tannarxini oshirib, uning raqobatbardoshligini pasaytiradi. To‘rtinchidan, valyuta risklari eksport operatsiyalarining moliyaviy natijalariga sezilarli ta’sir ko‘rsatadi.

Yuqoridagilarga asosan, eksport faoliyatining real samaradorligini aniqlashga xizmat qiluvchi quyidagi eksport samaradorligini baholash uchun integrallashgan indeksi (IEEI) indeks taklif etildi:

$$IEEI = \frac{Foyda - Valyuta\ yo'qotishlari}{Jami\ xarajatlar - Logistika\ xarajatlari}$$

Muhokama. Tadqiqot natijasida olingan natijalar shuni ko‘rsatadiki, agrar eksport operatsiyalarini hisobga olish va tahlil qilish tizimi hali to‘liq integrallashgan va zamonaviy talablar darajasiga yetmagan va eksport samaradorligini baholashda kompleks yondashuv muhim ahamiyatga ega. Tadqiqot natijalari ham ushbu yondashuvni tasdiqlaydi va mavjud tizimni takomillashtirish zarurligini ko‘rsatadi. Shuningdek, etish eksport samaradorligini oshirishning muhim omillari sifatida eksport tarkibini diversifikatsiya qilish, logistika tizimini optimallashtirish va moliyaviy risklarni boshqarish mexanizmlarini joriy namoyon bo‘ladi.

Xulosa. Tadqiqot davomida eksport operatsiyalarini buxgalteriya hisobida aks ettirish amaliyotida bir qator tizimli kamchiliklar mavjudligi aniqlandi. Jumladan, daromadni tan olishda yagona yondashuvning yo‘qligi, xarajatlarni noto‘g‘ri tasniflash, logistika xarajatlarining yetarli darajada detallashtirilmaganligi hamda xalqaro moliyaviy hisobot standartlariga to‘liq mos kelmaslik holatlari kuzatilmoqda. Ushbu kamchiliklar natijasida korxonalar faoliyatining real moliyaviy natijalari to‘liq aks ettirilmayapti, bu esa boshqaruv qarorlarining sifatiga salbiy ta’sir ko‘rsatmoqda. Shu bilan birga, yuqori ulushga ega bo‘lgan logistika xarajatlarining va ularning samarasiz boshqarilishi eksport tannarxini oshirib, tashqi bozorlarda narx raqobatbardoshligini pasaytirmoqda. Valyuta kurslarining o‘zgaruvchanligi esa eksport operatsiyalarining moliyaviy natijalariga sezilarli darajada ta’sir ko‘rsatib, korxonalarning foyda ko‘rsatkichlarini kamaytiruvchi muhim risk omili sifatida namoyon bo‘lmoqda. Tadqiqot natijalari shuni ko‘rsatadiki, mavjud sharoitda valyuta risklarini boshqarish mexanizmlarining yetarli darajada rivojlanmaganligi ushbu muammoni yanada keskinlashtirmoqda.

Mazkur muammolarni bartaraf etish maqsadida tadqiqotda bir qator ilmiy asoslangan taklif va yondashuvlar ishlab chiqildi. Xususan, eksport operatsiyalarini hisobga olishning transformatsion modeli daromadni “risk va nazorat o‘tishi”

tamoyili asosida tan olishni nazarda tutadi. Bu esa moliyaviy hisobotlarning ishonchliligini oshirish va xalqaro standartlarga moslashuvni ta’minlash imkonini beradi. Shuningdek, logistika xarajatlarini tizimli ravishda hisobga olish va tahlil qilish uchun “logistika xarajatlari matriksasi” taklif etildi. Ushbu yondashuv eksport jarayonidagi barcha xarajatlarni funksional jihatdan guruhlash va ularni optimallashtirish imkonini beradi.

Mazkur tadqiqotning eng muhim ilmiy natijalaridan biri sifatida eksport samaradorligini kompleks baholash imkonini beruvchi integrallashgan eksport samaradorligi indeksi (IEI) ishlab chiqildi. Ushbu indeks foyda, xarajatlar, logistika va valyuta risklarini yagona tizimda baholash imkonini berib, an’anaviy ko‘rsatkichlarga nisbatan ancha aniq va ishonchli natijalarni taqdim etadi.

Xulosa sifatida ta’kidlash joizki, agrar mahsulotlar eksport operatsiyalarini hisobga olish va tahlil qilish tizimini takomillashtirish nafaqat alohida korxonalar darajasida, balki butun milliy iqtisodiyotning raqobatbardoshligini oshirishda muhim ahamiyat kasb etadi. Taklif etilgan ilmiy yondashuvlar va modellarning amaliyotga joriy etilishi O‘zbekiston Respublikasining jahon agrar bozorlardagi pozitsiyasini mustahkamlashga xizmat qiladi.

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BUXGALTERIYA HISOBIDA RAQAMLI TEXNOLOGIYALARNI JORIY ETISHNING AHAMIYATI

Nurutdinova Zilola Kadirovna

Toshkent gumanitar fanlar universiteti

Annotatsiya. Mazkur tezisda zamonaviy iqtisodiy sharoitda buxgalteriya hisobini rivojlantirishda raqamli texnologiyalarning o‘rni va ahamiyati tahlil qilinadi. Raqamlashtirish jarayoni korxonalarda buxgalteriya hisobini yuritish usullarini tubdan o‘zgartirib, hisob-kitoblarning tezkorligi, aniqligi va shaffofligini oshirishga xizmat qilmoqda. Shuningdek, avtomatlashtirilgan hisob tizimlari, elektron hujjat aylanishi, bulutli texnologiyalar va axborot tizimlarining buxgalteriya hisobidagi samaradorligi ham yoritib berilgan. Tadqiqotda korxonalarda raqamli buxgalteriya tizimini joriy etishning iqtisodiy afzalliklari hamda moliyaviy boshqaruv jarayonini takomillashtirishdagi o‘rni haqida ilmiy

xulosalar keltirilgan.

Kalit so‘zlar: *buxgalteriya hisobi, raqamli texnologiyalar, elektron buxgalteriya, moliyaviy hisobot, avtomatlashtirish, axborot tizimlari, iqtisodiy samaradorlik.*

Annotation. *This thesis analyzes the role and importance of digital technologies in the development of accounting in modern economic conditions. The process of digitalization has significantly changed accounting practices in enterprises by improving the speed, accuracy, and transparency of accounting processes. The study also highlights the effectiveness of automated accounting systems, electronic document circulation, cloud technologies, and information systems in accounting. Furthermore, the research provides scientific conclusions on the economic advantages of implementing digital accounting systems and their role in improving financial management within enterprises.*

Keywords: *accounting, digital technologies, electronic accounting, financial reporting, automation, information systems, economic efficiency.*

Аннотация. *В данной работе рассматривается роль и значение цифровых технологий в развитии бухгалтерского учета в современных экономических условиях. Процесс цифровизации значительно изменил методы ведения бухгалтерского учета на предприятиях, повышая скорость, точность и прозрачность учетных процессов. В работе также освещается эффективность автоматизированных бухгалтерских систем, электронного документооборота, облачных технологий и информационных систем в бухгалтерском учете. Кроме того, представлены научные выводы об экономических преимуществах внедрения цифровых бухгалтерских систем и их роли в совершенствовании финансового управления предприятиями.*

Ключевые слова: *бухгалтерский учет, цифровые технологии, электронная бухгалтерия, финансовая отчетность, автоматизация, информационные системы, экономическая эффективность.*

Kirish

Bugungi globallashuv va raqamli iqtisodiyot sharoitida buxgalteriya hisobi tizimi ham zamonaviy texnologiyalar asosida rivojlanib bormoqda. Korxona faoliyatining samaradorligini ta’minlashda buxgalteriya hisobi muhim axborot manbai hisoblanadi. Buxgalteriya hisobi orqali korxonaning moliyaviy holati, aktivlari, majburiyatlari va moliyaviy natijalari haqida to‘liq ma’lumotlar shakllantiriladi.

So‘nggi yillarda iqtisodiyotning barcha tarmoqlarida raqamli texnologiyalar keng qo‘llanila boshladi. Bu jarayon buxgalteriya hisobida ham yangi yondashuvlarni talab qilmoqda. Avtomatlashtirilgan buxgalteriya tizimlari, elektron hujjat aylanishi, raqamli ma’lumotlar bazalari va bulutli texnologiyalar hisob jarayonlarini ancha soddalashtirib, inson omili tufayli yuzaga keladigan xatoliklarni kamaytirishga xizmat qilmoqda.

Shu sababli buxgalteriya hisobida raqamli texnologiyalarni joriy etish masalasi bugungi kunda dolzarb ilmiy va amaliy muammolardan biri hisoblanadi.

Buxgalteriya hisobini raqamlashtirishning zarurati

Raqamli texnologiyalarni buxgalteriya hisobiga joriy etish korxona faoliyatini samarali boshqarishda muhim ahamiyatga ega. An’anaviy buxgalteriya tizimida ko‘plab hisob-kitoblar qo‘lda bajarilganligi sababli ko‘p vaqt talab qilinar edi. Zamonaviy raqamli tizimlar esa ushbu jarayonlarni avtomatlashtirish imkonini bermoqda.

Buxgalteriya hisobini raqamlashtirish quyidagi omillar bilan izohlanadi:

-moliyaviy axborotlarni tezkor qayta ishlash zarurati;

-hisob-kitoblarning aniqligini oshirish;

-moliyaviy nazoratni kuchaytirish;

-hujjatlar aylanishini soddalashtirish;

-vaqt va mehnat resurslarini tejash.

Raqamli texnologiyalar yordamida buxgalteriya hisobida ko‘plab operatsiyalar avtomatik ravishda amalga oshiriladi. Bu esa korxona rahbariyatiga real vaqt rejimida moliyaviy ma’lumotlarni olish imkonini beradi.

Elektron buxgalteriya tizimlarining afzalliklari

Elektron buxgalteriya tizimlari korxona faoliyatini boshqarishda muhim rol o‘ynaydi. Ushbu tizimlar moliyaviy operatsiyalarni tezkor va aniq qayd etish imkonini beradi.

Elektron buxgalteriya tizimlarining asosiy afzalliklari quyidagilardan iborat:

1.**Tezkorlik** – moliyaviy ma’lumotlar qisqa vaqt ichida qayta ishlanadi.

2.**Aniqlik** – inson omili bilan bog‘liq xatoliklar kamayadi.

3.**Shaffoflik** – moliyaviy operatsiyalar ustidan nazorat kuchayadi.

4.**Axborot xavfsizligi** – ma’lumotlar elektron bazalarda saqlanadi.

5.**Hisobotlarni tez tayyorlash** – moliyaviy hisobotlar avtomatik shakllantiriladi.

Shuningdek, elektron buxgalteriya tizimlari soliq organlari bilan elektron aloqani ham osonlashtiradi. Bu esa hisobotlarni topshirish jarayonini ancha yengillashtiradi.

Buxgalteriya hisobida avtomatlashtirish jarayoni

Avtomatlashtirilgan buxgalteriya tizimlari korxona moliyaviy faoliyatini samarali boshqarish uchun keng imkoniyatlar yaratadi. Bunday tizimlarda hisob jarayonlari maxsus dasturiy ta’minot orqali amalga oshiriladi.

Avtomatlashtirilgan tizimlarning asosiy funksiyalari:

-buxgalteriya provodkalarini avtomatik shakllantirish;

-moliyaviy hisobotlarni tayyorlash;

-soliq hisob-kitoblarini yuritish;

-ombor va moddiy resurslar hisobini nazorat qilish;

-ish haqi hisob-kitoblarini amalga oshirish.

Ushbu jarayonlar korxonada moliyaviy boshqaruvni yanada takomillashtirishga yordam beradi.

Raqamli buxgalteriya tizimining iqtisodiy samaradorligi

Raqamli texnologiyalarni joriy etish korxona faoliyatining iqtisodiy samaradorligini oshiradi. Avvalo, buxgalteriya hisobida vaqt va mehnat sarfi sezilarli darajada kamayadi. Shuningdek, moliyaviy ma’lumotlarning aniqligi oshib, boshqaruv qarorlarini qabul qilish jarayoni ham tezlashadi.

Raqamli buxgalteriya tizimining iqtisodiy samaradorligi quyidagilarda namoyon bo‘ladi:

-operatsion xarajatlarning kamayishi;

-moliyaviy nazoratning kuchayishi;

-boshqaruv qarorlarining samaradorligi oshishi;

-hisobotlarning tezkor tayyorlanishi;

-korxona faoliyatining shaffofligi ortishi.

Natijada korxona raqobatbardoshligi oshib, uning moliyaviy barqarorligi mustahkamlanadi.

Xulosa

Xulosa qilib aytganda, raqamli texnologiyalarni buxgalteriya hisobiga joriy etish zamonaviy iqtisodiyotning muhim talablaridan biri hisoblanadi. Elektron buxgalteriya tizimlari, avtomatlashtirilgan hisob dasturlari va axborot texnologiyalari buxgalteriya jarayonlarini sezilarli darajada takomillashtiradi.

Raqamlashtirish hisob-kitoblarning tezkorligi va aniqligini oshirib, moliyaviy boshqaruv samaradorligini ta’minlaydi. Shu sababli korxonalarda raqamli buxgalteriya tizimlarini keng joriy etish iqtisodiy rivojlanishning muhim omillaridan biri hisoblanadi.

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QURILISH MATERIALLARI KORXONALARIDA INQIROZNING ERTA BELGILARINI ANIQLASH VA DIAGNOSTIKA KO‘RSATKICHLARI TIZIMINI TAKOMILLASHTIRISH

O‘rinboyev Doniyorjon Baxtiyorjon o‘g‘li

Farg‘ona davlat universiteti

e-mail: danik19953110@gmail.com

Annotatsiya. *Ushbu maqolada qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash hamda diagnostika ko‘rsatkichlari tizimini takomillashtirish masalalari tadqiq etiladi. Tadqiqotda moliyaviy, ishlab chiqarish va boshqaruv ko‘rsatkichlari asosida inqirozoldi holatini baholash yondashuvlari tahlil qilinadi. Mavjud diagnostika usullarining afzallik va cheklovlari ochib berilib, tarmoq xususiyatlariga mos indikatorlar tizimini shakllantirish bo‘yicha takliflar ishlab chiqiladi. Tadqiqot natijalari qurilish materiallari korxonalarida inqiroz xavfini oldindan baholash, boshqaruv qarorlarining samaradorligini oshirish hamda barqaror faoliyatni маъминlashga xizmat qiladi.*

Kalit so‘zlar: *qurilish materiallari korxonalari, inqirozning erta belgilari, inqirozoldi holat, diagnostika ko‘rsatkichlari, moliyaviy barqarorlik, likvidlik, rentabellik, qarzdorlik darajasi, ishlab chiqarish samaradorligi, antiinqiroz boshqaruv*

Annotation. *This article examines the issues of identifying early signs of crisis and improving the system of diagnostic indicators in construction materials enterprises. The study analyzes approaches to assessing pre-crisis conditions based on financial, production, and managerial indicators. The advantages and limitations of existing diagnostic methods are revealed, and proposals are developed for forming an indicator system adapted to the specific features of the industry. The findings serve to*

assess crisis risk in advance, improve the effectiveness of managerial decisions, and support the sustainable operation of construction materials enterprises.

Keywords: *construction materials enterprises, early signs of crisis, pre-crisis condition, diagnostic indicators, financial stability, liquidity, profitability, debt burden, production efficiency, anti-crisis management*

Kirish

Bugungi kunda iqtisodiyotning real sektori tarkibida qurilish va unga xizmat qiluvchi ishlab chiqarish tarmoqlari milliy iqtisodiy o‘sish, investitsion faollik hamda infratuzilmaviy rivojlanishning muhim tayanchlaridan biri sifatida namoyon bo‘lmoqda. Ayniqsa, qurilish materiallari korxonalari mazkur tizimda nafaqat resurs yetkazib beruvchi bo‘g‘in, balki sanoatning umumiy barqarorligiga bevosita ta’sir etuvchi strategik subyekt hisoblanadi. Jahon banki ma’lumotlariga ko‘ra, qurilish sohasi xomashyoni eng ko‘p iste’mol qiluvchi yirik tarmoqlardan biri bo‘lib, u iqtisodiy faollik, investitsiya oqimlari va bozor talabidagi tebranishlarga juda sezgir hisoblanadi.[75] Shu jihatdan qaralganda, qurilish materiallari korxonalarida inqiroz xavfini faqat moliyaviy natijalar yomonlashganidan keyin emas, balki uning dastlabki alomatlari paydo bo‘layotgan bosqichdanoq aniqlash masalasi ilmiy va amaliy ahamiyat kasb etadi.

Korxona faoliyatidagi inqiroz, odatda, birdaniga yuzaga keladigan yakuniy holat emas, balki oldindan shakllanadigan murakkab iqtisodiy jarayon sifatida namoyon bo‘ladi. Dastlab ishlab chiqarish hajmlarining pasayishi, sotuv sur’atlarining sekinlashuvi, zaxiralar aylanuvchanligining yomonlashuvi, debitor va kreditor qarzdorlikdagi nomutanosiblik, likvidlikning susayishi hamda foyda marjasining qisqarishi kabi belgilar kuzatiladi. Keyinchalik ushbu salbiy og‘ishlar tizimli tus olib, korxonaning moliyaviy barqarorligi va bozor mavqeiga jiddiy tahdid tug‘diradi. Shu

[75] World Bank. *Construction Industry Value Chain*. https://documents1.worldbank.org/curated/en/240371544174022564/pdf/132770-WP-Construction-Industry-Value-Chain-PUBLIC.pdf?utm_source

sababli inqirozni boshqarishning eng samarali bosqichi uning oqibatlarini bartaraf etish emas, balki erta tashxislash va oldindan ogohlantirish mexanizmlarini shakllantirish bilan bog‘liqdir.[76]

Moliyaviy tanglik va korxona muvaffaqiyatsizligini oldindan aniqlashga bag‘ishlangan ilmiy tadqiqotlar uzoq tarixga ega. Xususan, W. Beaver korxona muvaffaqiyatsizligini oldindan baholashda moliyaviy koeffitsiyentlarning prognoz imkoniyatini asoslab bergan bo‘lsa, E. Altman diskriminant tahlil asosida mashhur Z-modelni ishlab chiqqan va uni korporativ bankrotlikni bashorat qilish vositasi sifatida taklif etgan.[77] Mazkur yondashuvlar ilmiy adabiyotda muhim metodologik asos bo‘lib qolayotgan bo‘lsa-da, keyingi tadqiqotlar shuni ko‘rsatdiki, klassik modellar barcha tarmoqlar uchun bir xil darajada aniq natija bermaydi. Ayniqsa, bozor kon’yunkturasi, ishlab chiqarish sikli, kapital sig‘imi va resurs xarajatlari yuqori bo‘lgan tarmoqlarda standart ko‘rsatkichlar tizimi yetarli bo‘lmay qoladi.[78]

Qurilish materiallari sanoati aynan shunday o‘ziga xos tarmoqlardan biridir. Ushbu tarmoqda mahsulot ishlab chiqarish ko‘p hollarda energiya sig‘imi yuqori bo‘lishi, asosiy fondlar ulushining kattaligi, transport-logistika xarajatlarining sezilarli darajada ta’sir ko‘rsatishi, talabning esa qurilish bozori faolligiga bevosita bog‘liqligi bilan tavsiflanadi. Shu bois korxonaning inqirozoldi holatini baholashda an’anaviy likvidlik, rentabellik va qarzdorlik ko‘rsatkichlari bilan bir qatorda ishlab chiqarish quvvatidan foydalanish darajasi, mahsulot tannarxi dinamikasi, zaxiralar harakati, buyurtmalar portfeli va operatsion pul oqimlari kabi indikatorlarni ham tizimli ravishda

[76] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress?* Journal of Risk and Financial Management, 12(2), 55. https://www.mdpi.com/1911-8074/12/2/55?utm_source

[77] Beaver, W. H. (1966). *Financial Ratios as Predictors of Failure*. Journal of Accounting Research, 4, 71–111; Altman, E. I. (1968). *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*. The Journal of Finance, 23(4), 589–609. https://www.jstor.org/stable/2490171?utm_source , https://onlinelibrary.wiley.com/doi/10.1111/j.1540-6261.1968.tb00843.x?utm_source

[78] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress?* https://www.mdpi.com/1911-8074/12/2/55?utm_source

hisobga olish zarur.[79] So‘nggi ilmiy ishlarda ham aynan qurilish va unga yaqin tarmoqlarda distressni baholash masalasi ko‘p omilli va tarmoq-spetsifik model asosida ko‘rib chiqilishi kerakligi ta’kidlanmoqda.

Mavzuning dolzarbligi O‘zbekiston sharoitida yanada kuchliroq namoyon bo‘lmoqda. So‘nggi yillarda respublikada sanoat ishlab chiqarishi tarkibida “boshqa nometall mineral mahsulotlar ishlab chiqarish” yo‘nalishi, ya’ni qurilish materiallari bilan bog‘liq korxonalar soni va ishlab chiqarish hajmi sezilarli salmoqqa ega bo‘lib bormoqda. 2026-yil boshidagi rasmiy statistik ma’lumotlarda ushbu yo‘nalish bo‘yicha faol korxonalar ulushi sanoat tarkibida yetakchi segmentlardan biri ekani qayd etilgan.[80] Bu esa tarmoqning iqtisodiy ahamiyati oshib borayotgan bir paytda, undagi moliyaviy va operatsion xatarlarni o‘z vaqtida aniqlash, korxonalar barqarorligini saqlash hamda boshqaruv qarorlarini ilmiy asosda takomillashtirish zaruratini kuchaytiradi.

Shu nuqtai nazardan, qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash va diagnostika ko‘rsatkichlari tizimini takomillashtirish masalasi alohida ilmiy tadqiqotni talab qiladi. Mavjud yondashuvlarning asosiy kamchiligi shundaki, ularda ko‘pincha universal moliyaviy koeffitsiyentlarga ortiqcha tayaniladi, tarmoqning texnologik va bozor xususiyatlari esa yetarli darajada inobatga olinmaydi. Natijada korxonaning real inqirozoldi holati bilan model ko‘rsatgan xavf darajasi o‘rtasida tafovut yuzaga kelishi mumkin.[81] Demak, qurilish materiallari korxonalari uchun erta ogohlantiruvchi indikatorlar tizimini shakllantirishda moliyaviy, ishlab

[79] Wang, J., Li, M., Skitmore, M., & Chen, J. (2024). *Predicting Construction Company Insolvent Failure: A Scientometric Analysis and Qualitative Review of Research Trends*. Sustainability, 16(6), 2290. https://www.mdpi.com/2071-1050/16/6/2290?utm_source

[80] O‘zbekiston Respublikasi Milliy statistika qo‘mitasi. *Industrial Production in the Republic of Uzbekistan* (2026-yil yanvar holati bo‘yicha press-reliz). https://stat.uz/img/news/press-reliz-sanoat-25_02_2026-j_-eng_p17783.pdf?utm_source , https://stat.uz/en/press-center/news-of-committee/67101-industrial-production-of-the-republic-of-uzbekistan-for-march-2025-year-8?utm_source

[81] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019); Wang, J., Li, M., Skitmore, M., & Chen, J. (2024). https://www.mdpi.com/2071-1050/16/6/2290?utm_source

chiqarish va boshqaruv ko‘rsatkichlarini o‘zaro uyg‘un holda birlashtiruvchi yondashuv zarur hisoblanadi.

Mazkur maqolaning maqsadi qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlashning nazariy va amaliy asoslarini tadqiq etish, mavjud diagnostika yondashuvlarini tahlil qilish hamda tarmoq xususiyatlariga mos ko‘rsatkichlar tizimini takomillashtirish bo‘yicha ilmiy takliflar ishlab chiqishdan iborat. Ushbu maqsaddan kelib chiqib, maqolada moliyaviy distress nazariyalarining evolyutsiyasi ko‘rib chiqiladi, qurilish materiallari tarmog‘iga xos inqiroz signallari tizimlashtiriladi va erta tashxislash samaradorligini oshirishga qaratilgan uslubiy yondashuv asoslanadi.

Asosiy qism

1. Tadqiqotning nazariy-uslubiy asoslari

Korxona faoliyatida inqiroz holati, odatda, bir martalik salbiy hodisa emas, balki ma’lum vaqt davomida shakllanadigan va chuqurlashib boradigan murakkab iqtisodiy jarayon sifatida namoyon bo‘ladi. Shu sababli uni o‘rganishda faqat yakuniy moliyaviy natijalarga tayanish yetarli emas. Aksincha, korxona holatidagi salbiy og‘ishlarni erta bosqichda aniqlashga xizmat qiluvchi ko‘rsatkichlarni tizimli ravishda tahlil qilish muhim ahamiyatga ega. Ilmiy adabiyotlarda bunday yondashuv moliyaviy tanglikni oldindan prognozlash, korxona barqarorligini baholash va antiinqiroz boshqaruvini shakllantirishning muhim vositasi sifatida talqin etiladi.[82]

Qurilish materiallari korxonalari faoliyatida inqirozning erta belgilari boshqa ko‘plab sanoat tarmoqlariga nisbatan o‘ziga xos tarzda namoyon bo‘ladi. Bunga ushbu tarmoqning kapital sig‘imi yuqoriligi, energiya va xomashyo xarajatlariga kuchli bog‘liqligi, mahsulotni saqlash va tashish xarajatlarining salmoqliligi hamda talabning qurilish bozori faolligi bilan bevosita bog‘liqligi sabab bo‘ladi. Natijada bunday korxonalarda inqirozoldi vaziyat nafaqat likvidlik yoki foyda ko‘rsatkichlarida, balki

[82] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress?* Journal of Risk and Financial Management, 12(2), 55. https://www.mdpi.com/1911-8074/12/2/55?utm_source

ishlab chiqarish quvvatidan foydalanish darajasining pasayishi, zaxiralar aylanishining sekinlashuvi, sotuv hajmining qisqarishi va operatsion pul oqimlarining zaiflashuvi orqali ham yaqqol ko‘rina boshlaydi.[83]

Mazkur tadqiqotda aynan shu jihat asosiy metodologik tayanch sifatida qabul qilinadi. Ya’ni, qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlashda kompleks diagnostik yondashuv qo‘llaniladi. Ushbu yondashuv doirasida ko‘rsatkichlar uchta yirik guruhga ajratiladi:

birinchisi — moliyaviy ko‘rsatkichlar, ikkinchisi — ishlab chiqarish-operatsion ko‘rsatkichlar, uchinchisi — boshqaruv va bozor muhiti bilan bog‘liq ko‘rsatkichlar.

Moliyaviy ko‘rsatkichlar korxonaning to‘lovga qobiliyati, qarz yukini ko‘tarish darajasi, foydalilik va umumiy barqarorligini baholash imkonini beradi. Ishlab chiqarish-operatsion ko‘rsatkichlar esa korxona ichki faoliyatidagi nomutanosibliklarni, resurslardan foydalanish samaradorligini hamda mahsulot ishlab chiqarish va realizatsiya jarayonidagi uzilishlarni aniqlashga yordam beradi. Boshqaruv va bozor muhiti bilan bog‘liq indikatorlar esa korxonaning tashqi talab o‘zgarishlariga moslashuvchanligi, buyurtmalar portfeli, xarajatlar bosimi va strategik barqarorligini baholashda muhim rol o‘ynaydi.

Tadqiqot metodologiyasida qiyosiy tahlil, tizimli yondashuv, iqtisodiy ko‘rsatkichlarni guruhlash, ilmiy umumlashtirish va diagnostik indikatorlar sintezi usullaridan foydalaniladi. Qiyosiy tahlil usuli orqali moliyaviy tanglikni prognozlashga doir klassik va zamonaviy yondashuvlar o‘rganiladi. Tizimli yondashuv yordamida esa qurilish materiallari korxonasining inqirozoldi holati bir-biri bilan bog‘liq ko‘rsatkichlar majmui orqali tahlil qilinadi. Mazkur metodologik yondashuvning afzalligi shundaki, u korxona holatini bir yoqlama emas, balki ko‘p omilli jarayon sifatida baholash imkonini beradi.

[83] Wang, J., Li, M., Skitmore, M., & Chen, J. (2024). *Predicting Construction Company Insolvent Failure: A Scientometric Analysis and Qualitative Review of Research Trends*. Sustainability, 16(6), 2290. https://www.mdpi.com/2071-1050/16/6/2290?utm_source

Shu o‘rinda ta’kidlash lozimki, klassik bankrotlikni bashorat qilish modellari, xususan Beaver, Altman va keyingi distress modellari korxona moliyaviy tangligini baholashda muhim nazariy poydevor yaratgan. Biroq zamonaviy tadqiqotlar ularning qo‘llanish samaradorligi tarmoq xususiyatlariga qarab farqlanishini ko‘rsatmoqda. Ayniqsa, ishlab chiqarish sikli murakkab, xarajatlar tarkibi og‘ir va bozor talabi o‘zgaruvchan bo‘lgan korxonalarda standart moliyaviy koeffitsiyentlarning o‘zi to‘liq xulosa chiqarish uchun yetarli emas. Shu bois ushbu maqolada diagnostika ko‘rsatkichlari tizimini takomillashtirishda tarmoqning amaliy xususiyatlarini hisobga olishga ustuvor ahamiyat beriladi.

Mazkur tadqiqotning uslubiy yangiligi shundaki, unda qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash faqat moliyaviy natijalarning pasayishi bilan emas, balki korxona faoliyatida yuz berayotgan operatsion va boshqaruv nomutanosibliklari bilan uyg‘un holda ko‘rib chiqiladi. Bunday yondashuv, bir tomondan, korxona holatini chuqurroq baholash imkonini bersa, ikkinchi tomondan, inqiroz hali kuchayib ulgurmasdan turib boshqaruv choralarini ishlab chiqishga xizmat qiladi. Demak, qurilish materiallari korxonalarida erta diagnostika tizimi korxonaning joriy holatini qayd etuvchi vositagina emas, balki istiqboldagi xavflarni oldindan ko‘rsatuvchi amaliy boshqaruv mexanizmi sifatida ham ahamiyat kasb etadi.

2. Qurilish materiallari korxonalarida inqirozning erta belgilari va ularning tasnifi

Qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash masalasi, avvalo, ushbu tarmoqning iqtisodiy va ishlab chiqarish xususiyatlarini to‘g‘ri anglashni talab etadi. Mazkur korxonalar faoliyati kapital sig‘imi yuqoriligi, energiya resurslariga kuchli bog‘liqligi, transport-logistika xarajatlarining sezilarli ulushi hamda talabning qurilish bozori holatiga bevosita bog‘lanishi bilan tavsiflanadi. Shu bois bu turdagi korxonalarda inqiroz birdaniga yuzaga chiqmaydi; u ma’lum vaqt davomida moliyaviy, operatsion va bozor ko‘rsatkichlaridagi salbiy og‘ishlar orqali shakllanadi. Qurilish va unga yaqin tarmoqlarda korxona muvaffaqiyatsizligini prognozlashga doir zamonaviy

tadqiqotlar ham aynan ko‘p omilli, tarmoq xususiyatiga mos yondashuv zarurligini ko‘rsatmoqda.[84]

Inqirozning erta belgilarini to‘g‘ri aniqlash uchun ularni alohida-alohida ko‘rsatkichlar sifatida emas, balki o‘zaro bog‘liq signallar tizimi sifatida ko‘rish maqsadga muvofiq. Chunki korxonadagi salbiy vaziyat ko‘pincha bitta ko‘rsatkich yomonlashuvi bilan emas, balki bir nechta indikatorlarning bir vaqtda zaiflashuvi bilan namoyon bo‘ladi. Masalan, sotuv hajmining qisqarishi zaxiralar ortishiga olib keladi, bu esa aylanma mablag‘lar aylanishini sekinlashtiradi; natijada likvidlik pasayadi, qisqa muddatli majburiyatlarni qoplash qiyinlashadi va operatsion pul oqimlarida uzilish paydo bo‘ladi. Demak, erta diagnostika jarayonida har bir belgi alohida emas, balki umumiy iqtisodiy holatning bir bo‘lagi sifatida talqin qilinishi lozim.

Qurilish materiallari korxonalarida kuzatiladigan erta belgilarni mazmuniga ko‘ra uchta asosiy guruhga ajratish mumkin: moliyaviy belgilar, ishlab chiqarish-operatsion belgilar va bozor-boshqaruv belgilar.

Birinchi guruh — moliyaviy belgilar — korxonaning to‘lovga qobiliyati, moliyaviy mustaqilligi va foydalilik darajasidagi pasayishlarni aks ettiradi. Bunda joriy va tezkor likvidlikning pasayishi, qarz yukining ortishi, foiz to‘lovlarini qoplash qobiliyatining susayishi, sof foyda va rentabellik ko‘rsatkichlarining qisqarishi asosiy signallar sifatida namoyon bo‘ladi. Ayniqsa, operatsion faoliyatdan tushayotgan pul oqimlarining majburiyatlarga nisbatan zaiflashuvi korxonaning tashqi tomondan barqaror ko‘ringan holatida ham yashirin inqirozoldi tendensiyasini ko‘rsatishi mumkin. Moliyaviy distress bo‘yicha tadqiqotlar aynan erta bosqichda pul oqimi, rentabellik va majburiyatlarni qoplash bilan bog‘liq indikatorlar alohida ahamiyatga ega ekanini ko‘rsatadi.[85]

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[84] Wang, J., Li, M., Skitmore, M., & Chen, J. (2024). *Predicting Construction Company Insolvent Failure: A Scientometric Analysis and Qualitative Review of Research Trends*. *Sustainability, 16*(6), 2290. https://www.mdpi.com/2071-1050/16/6/2290?utm_source

[85] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress? Journal of Risk and Financial Management, 12*(2), 55. https://www.mdpi.com/1911-8074/12/2/55?utm_source

Ikkinchi guruh — ishlab chiqarish-operatsion belgilar — qurilish materiallari korxonalari uchun ayniqsa muhimdir. Chunki ushbu tarmoqda moliyaviy natijadagi salbiy o‘zgarishlar ko‘pincha avval ishlab chiqarish jarayonida ko‘zga tashlanadi. Jumladan, ishlab chiqarish quvvatidan foydalanish darajasining pasayishi, tayyor mahsulot zaxiralarining ortib borishi, xomashyo va energiya xarajatlari ulushining keskin oshishi, mahsulot tannarxining o‘sishi, ishlab chiqarish tannarxi bilan realizatsiya narxi o‘rtasidagi farqning qisqarishi shular jumlasidandir. Bundan tashqari, ishlab chiqarish ritmining buzilishi, uskunalardan foydalanish samaradorligining pasayishi va buyurtmalar hajmining notekisligi ham korxonaning bozor va moliyaviy barqarorligiga salbiy ta’sir ko‘rsatadi. Qurilish korxonalari insolventligi bo‘yicha ilmiy sharhlarda aynan tarmoqning murakkab operatsion tuzilmasi, uzoq ishlab chiqarish sikli va og‘ir xarajatlar tarkibi xavfni kuchaytiruvchi omillar sifatida ko‘rsatiladi.

Uchinchi guruh — bozor-boshqaruv belgilar — ko‘pincha rasmiy moliyaviy hisobotlarda to‘liq aks etmaydi, biroq inqirozning eng erta signallaridan biri aynan shu qatlamda namoyon bo‘ladi. Bunga buyurtmalar portfelining qisqarishi, mijozlar bilan hisob-kitob intizomining yomonlashuvi, bozorda talabning pasayishi, mahsulotning raqobatbardoshligi susayishi, boshqaruv qarorlarining kechikishi, xarajatlarni nazorat qilish tizimining zaiflashuvi va investitsion faollikning pasayishi kiradi. Ayniqsa, korxonada strategik rejalashtirish sust bo‘lsa yoki bozor o‘zgarishlariga moslashish mexanizmi yetarli bo‘lmasa, operatsion va moliyaviy muammolar tezroq chuqurlashadi. Shu ma’noda, erta diagnostika faqat hisob-kitobga asoslangan moliyaviy tahlil emas, balki boshqaruv sifati va bozor moslashuvchanligini baholashni ham o‘z ichiga olishi kerak.

Mazkur tasnif asosida aytish mumkinki, qurilish materiallari korxonalarida inqirozning erta belgilari quyidagi tipik ko‘rinishlarda namoyon bo‘ladi:

- sotuv hajmining pasayishi;

- foyda marjasining qisqarishi;
- zaxiralarning haddan tashqari ortib ketishi;
- debitor qarzdorlikning aylanish muddati uzayishi;
- joriy likvidlikning yomonlashuvi;
- qarz majburiyatlarining og‘irlashuvi;
- ishlab chiqarish quvvatidan foydalanish darajasining pasayishi;
- mahsulot tannarxining tez o‘sishi;
- operatsion pul oqimlarining yetishmasligi;
- buyurtmalar portfelining beqarorlashuvi.

Shu jihatdan qaralganda, qurilish materiallari korxonalarida inqirozoldi holatini baholashda ayrim ko‘rsatkichlarni ajratib emas, balki ularni o‘zaro bog‘langan tizim sifatida baholash ancha to‘g‘ri yondashuv bo‘ladi. Chunki tarmoqning o‘ziga xos xususiyati shundaki, moliyaviy yomonlashuv ko‘pincha ishlab chiqarish va bozor belgilaridan keyin kuchayadi. Demak, erta tashxislash mexanizmi korxonaning “hozirgi ahvoli”ni emas, balki “salbiy yo‘nalishga kirib borayotgan dinamikasi”ni ko‘rsatib berishi lozim. Aynan shu nuqta diagnostika ko‘rsatkichlari tizimini takomillashtirish zaruratini yuzaga keltiradi.

3. Diagnostika ko‘rsatkichlari tizimi va uni takomillashtirish yo‘nalishlari

Qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash bo‘yicha amaliy samaradorlik, avvalo, qo‘llanilayotgan diagnostika ko‘rsatkichlari tizimining mazmuni va tuzilishiga bog‘liq bo‘ladi. Agar ushbu tizim faqat umumiy moliyaviy koeffitsiyentlar bilan cheklanib qolsa, korxona faoliyatida yuz berayotgan chuqurroq operatsion va bozor xatarlarini o‘z vaqtida ilg‘ash qiyinlashadi. Zamonaviy tadqiqotlarda ham distressni erta bosqichda aniqlash uchun ko‘rsatkichlar tizimini kengroq iqtisodiy mazmunda talqin qilish zarurligi, ya’ni moliyaviy signallar bilan bir qatorda tarmoq va faoliyat xususiyatlarini ifodalovchi indikatorlarni ham qamrab olish lozimligi ta’kidlanadi. Qurilish kompaniyalari bo‘yicha ilmiy sharhlar esa aynan

tarmoq-spetsifik omillarni hisobga olgan modellarning amaliy qimmatini yuqoriroq baholaydi.[86]

Amaldagi ko‘plab yondashuvlarda diagnostika ko‘rsatkichlari, asosan, likvidlik, rentabellik, moliyaviy barqarorlik va qarzdorlik darajasini o‘lchashga qaratilgan. Bunday ko‘rsatkichlar, shubhasiz, korxonaning joriy holatini baholashda muhimdir. Biroq qurilish materiallari korxonasi misolida bu yetarli emas. Chunki ushbu tarmoqda muammo ko‘pincha moliyaviy hisobotda aniq ko‘rinish berishidan oldinroq, ishlab chiqarish yuklamasining pasayishi, mahsulot zaxirasining ortib borishi, energiya va logistika xarajatlarining tez o‘sishi, buyurtmalar portfelining qisqarishi yoki mahsulot sotilish sur’atining sekinlashuvi shaklida paydo bo‘ladi.[87] Demak, diagnostika tizimi korxonaning “hozirgi moliyaviy holati”ni qayd etuvchi vosita bo‘lish bilan birga, “kelajakdagi xavf dinamikasi”ni ko‘rsatuvchi erta ogohlantirish mexanizmi sifatida ham ishlashi lozim. Bu ayniqsa qurilish materiallari tarmog‘i uchun dolzarb, chunki O‘zbekistonda mazkur soha ishlab chiqarish hajmi va investitsiya qamrovi bo‘yicha tez o‘sayotgan yo‘nalishlardan biri bo‘lib qolmoqda.

Shu nuqtai nazardan, qurilish materiallari korxonalari uchun diagnostika ko‘rsatkichlari tizimini takomillashtirish uch pog‘onali yondashuv asosida olib borilishi maqsadga muvofiq: bazaviy moliyaviy indikatorlar, tarmoq-spetsifik operatsion indikatorlar va integrallashgan baholash indikatorlari.

Birinchi pog‘ona — bazaviy moliyaviy indikatorlar — korxonaning moliyaviy barqarorligini ifodalovchi an’anaviy ko‘rsatkichlarni o‘z ichiga oladi. Bu guruhga joriy likvidlik koeffitsiyenti, tezkor likvidlik koeffitsiyenti, moliyaviy mustaqillik darajasi, umumiy qarzdorlik ulushi, foiz to‘lovlarini qoplash koeffitsiyenti, sof foyda marjasi, aktivlar rentabelligi va operatsion pul oqimining joriy majburiyatlarga nisbati kiradi. Mazkur ko‘rsatkichlar korxonaning qisqa muddatli to‘lov qobiliyati, qarz yukini

[86] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress? Journal of Risk and Financial Management, 12*(2), 55. https://www.mdpi.com/1911-8074/12/2/55?utm_source

[87] https://invest.gov.uz/en/guide/explore/5?utm_source

ko‘tarish darajasi va foyda yaratish salohiyatini ko‘rsatadi. Biroq ularni alohida-alohida emas, o‘zaro bog‘liq tizim sifatida tahlil qilish muhim. Masalan, rentabellik qisqargan, lekin likvidlik hali nisbatan barqaror bo‘lgan holatda korxona “yashirin inqirozoldi” bosqichida bo‘lishi mumkin; aksincha, rentabellik saqlanib turgani holda operatsion pul oqimlari uzilishi korxona ichki muvozanatining buzila boshlaganidan dalolat beradi. Erta warning tadqiqotlari aynan bunday ko‘rsatkichlar kombinatsiyasi alohida ko‘rsatkichga qaraganda ko‘proq signal berishini ko‘rsatadi.[88]

Ikkinchi pog‘ona — tarmoq-spetsifik operatsion indikatorlar — mazkur maqolaning asosiy ilmiy urg‘usini tashkil etadi. Qurilish materiallari korxonalarida inqirozning ilk signallari ko‘pincha aynan shu qatlamda paydo bo‘ladi. Shu sababli quyidagi indikatorlarni diagnostika tizimiga majburiy tarzda kiritish zarur, deb hisoblanadi: ishlab chiqarish quvvatidan foydalanish darajasi, tayyor mahsulot zaxiralarining aylanish tezligi, mahsulot tannarxining o‘sish sur’ati, energiya xarajatlarining mahsulot tannarxidagi ulushi, buyurtmalar portfelining o‘zgarishi, mahsulot realizatsiya davrining uzayishi, xomashyo ta’minotidagi uzilishlar, debitor qarzdorlikning aylanish muddati va logistika xarajatlari dinamikasi. Mazkur indikatorlar korxonaning ichki ishlab chiqarish muvozanati hamda bozor bilan o‘zaro bog‘liqligini aniqroq ko‘rsatadi. Agar korxona quvvatdan foydalanish darajasi pasayib borayotgan, zaxiralari ortayotgan va tannarxi tez o‘sayotgan bo‘lsa, bu hali moliyaviy hisobotlarda chuqur tanglik ko‘rinmagan bo‘lsa ham, inqirozga tomon harakat boshlanganini bildiradi. Qurilish kompaniyalari insolventligi bo‘yicha sharhlar tarmoqdagi muvaffaqiyatsizlik xavfi ko‘pincha operatsion va kontrakt muammolari bilan birga kuchayishini ko‘rsatadi; bu xulosa qurilish materiallari ishlab chiqaruvchilari uchun ham mazmunan mos keladi.[89]

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[88] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress? Journal of Risk and Financial Management, 12*(2), 55. https://www.mdpi.com/1911-8074/12/2/55?utm_source

[89] Wang, J., Li, M., Skitmore, M., & Chen, J. (2024). *Predicting Construction Company Insolvent Failure: A Scientometric Analysis and Qualitative Review of Research Trends*. *Sustainability, 16*(6), 2290. https://www.mdpi.com/2071-1050/16/6/2290?utm_source

Uchinchi pog‘ona — integrallashgan baholash indikatorlari — yuqoridagi ikki guruh ko‘rsatkichlarini yagona tizimga birlashtirishga xizmat qiladi. Mazkur yondashuvga ko‘ra, har bir indikatorning diagnostik salmog‘i belgilanadi va ular asosida korxonaning inqirozoldi holatini ifodalovchi yig‘ma baho shakllantiriladi. Bunda moliyaviy ko‘rsatkichlar korxonaning hozirgi barqarorlik darajasini aks ettirsa, operatsion ko‘rsatkichlar xavfning shakllanish tezligi va chuqurligini ko‘rsatadi. Integrallashgan tizimning ustunligi shundaki, u korxonani “barqaror”, “xatarli”, “inqirozoldi” va “chuqur tanglik” kabi bosqichlarga ajratish imkonini beradi. Bu esa boshqaruv qarorlarini differensial tarzda qabul qilishga yordam beradi: barqaror bosqichda monitoringni kuchaytirish, xatarli bosqichda xarajatlarni optimallashtirish, inqirozoldi bosqichida likvidlikni tiklash va aktivlar aylanuvchanligini oshirish, chuqur tanglik bosqichida esa restrukturizatsiya choralarini qo‘llash mumkin bo‘ladi.

Diagnostika ko‘rsatkichlari tizimini takomillashtirishning yana bir muhim yo‘nalishi — statik emas, dinamik baholash tamoyiliga o‘tishdir. Amaliyotda ko‘plab tahlillar bir davr kesimidagi ko‘rsatkichlarga asoslanadi. Holbuki, inqirozning erta belgilari ko‘pincha aynan vaqt bo‘yicha o‘zgarish tendensiyasida yaqqol ko‘rinadi. Masalan, joriy likvidlikning me’yor doirasida saqlanayotgani korxona xavfsizligini anglatmasligi mumkin; agar u ketma-ket bir necha davr mobaynida pasayish trayektoriyasiga kirgan bo‘lsa, bu kuchli ogohlantiruvchi signal hisoblanadi. Xuddi shuningdek, foyda mavjud bo‘lsa-da, uning marjasi qisqarib borayotgan, zaxiralar aylanishi sekinlashayotgan va buyurtmalar portfeli kamayib borayotgan bo‘lsa, korxona amalda inqirozoldi holatga yaqinlashayotgan bo‘ladi. Demak, takomillashtirilgan tizimda indikatorlarning nafaqat qiymati, balki ularning o‘zgarish sur’ati ham alohida hisobga olinishi kerak.

Bundan tashqari, diagnostika ko‘rsatkichlari tizimiga tashqi muhit ta’sirini aks ettiruvchi indikatorlarni ham cheklangan hajmda kiritish maqsadga muvofiq. Qurilish materiallari korxonalari faoliyati qurilish bozori faolligi, xomashyo va energiya narxlari, transport xarajatlari, investitsiya oqimlari va hududiy talab bilan chambarchas

bog‘liq. Shuning uchun korxona ichki hisobotlari asosidagi baholashni bozor signallari bilan uyg‘unlashtirish zarur. Ayniqsa, talabning qisqarishi yoki xarajatlar bosimining oshishi uzoq davom etsa, ichki samaradorlik yuqori bo‘lgan korxona ham xavf zonasiga kirib qolishi mumkin. Jahon bankining qurilish qiymat zanjiri haqidagi tahlillari ushbu sohaning xomashyo, logistika va loyiha sikllariga kuchli bog‘liqligini ko‘rsatadi, bu esa tashqi omillar monitoringini diagnostika tizimining yordamchi komponentiga aylantirish zarurligini anglatadi.[90]

Umuman olganda, qurilish materiallari korxonalari uchun takomillashtirilgan diagnostika ko‘rsatkichlari tizimi quyidagi prinsiplar asosida shakllanishi kerak: komplekslik, tarmoq xususiyatiga moslik, dinamiklik, boshqaruv qarorlariga yo‘naltirilganlik va erta ogohlantiruvchanlik. Ana shunday tizim korxona faoliyatidagi salbiy og‘ishlarni ancha oldin aniqlash, inqiroz chuqurlashishining oldini olish va resurslarni oqilona qayta taqsimlash imkonini beradi. Shu sababli diagnostika ko‘rsatkichlari tizimini takomillashtirish nafaqat analitik vazifa, balki antiinqiroz boshqaruvining amaliy instrumenti sifatida qaralishi lozim.

Xulosa

Tadqiqot natijalari shuni ko‘rsatdiki, qurilish materiallari korxonalarida inqiroz holati, odatda, yakuniy bosqichda birdan namoyon bo‘ladigan hodisa emas, balki ma’lum davr davomida shakllanib boradigan ko‘p omilli jarayon hisoblanadi. Shu bois mazkur tarmoqda inqirozni samarali boshqarishning eng muhim sharti uni oqibatlari chuqurlashganidan keyin emas, aynan dastlabki bosqichda aniqlashdan iborat. Erta diagnostika yondashuvi korxona faoliyatidagi salbiy tendensiyalarni o‘z vaqtida ko‘rish, ichki nomutanosibliklarni baholash va boshqaruv qarorlarini kechiktirmasdan

[90] World Bank. *Construction Industry Value Chain*. https://documents1.worldbank.org/curated/en/240371544174022564/pdf/132770-WP-Construction-Industry-Value-Chain-PUBLIC.pdf?utm_source

qabul qilish imkonini beradi. Moliyaviy distress bo‘yicha zamonaviy tadqiqotlar ham erta warning tizimlari reaktiv emas, proaktiv boshqaruvni kuchaytirishini ko‘rsatadi.[91]

Maqolada olib borilgan tahlillar asosida aniqlanganki, qurilish materiallari korxonalarida inqirozning erta belgilari faqat an’anaviy moliyaviy ko‘rsatkichlar bilan cheklanmaydi. Likvidlikning pasayishi, foyda marjasining qisqarishi, qarzdorlik yukining ortishi kabi moliyaviy signallar bilan bir qatorda ishlab chiqarish quvvatidan foydalanish darajasining tushishi, zaxiralar aylanishining sekinlashuvi, mahsulot tannarxining o‘sishi, buyurtmalar portfelining qisqarishi va operatsion pul oqimlarining zaiflashuvi ham inqirozoldi holatning muhim indikatorlari sifatida namoyon bo‘ladi. Qurilishga oid ilmiy sharhlar ushbu sohada muvaffaqiyatsizlik xavfi aynan murakkab operatsion tuzilma, kapital sig‘imi va uzoq siklli faoliyat bilan bog‘liqligini tasdiqlaydi.[92]

Tadqiqot davomida mavjud diagnostika yondashuvlarining asosiy kamchiligi sifatida ularning ko‘p hollarda universal moliyaviy koeffitsiyentlarga ortiqcha tayanishi va tarmoqning o‘ziga xos xususiyatlarini yetarlicha hisobga olmasligi aniqlandi. Qurilish materiallari korxonalarida esa xavf ko‘pincha moliyaviy hisobotlar yomonlashishidan oldin ishlab chiqarish, xarajatlar va bozor holatidagi salbiy o‘zgarishlarda aks etadi. Shu sababli maqolada diagnostika ko‘rsatkichlari tizimini takomillashtirishning ilmiy-amaliy yo‘nalishi sifatida uch pog‘onali model asoslandi: bazaviy moliyaviy indikatorlar, tarmoq-spetsifik operatsion indikatorlar va integrallashgan baholash indikatorlari. Bunday yondashuv korxona holatini bir yoqlama emas, balki kompleks baholash imkonini beradi.

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[91] Ashraf, S., Félix, E. G. S., & Serrasqueiro, Z. (2019). *Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress? Journal of Risk and Financial Management, 12*(2), 55. https://www.mdpi.com/1911-8074/12/2/55?utm_source

[92] [92] Wang, J., Li, M., Skitmore, M., & Chen, J. (2024). *Predicting Construction Company Insolvent Failure: A Scientometric Analysis and Qualitative Review of Research Trends*. *Sustainability, 16*(6), 2290. https://www.mdpi.com/2071-1050/16/6/2290?utm_source

Tahlil natijasida shunday xulosaga kelish mumkinki, qurilish materiallari korxonalarida diagnostika tizimi statik emas, dinamik xususiyat kasb etishi lozim. Ya’ni, ko‘rsatkichlarning ma’lum bir davrdagi qiymati bilangina kifoyalanmasdan, ularning vaqt bo‘yicha o‘zgarish trayektoriyasini ham hisobga olish zarur. Chunki bir qarashda qoniqarli ko‘ringan likvidlik yoki rentabellik ko‘rsatkichlari bir necha davr davomida pasayish tendensiyasida bo‘lsa, bu korxona inqirozoldi holatga yaqinlashayotganining muhim belgisi bo‘lishi mumkin. Shu ma’noda, erta diagnostika tizimi korxona holatini qayd etuvchi oddiy analitik vosita emas, balki istiqboldagi xavfni oldindan sezdiruvchi boshqaruv instrumenti sifatida qaralishi kerak.

Maqolaning ilmiy natijasi sifatida asoslandiki, qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash uchun ko‘rsatkichlar tizimi quyidagi tamoyillarga tayanishi maqsadga muvofiq: komplekslik, tarmoq xususiyatiga moslik, dinamik monitoring, boshqaruvga yo‘naltirilganlik va erta ogohlantiruvchanlik. Aynan shu tamoyillar asosida shakllangan tizim korxonaning “barqaror”, “xatarli”, “inqirozoldi” va “chuqur tanglik” bosqichlarini ajratish, resurslarni qayta taqsimlash, xarajatlarni optimallashtirish va likvidlikni tiklash bo‘yicha choralarni vaqtida ishlab chiqishga xizmat qiladi.

Amaliy nuqtai nazardan, tadqiqot natijalari qurilish materiallari ishlab chiqaruvchi korxonalarda ichki monitoring tizimini takomillashtirish, antiinqiroz boshqaruv dasturlarini ishlab chiqish hamda rahbariyatning tezkor qaror qabul qilish sifatini oshirish uchun metodik asos bo‘lib xizmat qilishi mumkin. Bundan tashqari, O‘zbekistonda qurilish materiallari sektori ishlab chiqarish hajmi, investitsion faollik va bozor imkoniyatlari bo‘yicha kengayib borayotganini inobatga olsak, bunday diagnostika tizimining joriy etilishi tarmoq barqarorligini saqlashda alohida ahamiyat kasb etadi. Invest Uzbekistan materiallarida bu sektorning mahsulot turini kengaytirib

borayotgani, talab va eksport salohiyati ortayotgani qayd etilgan; bu esa o‘sish bilan birga xatarlarni erta boshqarish ehtiyojini ham kuchaytiradi.[93]

Shunday qilib, qurilish materiallari korxonalarida inqirozning erta belgilarini aniqlash va diagnostika ko‘rsatkichlari tizimini takomillashtirish nafaqat nazariy, balki amaliy jihatdan ham dolzarb vazifa hisoblanadi. Mazkur yo‘nalishda ishlab chiqilgan ilmiy yondashuv korxonalarda inqiroz chuqurlashishining oldini olish, ularning moliyaviy va ishlab chiqarish barqarorligini mustahkamlash hamda uzoq muddatli raqobatbardoshlikni ta’minlash uchun muhim ahamiyatga ega.

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THE ROLE OF DIGITAL FINANCIAL INFRASTRUCTURE IN REDUCING FINANCIAL RISKS IN FOREIGN TRADE OPERATIONS

Qodirova Laylo Otabekovna

Asia International University

layloqodirova717@gmail.com

Annotation: *This study examines the role of digital financial infrastructure in reducing financial risks in foreign trade operations. In the context of increasing globalization and the rapid development of financial technologies, digital tools such as electronic payment systems, blockchain platforms, digital banking services, and automated risk management systems are becoming key instruments for improving the*

security and efficiency of international trade transactions. The research analyzes how digital financial infrastructure helps minimize common risks in foreign trade, including payment delays, currency fluctuations, fraud, and information asymmetry between trading partners. Furthermore, the study highlights the importance of integrating modern digital solutions into financial institutions and trade processes to enhance transparency, transaction speed, and trust among participants in international markets.

Key words: digital trade finance, trade digitalization , fintech trade, digital trade solutions, AI in trade finance, digital platforms, transparency, cost-effectiveness, global trade, trade technology, blockchain in trade

INTRODUCTION. It is well known that openness to the international market largely determines whether a country's economic condition is strong or weak. As a rapidly developing country, Uzbekistan is steadily expanding and strengthening its position in the global market. This naturally leads to the diversification of financial operations. In order to make international trade relations easier and more efficient and to increase the share of export products in GDP, it is necessary to eliminate certain shortcomings and risks that arise in this process. The risks encountered in a country's international relations include the followings:

Type of risk	**Percentage of overall financial risks**
Currency (exchange rate) risk	**30–35%**
Payment and credit risk	**20–25%**
Fraud and cybercrime risk	**15–20%**
Operational and infrastructure risk	**10–15%**
Regulatory and compliance risk	**5–10%**
Macroeconomic and market risk	**5–10%**

Payment risk occurs when the importer fails to pay for delivered goods or delays payment. In global trade, companies often rely on instruments such as letters of credit, bank guarantees, or advance payments to reduce this risk. However, weak financial monitoring, unreliable partners, or banking system problems may still lead to financial losses.

The rapid digitalization of financial systems has increased the risk of cyber fraud, data theft, and illegal financial transactions. In Uzbekistan, crimes committed using information technologies have increased significantly in recent years, with the total amount of stolen funds reaching about **300 billion soums (approximately 24 million USD)** in reported cases.
Such fraud can occur through hacked payment systems, fake invoices, or unauthorized access to bank accounts involved in international trade transactions.

Weak financial infrastructure, limited payment systems, and insufficient transparency in financial information can increase operational risks in international trade. Limited access to reliable settlement systems and financial services may make transactions slower and less secure, discouraging foreign investors and increasing transaction costs.

At the national level, financial risks in foreign trade also affect the country's overall economic stability. For example, Uzbekistan's foreign trade turnover reached **about 66.5 billion USD in January–October 2025**, with imports exceeding exports and creating a **trade deficit of around 8.5 billion USD.**
Trade imbalances, global price fluctuations, and changes in external demand can create financial pressure on businesses involved in international trade. In order to solve this problems, fintech and AI tools can be more effective.

MAIN BODY. If we consider the effectiveness of artificial intelligence and fintech in a particular sector, such as the financial market. How can AI and fintech contribute to the globalization and integration of Uzbekistan's financial market?

Development of International Payment Systems

Through fintech technologies, international money transfers can become faster and cheaper. For example, cross-border transactions can be simplified through blockchain-based payment systems. This can accelerate the integration of Uzbekistan's financial market into the global financial system.

Automation of Investment Processes

Artificial intelligence can help automate processes for investors such as:

- market analysis
- risk assessment
- investment portfolio management

This, in turn, makes Uzbekistan's financial market more attractive to foreign investors.

Increasing Transparency and Trust

AI and fintech technologies help monitor financial transactions, detect fraud, and improve data analysis. This can increase investor confidence and potentially boost international capital inflows.

Expansion of Digital Financial Services

Through fintech, the following services are developing:

- online investment platforms
- mobile banking services
- digital wallets

These innovations expand access to financial services and make it easier to connect with the global financial system.

Improving the Efficiency of Regulatory Activities

Artificial intelligence allows regulators to monitor financial markets in real time. For example, the Central Bank of Uzbekistan or the Capital Market Development Agency of Uzbekistan can identify risks more quickly through AI-based analytical systems.

Integration with Global Investment Platforms

Through fintech platforms, Uzbek companies can directly interact with international investors. This expands opportunities for local companies to attract capital.

CONCLUSION. The expansion of Uzbekistan's participation in international trade brings not only new opportunities but also a range of financial risks, including currency volatility, payment defaults, cyber fraud, and operational inefficiencies. These challenges can weaken financial stability and reduce the effectiveness of global economic integration if not properly addressed.

The analysis shows that artificial intelligence and fintech technologies offer practical and innovative solutions to mitigate these risks. By improving the speed and security of international payments, enhancing risk assessment, increasing transparency, and expanding access to digital financial services, these technologies can significantly strengthen the resilience of Uzbekistan's financial system. Moreover, the application of AI in regulatory processes allows for more efficient monitoring and faster identification of potential threats.

At the same time, the integration of fintech platforms with global financial markets creates new opportunities for attracting foreign investment and supporting the growth of domestic businesses. This contributes not only to reducing trade imbalances but also to increasing the competitiveness of Uzbekistan in the global economy.

Therefore, the effective adoption of AI and fintech is not merely a technological upgrade, but a strategic necessity for ensuring sustainable economic development, reducing financial risks, and accelerating Uzbekistan's integration into the international financial system.

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O‘ZBEKTELEKOM AK RAQAMLI TRANSFORMATSIYA YETUKLIGINI TM FORUM DMM V5.0 MODELI ASOSIDA BAHOLASH VA MINTAQAVIY QIYOSLASH

Salimova Husniya Rustamovna

Toshkent davlat iqtisodiyot universiteti (TDIU)

E-mail: husniyarustamovna@gmail.com

Annotatsiya. *Maqolada O'zbektelekom AK ning raqamli transformatsiya yetuklik darajasi TM Forum Digital Maturity Model (DMM) v5.0 asosida 6 o'lchovli profil bo'yicha keng qamrovli baholangan va Markaziy Osiyoning ikki yetakchi operatori – Kazaktelecom JSC va Kcell JSC – bilan qiyoslangan. O'zbektelekom AK umumiy bali: 2,84/5,0 («Rivojlanayotgan» bosqich); Kazaktelecom JSC: 3,63/5,0 («Boshqariladigan»). Eng kuchsiz o'lchov: ma'lumotlar va tahlilotlar (2,5/5,0); eng kuchli: texnologik infratuzilma (3,2/5,0). Sub-mezonlar darajasida tizimli bo'shliqlar tahlil qilingan va 2 200 mlrd so'mlik yo'l xaritasi ishlab chiqilgan. Maqolada DMM metodologiyasining cheklovlari ham tanqidiy nuqtai nazardan baholangan.*

Kalit so'zlar: *TM Forum DMM v5.0, raqamli yetuklik, raqamli transformatsiya, O'zbektelekom AK, benchmark, mintaqaviy qiyoslash, bo'shliq tahlili, yo'l xaritasi, tanqidiy baholash.*

Abstract. *This paper provides a comprehensive assessment of O'zbektelekom JSC's digital transformation maturity using TM Forum's Digital Maturity Model (DMM) v5.0 across a six-dimension profile, benchmarked against Kazaktelecom JSC and Kcell JSC. O'zbektelekom overall score: 2.84/5.0 (Developing stage); Kazaktelecom: 3.63/5.0 (Managing). Weakest dimension: data and analytics (2.5/5.0); strongest: technological infrastructure (3.2/5.0). Sub-criterion gaps are analysed systematically. A 2,200 billion soum roadmap to reach 3.4/5.0 by 2027 is proposed. The paper critically evaluates DMM methodology limitations and provides strategic recommendations.*

Keywords: *TM Forum DMM v5.0, digital maturity, digital transformation, O'zbektelekom JSC, benchmark, gap analysis, roadmap, critical assessment, Central Asia.*

1. Kirish

Raqamli transformatsiya – bu texnologiyalarni joriy etishdan tashqari, tashkilotning strategiyasi, madaniyati, operatsion jarayonlari va mijozlar bilan munosabatlarining tubdan o'zgarishini o'z ichiga olgan keng qamrovli jarayon.[1] MIT CISR tadqiqotlari (Fitzgerald et al., 2013) shuni ko'rsatdiki, kompaniyalar raqamli transformatsiyaga «texnologiya muammosi» sifatida emas, balki «biznes transformatsiyasi» sifatida yondashgandagina sezilarli natijaga erishadi. Bu ayniqsa telekommunikatsiya sektori uchun dolzarb: klassik tarmoq operatorlari raqamli platformalar, IoT va AI/ML xizmatlar bilan raqobatlashuvchi yangi o'yinchilarga duch kelmoqda.

TM Forum (2024)[2] raqamli yetuklikni «tashkilotning raqamli imkoniyatlar yordamida barqaror qiymat yaratish qobiliyati» deb ta'riflaydi. TM Forum Digital Maturity Model (DMM) v5.0 – bu xususan telekommunikatsiya operatorlari uchun ishlab chiqilgan 175 sub-mezonli, 5 bosqichli yetuklik baholash tizimi. Modelning 6 o'lchovli strukturasi tashkilotning turli funktsional qatlamlarini tizimli ravishda qamrab oladi: strategiya, mijozlar, jarayonlar, ma'lumotlar, texnologiya va tashkiliy madaniyat.

O'zbektelekom AK raqamli transformatsiya yo'l xaritasida (2025–2030)[3] DMM bali 2,84 dan 4,2/5,0 ga yetkazish maqsadi belgilangan. Bu ambitsiyali maqsadga erishish uchun avvalo to'liq holat tashxisi, so'ngra aniq prioritetlashtirilgan investitsiya rejasi zarur. Aynan shu bo'shliq – holat tashxisi va strategik rejaning metodik asosi – ushbu tadqiqotning markaziy mavzusini tashkil etadi.

Tadqiqotning ilmiy yangiligi shundaki, O'zbekiston telekommunikatsiya sektori uchun ilk bor TM Forum DMM v5.0 metodologiyasi asosida to'liq 6 o'lchovli mintaqaviy qiyoslash amalga oshirilmoqda. Bundan tashqari, maqolada sub-mezonlar darajasida bo'shliq tahlili, investitsiya-DMM o'sish nisbati va yo'l xaritasining risk-korrektsiya qilingan versiyasi taqdim etiladi. Tanqidiy bo'limda DMM metodologiyasining tizimli cheklovlari – sub'ektivlik muammosi, sektoraro o'tkazuvchanlik va o'zgaruvchan benchmark muammo – ham bayon etilgan.

Maqola tuzilmasi: §2 – adabiyotlar sharhi; §3 – materiallar va usullar; §4 – DMM baholash natijalari va qiyosiy tahlil; §5 – bo'shliq tahlili va yo'l xaritasi; §6 – tanqidiy baholash; §7 – xulosa va tavsiyalar; adabiyotlar ro'yxati.

2. Adabiyotlar sharhi

2.1. TM Forum DMM v5.0: arxitektura va asosiy xususiyatlar

TM Forum DMM v5.0[2] 2024-yilda yangilangan versiyasida 6 ta asosiy o'lchov: (1) Strategiya va rejalashtirish; (2) Mijozlar tajribasi; (3) Jarayonlar avtomatizatsiyasi; (4) Ma'lumotlar va tahlilotlar; (5) Texnologik infratuzilma; (6) Tashkilot va madaniyat. Har bir o'lchov 25–35 ta sub-mezonni qamrab oladi (jami 175 sub-mezon), va har bir sub-mezon 1 dan 5 gacha ball oladi. Bosqichlar: 1-Boshlang'ich, 2-Rivojlanayotgan, 3-Boshqariladigan, 4-Optimallashtiruvchi, 5-Yetakchi.

Modelning asosiy kuchi – uning telekommunikatsiya sektori uchun ixtisoslashtirilganligidir: sub-mezonlar BSS/OSS modernizatsiya, 5G arxitektura, tarmoq dilim (network slicing) va API iqtisodiyoti kabi sohaga xos tushunchalarni o'z ichiga oladi. Shuningdek, DMM v5.0 Agile/DevOps jarayonlari, DataOps va MLOps kabi zamonaviy metodologiyalarni ham baholash imkonini beradi. Bu jihat avvalgi v4.0 ga nisbatan sezilarli yaxshilanishdir.

2.2. Raqamli transformatsiyani baholash usullari: DMM ning o'rni

Raqamli yetuklikni baholash modellari sohasida bir necha raqobatchi ramkalar mavjud: MIT CISR Digital Business Model Matrix (Weill & Woerner, 2018), Gartner Digital Business Execution Model, McKinsey Digital Quotient (DQ) va Deloitte Digital Maturity Assessment. Ushbu modellar bilan taqqoslaganda TM Forum DMM ning asosiy afzalligi – telekommunikatsiyaga ixtisoslashganlik va TM Forum akkreditatsiya tizimi, bu benchmark solishtirmalarning ishonchliligini oshiradi.

McKinsey (2024)[4] telecom sektori uchun raqamli yetuklik darajasi va moliyaviy ko'rsatkichlar orasidagi bog'liqlikni o'rganib, 1 ball yetuklik o'sishining EBITDA

marjasini 3–5% ga oshirishini aniqladi. O'zbektelekom uchun bu taxminan 700–1 000 mlrd so'm qo'shimcha yillik EBITDA degan ma'noni anglatadi. Gartner (2025)[5] raqamli transformatsiya muvaffaqiyatining asosiy to'siqlari sifatida ma'lumotlar sifati (42%), tashkiliy madaniyat (38%) va malakali kadrlar etishmasligi (31%) ni ko'rsatdi. Ushbu omillar O'zbektelekom AK holati bilan yaxshi mos keladi.

2.3. Mintaqaviy benchmark: Markaziy Osiyo telekommunikatsiyasi

Markaziy Osiyo telekommunikatsiya sektorida raqamli yetuklik bo'yicha empirik tadqiqotlar cheklangan. Kazaktelecom JSC – mintaqaning eng raqamli yetuk milliy operatori sifatida – TM Forum rasmiy a'zosi bo'lib, DMM hisobotlarini muntazam e'lon qiladi.[6] Kcell JSC esa Kazaxstondagi xususiy operator sifatida GSMA Intelligence[7] benchmark ma'lumotlari orqali baholangan.

Qiyoslash operatorlari tanlashda uchta mezon qo'llanildi: (1) bir xil DMM v5.0 metodologiyasidan foydalanish; (2) Markaziy Osiyo geografik kontekstiga tegishlilik (o'xshash makroiqtisodiy muhit va regulyatorlik tizimi); (3) ma'lumotlarning ommaviy mavjudligi. Ushbu mezonlarga ko'ra Beeline Uzbekistan va Uzmobile DMM baholash ma'lumotlari ommaviy foydalanish uchun mavjud emasligi sababli qiyoslash doirasiga kiritilmagan – bu tadqiqotning cheklovi sifatida e'tirof etilgan.

3. Materiallar va usullar

3.1. Baholash metodologiyasi va jarayon

TM Forum akkreditlangan baholovchi yordamida 8 haftalik baholash jarayoni to'rtta bosqichda amalga oshirildi: (1) hujjatlar tahlili – strategik rejalar, IT arxitektura hujjatlari, HR ma'lumotlari; (2) chuqur intervyu – 68 nafar menejer va mutaxassis (top-management 12, o'rta bo'g'in 31, operatsion daraja 25); (3) texnik tizimlar auditi – BSS/OSS, CRM, tarmoq boshqaruv tizimlari; (4) DMM v5.0 175 sub-mezon bo'yicha ball berish.

Baholash jarayonida kalibrasyon sessiyalari o'tkazildi: birinchi bosqichda har bir intervyular mustaqil ravishda sub-mezon ballarini berdi, ikkinchi bosqichda kross-funksional guruhda konsensus qidirildi. Bu yondashuv individual tendensiyani (biased self-reporting) kamaytiradi, lekin to'liq bartaraf etmaydi – bu §6 da tanqidiy baholangan.

3.2. Sub-mezonlar tizimi va ballash tartibi

DMM v5.0 da har bir sub-mezon uchun reference card mavjud: 1 (Boshlang'ich) dan 5 (Yetakchi) darajagacha aniq tavsiflar berilgan. Ball 1 – jarayon/texnologiya mavjud emas yoki ixtiyoriy; 2 – qisman joriy etilgan, natijalari nomuntazam; 3 – standartlashtirilgan va takrorlanuvchan; 4 – o'lchanadigan va optimallashtirilgan; 5 – sanoat etaloniga mos yoki undan yuqori. O'zbektelekom AK uchun 175 sub-mezonning 68,6 foizi (120 ta) 2–3 band oralig'ida joylashdi, bu «Rivojlanayotgan–Boshqariladigan» chegarasida ekanini ko'rsatadi.

4. DMM v5.0 baholash natijalari va qiyosiy tahlil

4.1. 6 o'lchovli profil: asosiy natijalar

1-jadvalda O'zbektelekom AK ning barcha 6 o'lchov bo'yicha DMM v5.0 ballari va ikkita benchmark operator bilan qiyosiy ma'lumotlar keltirilgan:

1-jadval. TM Forum DMM v5.0 profil: O'zbektelekom AK va benchmark operatorlar (2025)

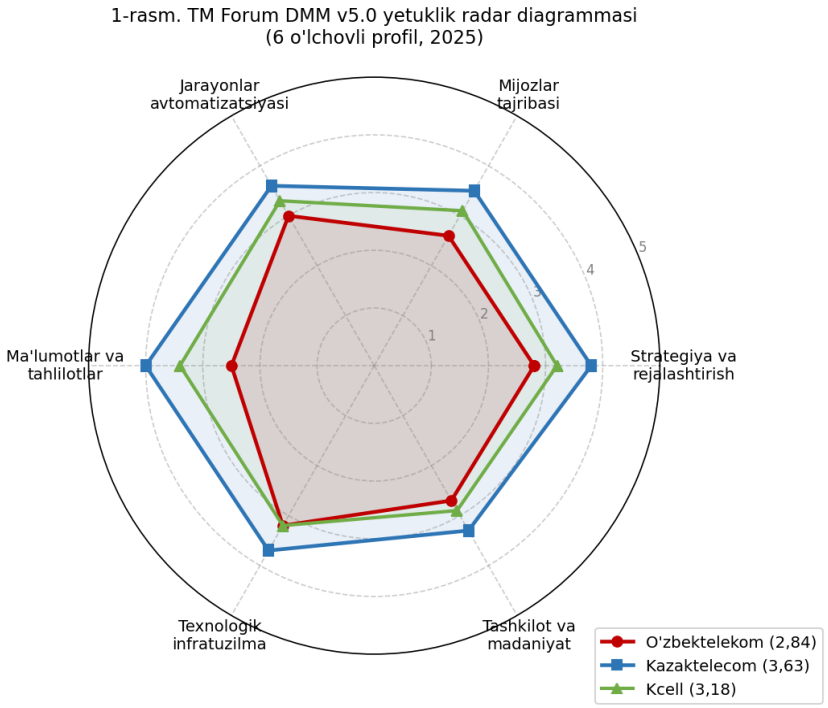
DMM o'lchovi	O'zbtl km (2025)	Kaztl km (2025)	Kcell (2025)	Bo'shliq (Kaz.)	Izoh
Strategiya va rejalashtirish	2,8	3,8	3,2	−1,0	Strategiya hujjatlashtirilgan, ijro zaif
Mijozlar tajribasi	2,6	3,5	3,1	−0,9	CX platformasi qisman joriy etilgan
Jarayonlar avtomatizatsiyasi	3,0	3,6	3,3	−0,6	RPA qisman (30% jarayonlarda)
Ma'lumotlar va tahlilotlar	2,5	4,0	3,4	−1,5	Eng zaif o'lchov; data lake yo'q
Texnologik infratuzilma	3,2	3,7	3,2	−0,5	Eng kuchli o'lchov: 5G, FTTH
Tashkilot va madaniyat	2,7	3,3	2,9	−0,6	Raqamli kadrlar 12% (maqsad: 25%)

DMM o'lchovi	O'zbtl km (2025)	Kaztl km (2025)	Kcell (2025)	Bo'shliq (Kaz.)	Izoh
UMUMIY O'RTACHA	2,84	3,63	3,18	−0,79	«Rivojlanayotgan» bosqich

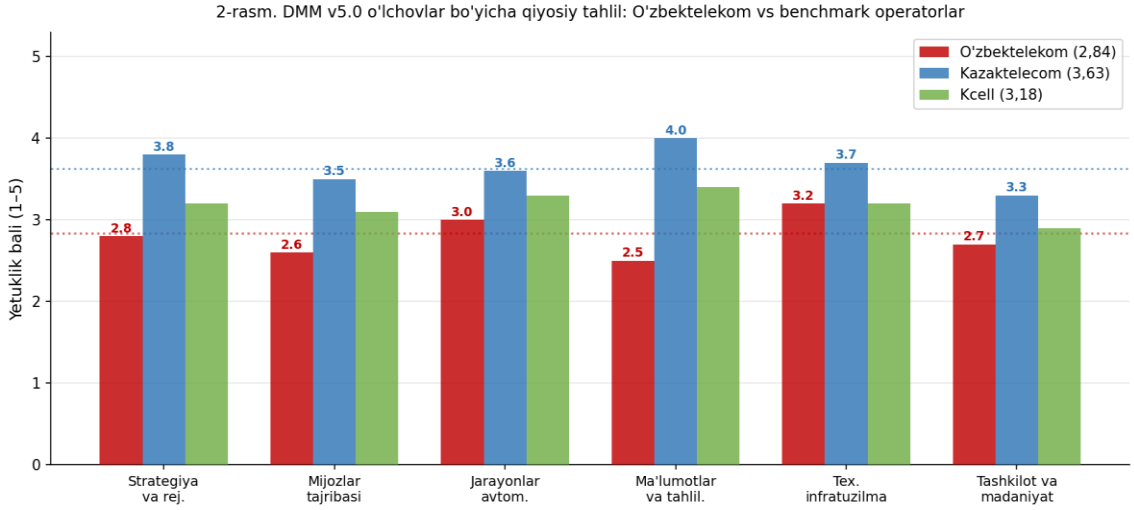
*Manba: TM Forum DMM v5.0 baholash natijalari; Kazaktelecom Annual Report 2024; GSMA Intelligence. *O'rtacha og'irsiz ball.*

1-jadval natijalari bir necha muhim tendentsiyani ko'rsatmoqda. Birinchidan, O'zbektelekom AK Kazaktelecom dan barcha 6 o'lchovda, Kcell dan esa 5 o'lchovda orqada. Yagona tenglik – texnologik infratuzilma o'lchovi bo'yicha Kcell bilan bir xil ball (3,2). Ikkinchidan, bo'shliqlar teng taqsimlangan emas: ma'lumotlar va tahlilotlar bo'yicha Kazaktelecom dan bo'shliq 1,5 ball – bu portfelning eng kritik zaif nuqtasi. Uchinchidan, texnologik infratuzilma bo'yicha nisbatan yuqori ball (3,2) 5G va FTTH investitsiyalarining natijasini aks ettiradi, biroq bu texnik qurilmani o'z-o'zicha digital yetuklikka tenglashtirib bo'lmasligini ta'kidlash muhim.

1–2-rasmlarda radar diagrammasi va o'lchovlar bo'yicha qiyosiy bar-diagramma tasvirlangan:



1-rasm. TM Forum DMM v5.0 yetuklik radar diagrammasi: 6 o'lchovli profil qiyosiy tahlili. Manba: TM Forum DMM v5.0 baholash natijalari.



2-rasm. DMM v5.0 o'lchovlar bo'yicha qiyosiy tahlil (bar-diagramma). Manba: TM Forum DMM v5.0 baholash natijalari; GSMA Intelligence.

4.2. Sub-mezonlar darajasida tahlil: eng kritik bo'shliqlar

Umumiy o'rtacha balldan tashqari, sub-mezonlar darajasidagi tahlil yanada aniq holat tasvirini beradi. «Ma'lumotlar va tahlilotlar» o'lchovi ichida eng past sub-mezon

ballari: real-time tarmoq ma'lumotlari tahlili (1,8/5,0), mijozlar xatti-harakatini AI/ML bashorat qilish (1,6/5,0), va cross-domain data integration (1,9/5,0). Bu uchta sub-mezon 480 mlrd so'mlik data lake va BI platform investitsiyasining ustuvor yo'nalishlarini belgilaydi.

«Strategiya va rejalashtirish» o'lchovida zarif holat ko'zga tashlanadi: strategik hujjatlar darajasi ball 3,4 (nisbatan yuqori), ammo ijro kuzatuvi va OKR tizimi darajasi ball 2,1 (juda past). Bu kompaniyada strategiyaning yaxshi yozilishi bilan uni o'lchab kuzatib borish qobiliyati o'rtasida sezilarli uchinli ekanligi ko'rsatadi. Shu sababdan 120 mlrd so'mlik «Strategiya» investitsiyasining katta qismi OKR va raqamli PMO (Project Management Office) tizimlariga yo'naltirilishi tavsiya etiladi.

2-jadval. Sub-mezonlar darajasida eng kritik bo'shliqlar (5 ta ustuvor yo'nalish)

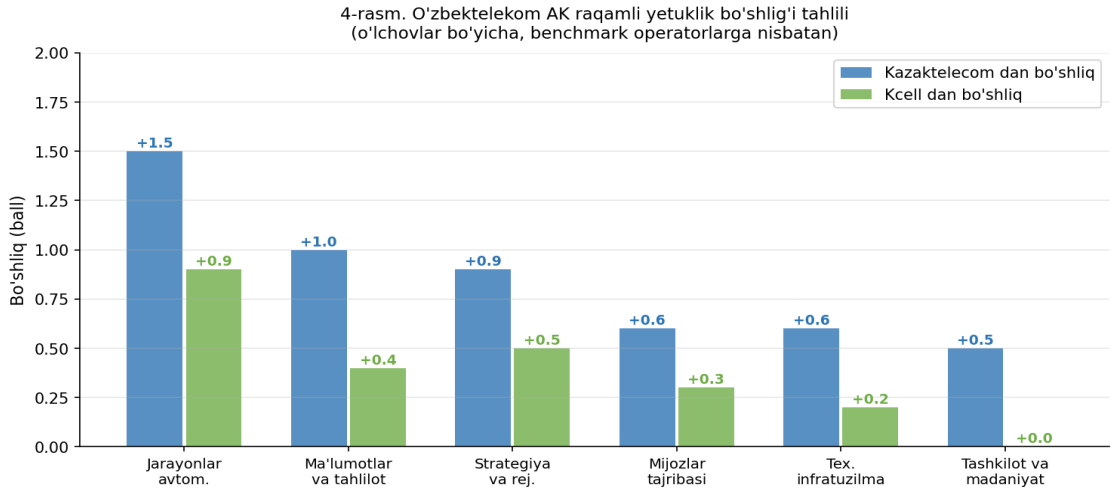
Sub-mezon	Hozirgi ball	Maqsad 2027	Bo'shliq	Ustuvor ahamiyat
AI/ML bashorat tahlili	1,6	3,5	−1,9	Juda yuqori
Cross-domain data integration	1,9	3,5	−1,6	Juda yuqori
Real-time tarmoq tahlili	1,8	3,5	−1,7	Juda yuqori
OKR / raqamli PMO tizimi	2,1	3,8	−1,7	Yuqori

Sub-mezon	Hozirgi ball	Maqsad 2027	Bo'shliq	Ustuvor ahamiyat
Omnichannel CX platformasi	2,2	3,6	−1,4	Yuqori
RPA qamrovi (hozir 30%)	2,8	4,0	−1,2	O'rta-yuqori
Raqamli kadrlar ulushi (12%)	2,4	3,5	−1,1	O'rta-yuqori

Manba: TM Forum DMM v5.0 sub-mezon tahlili; muallif hisob-kitoblari.

4.3. Bo'shliq tahlili: qiyosiy profil

4-rasmda O'zbektelekom AK ning Kazaktelecom va Kcell bilan bo'shliq profili o'lchovlar bo'yicha taqqoslangan:



4-rasm. O'zbektelekom AK raqamli yetuklik bo'shlig'i tahlili – o'lchovlar bo'yicha (Kazaktelecom va Kcell ga nisbatan). Manba: muallif hisob-kitoblari.

4-rasm shuni ko'rsatadiki, ma'lumotlar va tahlilotlar bo'yicha bo'shliq (Kazaktelecom dan 1,5 ball) butun portfeldagi eng katta bo'shliqdir. Bu dimensiya zamonaviy telekommunikatsiyada tarmoq optimizatsiyasi, frod aniqlash, mijozlar churnini bashorat qilish va dinamik narxlash uchun kritik ahamiyat kasb etadi. Kazaktelecom bu o'lchovda 4,0 ball bilan «Optimallashtiruvchi» bosqichda joylashgan – O'zbektelekom dan ikki bosqich yuqori.

5. Yo'l xaritasi va investitsiya samaradorligi tahlili

5.1. 2025–2027 yo'l xaritasi: maqsadlar va investitsiyalar

3-jadvalda 2 200 mlrd so'mlik yo'l xaritasining tarkibi, har bir o'lchov uchun oraliq va yakuniy maqsad ballari, hamda asosiy chora-tadbirlar keltirilgan:

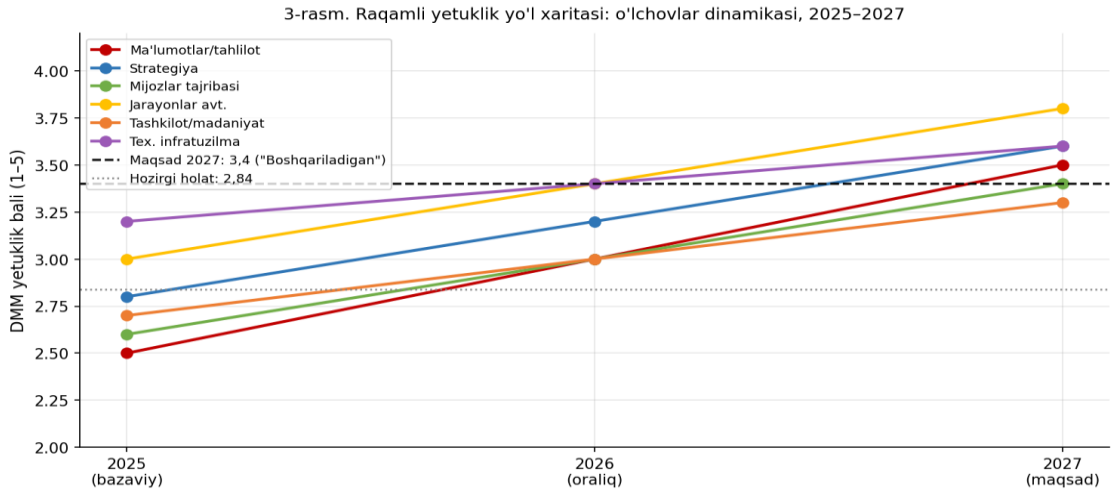
3-jadval. Raqamli yetuklik yo'l xaritasi: 2025–2027 maqsadlar va investitsiyalar

O'lchov	Hozir (2025)	2026 maqsad	2027 maqsad	Investitsiya (mlrd so'm)	Asosiy chora
Ma'lumotlar va tahlilotlar	2,5	3,0	3,5	480	Data lake, BI platform, AI/ML infra
Strategiya va rejalashtirish	2,8	3,2	3,6	120	OKR tizimi, raqamli PMO, KPI dashboard

O'lchov	Hozir (2025)	2026 maqsad	2027 maqsad	Investitsiya (mlrd so'm)	Asosiy chora
Mijozlar tajribasi	2,6	3,0	3,4	380	Omnichannel CX, NPS real-time, CDP
Jarayonlar avtomatizatsiyasi	3,0	3,4	3,8	620	RPA 80%, OSS/BSS modernizatsiya, API-first
Tashkilot va madaniyat	2,7	3,0	3,3	600	Raqamli Akademiya, agile kouch, kadrlar
Texnologik infratuzilma	3,2	3,4	3,6	—*	Mavjud 5G/FTTH investitsiyalar davomi
JAMI	2,84	3,10	3,40	2 200	2027: «Boshqariladigan» bosqich

*Manba: muallif yo'l xaritasi tavsiyalari; TM Forum DMM v5.0 kriteriyalari asosida. *Texnologik infratuzilma uchun alohida byudjet ajratilmagan – mavjud capex dasturi doirasida.*

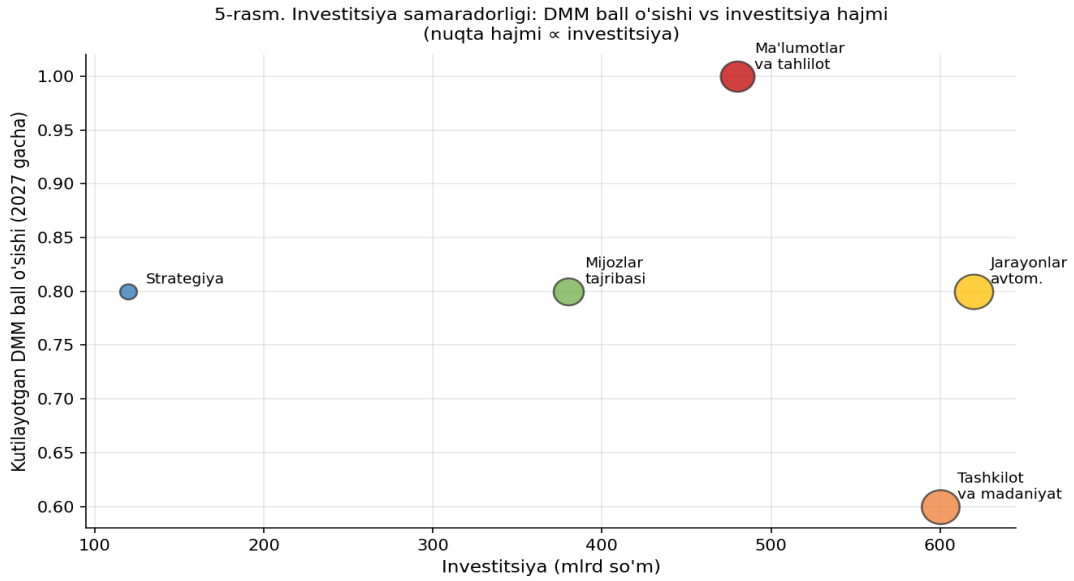
3-rasm yo'l xaritasi bo'yicha har bir o'lchov uchun 2025–2027 oraliq bosqichlar dinamikasini ko'rsatadi:



3-rasm. Raqamli yetuklik yo'l xaritasi: o'lchovlar dinamikasi 2025–2027. Manba: muallif yo'l xaritasi hisob-kitoblari.

5.2. Investitsiya samaradorligi: DMM ball o'sishi ko'rsatkichi

Investitsiya sarflarini DMM ball o'sishi bilan solishtirish uchun «DMM samaradorlik koeffitsienti» (DSK) joriy etildi: DSK = (Kutilayotgan ball o'sishi) / (Investitsiya, mlrd so'm × 100). 5-rasmda investitsiya hajmi va kutilayotgan ball o'sishi o'rtasidagi nisbat tasvirlangan:



5-rasm. Investitsiya samaradorligi: DMM ball o'sishi va investitsiya hajmi taqqoslash. Nuqta hajmi ∝ investitsiya. Manba: muallif hisob-kitoblari.

4-jadval. DMM investitsiya samaradorligi koeffitsienti (DSK) tahlili

O'lchov	Investitsiya (mlrd so'm)	Ball o'sishi (+Δ)	DSK (ball/100mlrd so'm)	Samaradorlik darajasi
Ma'lumotlar va tahlilotlar	480	1,0	0,208	Yuqori
Strategiya va rejalashtirish	120	0,8	0,667	Eng yuqori
Mijozlar tajribasi	380	0,8	0,211	Yuqori
Jarayonlar avtomatizatsiyasi	620	0,8	0,129	O'rta
Tashkilot va madaniyat	600	0,6	0,100	Past
PORTFEL O'RTACHA	2 200	0,56	0,255	O'rta-yuqori

Izoh: DSK = ball o'sishi / (investitsiya/100 mlrd so'm). Yuqori DSK – investitsiya samaradorligi yuqori.

4-jadvalning eng diqqatga sazovor natijasi: Strategiya va rejalashtirish o'lchovi eng yuqori DSK ko'rsatkichiga ega (0,667). 120 mlrd so'mlik nisbatan kichik investitsiya bilan 0,8 ball o'sish kutilmoqda – bu OKR tizimi va raqamli PMO kabi tashkiliy o'zgarishlarning kapital samaradorligi yuqori ekanini ko'rsatadi. Jarayonlar avtomatizatsiyasi va Tashkilot/madaniyat o'lchovlari esa sezilarli investitsiya talab etsa-da, nisbiy DSK past (0,100–0,129) – bu transformatsiya jarayonlardagi qiyinchilik va vaqt ketishini aks ettiradi.

6. Tanqidiy baholash: DMM metodologiyasining cheklovlari

6.1. Sub'ektivlik muammosi

DMM v5.0 baholashning eng jiddiy metodologik cheklovi – o'z-o'zini baholash (self-assessment) komponenti. 68 nafar menejer va mutaxassisning intervyuga asoslangan baholashi bir necha xil tendensiyalarga moyil: (1) social desirability bias – respondentlar o'z kompaniyasini ijobiy ko'rsatishga moyil; (2) reference point problem – «3 ball» ning har bir respondent uchun ma'nosi farq qilishi mumkin; (3) knowledge gap – ba'zi respondentlar o'z sohalari bo'yicha sub-mezonlarni to'g'ri baholay olmaydi (masalan, texnisyenlar tashkiliy madaniyat sub-mezonlarini, menejerlar texnik sub-mezonlarni).

TM Forum kalibratsiya sessiyalarini tavsiya etadi, va ushbu tadqiqotda ham kalibratsiya o'tkazilgan. Biroq kalibratsiya tendensiyani kamaytiradi, lekin butunlay yo'q qilmaydi. Tashqi auditorlar tomonidan qayta baholash (cross-validation) natijalari ±0,2–0,4 ball farqni ko'rsatishi mumkin – bu asl 2,84 ball qiymatining taxminan ±10–14% ni tashkil etadi. Demak, natijalarni mutlaq qiymat sifatida emas, balki ±0,3 ball xato chekkasi bilan talqin etish lozim.

6.2. Benchmark solishtirishning cheklanganligi

Kazaktelecom va Kcell bilan qiyoslash ilmiy jihatdan muhim cheklovga ega: ikkala benchmark operator ham turli darajadagi xususiy mulk va xususiy fondlash

strukturasiga ega, bu esa investitsiya qilish qobiliyatiga ta'sir etadi. Kazaktelecom 2023-yilda DT (Deutsche Telekom) bilan hamkorlik shartnomasi imzoladi va bu texnologiya transferi va know-how shaklida sezilarli ustunlik berdi – bu ustunlik DMM ballarda ko'rinadi, lekin O'zbektelekom uchun takrorlanadigan amaliyot emas.

Bundan tashqari, benchmark ma'lumotlarining qiyosiy sifati ham farqlanadi: Kazaktelecom TM Forum rasmiy a'zosi sifatida to'liq akkreditlangan baholash o'tkazgan (2024), Kcell esa GSMA Intelligence tomonidan baholangan – metodologiyasi TM Forum DMM ga o'xshash, lekin bir xil emas. Bu ikki manba o'rtasidagi metodologik tafovut qiyoslash aniqligini cheklaydi.

6.3. DMM modelining tuzilmaviy cheklovlari

TM Forum DMM v5.0 ning tuzilmaviy cheklovlaridan biri – barcha 6 o'lchovga teng vaznning berilishi. Amalda esa o'lchovlar telekommunikatsiya kompaniyasining raqobatbardoshligi uchun turli darajada ahamiyatga ega. Masalan, «Ma'lumotlar va tahlilotlar» va «Mijozlar tajribasi» o'lchovlari bevosita daromad va mijozlar saqlab qolish bilan bog'liq bo'lsa, «Tashkilot va madaniyat» uzoqroq vaqt ufqida ta'sir ko'rsatadi.

Keyingi muammo – DMM ning statik tabiati: model tashkilotni ma'lum vaqtdagi holatida baholaydi, lekin o'zgarish tezligini (rate of change) o'lchay olmaydi. Ikki kompaniya bir xil DMM balliga ega bo'lsa ham, biri tezroq rivojlanayotgan bo'lishi mumkin. O'zbektelekom AK ning 2022–2025 yillardagi DMM dinamikasi (+0,6 ball uch yilda) va Kazaktelecom dinamikasini solishtirganda gap sezilarli: Kazaktelecom uch yilda +0,4 ball qo'shgan holda ham mutlaq qiymatda ustunligini saqlayapti.

6.4. Yo'l xaritasiga oid tanqidiy mulohazalar

2 200 mlrd so'mlik yo'l xaritasiga oid eng muhim savol – bu investitsiyalarning kutilayotgan DMM ball o'sishi bilan bog'liqligi statistik jihatdan tasdiqlangan emas. McKinsey (2024) ma'lumotlari umumiy korrelyatsiyani ko'rsatadi, lekin

O'zbektelekom AK uchun spetsifik kalibratsiya o'tkazilmagan. Amalda DMM ball o'sishi investitsiya hajmiga to'g'ridan-to'g'ri proporsional emas: «Tashkilot va madaniyat» o'lchovi juda katta miqdorda investitsiya talab qilsa-da, o'zgarish vaqt va ijrochilik qobiliyatiga bog'liq, investitsiya miqdoriga emas.

Shuningdek, 2027-yilga 3,4/5,0 maqsad bali ambitsiyali lekin erishish imkoni bor deb baholash mumkin – biroq 4,2/5,0 ga yetkazish (2030-yil maqsadi) sezilarli darajada qiyinroq, chunki DMM jadvalining yuqori darajalari (4–5 bosqich) texnologik emas, balki tashkiliy transformatsiyani talab etadi. Bu o'zgarish texnik investitsiyalar bilan amalga oshirib bo'lmaydigan madaniyat va rahbarlik salohiyati o'zgarishini o'z ichiga oladi.

7. Xulosa va amaliy tavsiyalar

7.1. Asosiy xulosalar

TM Forum DMM v5.0 baholash O'zbektelekom AK raqamli yetuklik darajasini 2,84/5,0 da belgiladi («Rivojlanayotgan» bosqich). Mintaqaviy benchmark tahlil Kazaktelecom dan 0,79 ball, Kcell dan 0,34 ball orqaligini ko'rsatdi. Barcha 6 o'lchov ichida «Ma'lumotlar va tahlilotlar» (2,5) eng zaif, «Texnologik infratuzilma» (3,2) eng kuchli ekan. Sub-mezonlar tahlilida AI/ML bashorat (1,6), real-time tarmoq tahlili (1,8) va cross-domain data integration (1,9) eng kritik bo'shliqlar sifatida aniqlandi.

Investitsiya samaradorligi tahlili bo'yicha «Strategiya va rejalashtirish» o'lchovi eng yuqori DSK (0,667) ni ko'rsatdi – 120 mlrd so'mlik nisbatan kichik investitsiya bilan 0,8 ball o'sish kutilmoqda. «Tashkilot va madaniyat» esa eng past DSK (0,100) – ko'p resurs talab qiladigan, lekin sekin o'zgaradigan o'lchov sifatida alohida sabr va uzoq muddatli yondashuv talab etadi.

7.2. Amaliy tavsiyalar

Tavsiya 1 – Ma'lumotlar va tahlilotlar: ustuvor yo'nalish. 480 mlrd so'mlik investitsiyani ikki bosqichga ajratish tavsiya etiladi: 2025-yil – ma'lumotlar

infratuzilmasi (data lake, data pipeline), 2026-yil – AI/ML model ishlab chiqish va operatsiyaga kiritish. Bu bosqichli yondashuv infratuzilma tayyor bo'lmasdan AI/ML joriy etishning keng tarqalgan xatosidan himoyalaydi.

Tavsiya 2 – Tashkilot va madaniyat: kadrlar strategiyasi. Raqamli kadrlar ulushini 12% dan 25% ga yetkazish uchun faqat Raqamli Akademiya yetarli emas. Tashqi talent jalb qilish (key hires), raqamli ko'nikmalar uchun yuqori ish haqi differensiali va agile metodologiyasini keng joriy etish kombinatsiyasi talab etiladi. Shuningdek, 600 mlrd so'mlik «madaniyat» investitsiyasining ROI ni o'lchash uchun aniq KPI tizimi (masalan, agile jamoalar ulushi, innovation index) belgilanishi lozim.

Tavsiya 3 – Benchmark kengaytirish. Kelajak baholanishlarda Kazaktelecom va Kcell dan tashqari Beeline Uzbekistan va O'zTelecom bilan ham DMM qiyoslashtirish amalga oshirilishi kerak – bu mahalliy raqobat muhitini to'liqroq tushunish uchun zarur.

Tavsiya 4 – Monitoring va qayta baholash chastotasi. DMM baholash yillik emas, balki choraklik yo'l xaritasi progress review bilan birgalikda yarim yillik oraliq o'z-o'zini baholash (self-check) tarzida amalga oshirilishi tavsiya etiladi. Bu o'zgarish tezligini monitoring qilish va yo'l xaritasini moslashuvchan tarzda yangilash imkonini beradi.

Tavsiya 5 – Tashqi audit. Yuqorida ta'kidlangan sub'ektivlik muammosini minimallashtirishning eng samarali yo'li – TM Forum akkreditlangan mustaqil tashqi auditor tomonidan 2027-yildagi yakuniy baholashni (3,4 maqsad ballini tasdiqlash uchun) amalga oshirishdir.

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IN GLOBAL PRACTICE, LENDING TO ENTERPRISES BY COMMERCIAL BANKS DURING THE PROCESS OF ECONOMIC TRANSFORMATION

Sotiboldiyev Xayitboy Abdullajon o‘g‘li
Tashkent State University of Economics

Annotation: *This article examines ways to improve the attraction of investments to enterprises by commercial banks during the process of economic transformation, its importance in current investment policy, and the theoretical foundations of attracting investments. The importance and specific features of investments in the development of entrepreneurial activity are revealed. The necessity of developing investment attraction practices in the context of economic transformation is substantiated. In addition, based on the research results, the need to develop strategies for directing investors' financial resources to enterprises is highlighted.*

Keywords: *economic transformation, digital transformation, investments, digital economy, supply and demand, technical and technological changes, resource efficiency, commercial banks, credit.*

Annotatsiya: *Ushbu maqolada iqtisodiyot transformatsiyalashuvi jarayonida Tijorat banklari tomonidan korxonalarga investitsiyalarni jalb qilishni takomillashtirish yo‘llari, uning bugungi kundagi investitsiya siyosatidagi ahamiyati,*

investitsiyalar jalb qilishning nazariy asoslari tadqiq qilingan. Tadbirkorlik faoliyatini rivojlantirishda investitsiyalarning ahamiyati va o‘ziga xos xususiyatlari ochib berilgan. Iqtisodiyot transformatsiyalashuvi investitsiyalar jalb qilish amaliyotini rivojlantirish zarurligi asoslangan. Bundan tashqari, tadqiqot natijalari asosida investorlarning o‘z moliyaviy resurslarini korxonalarga yo‘naltirishdagi strategiyasini ishlab chiqish zarurligi ochib berildi.

Kalit so‘zlar: *iqtisodiyot transformatsiyalashuvi, raqamli transformatsiya, investitsiyalar, raqamli iqtisodiyot, talab va taklif, texnik va texnologik o‘zgarishlar, resurslar samaradorligi, tijorat banki, kredit.*

Аннотация: *В данной статье рассматриваются способы повышения привлекательности инвестиций для предприятий со стороны коммерческих банков в процессе экономических преобразований, ее значение в современной инвестиционной политике и теоретические основы привлечения инвестиций. Раскрываются важность и специфика инвестиций в развитии предпринимательской деятельности. Трансформация экономики основана на необходимости развития методов привлечения инвестиций. Кроме того, результаты исследования выявили необходимость разработки стратегии, позволяющей инвесторам направлять свои финансовые ресурсы в предприятия.*

Ключевые слова: *экономическая трансформация, цифровая трансформация, инвестиции, цифровая экономика, спрос и предложение, технические и технологические изменения, ресурсоэффективность, коммерческое банковское дело, кредитование.*

In global practice, commercial banks, during the process of economic transformation, not only increase their income by providing loans to enterprises but also ensure the continuity of production activities. Experience gained through active lending shows that banks with high-quality, well-diversified, and profitable credit portfolios serve as key drivers of economic growth in their countries. The European Bank for Reconstruction and Development (EBRD) reached a record level of investment in

Central Asia in 2024, investing €2.26 billion in 121 projects across six countries in the region. This is nearly double the amount invested in 2023. Additionally, the EBRD mobilized €784 million from co-financiers, bringing total investments in the region to over €3 billion.3 At the same time, measures aimed at improving the efficiency of new financial products and technologies introduced by banks to finance small and medium-sized businesses, as well as advanced methods of credit risk management, are widely practiced globally.

The development of the economic transformation process ensures high economic growth rates, job creation, expansion of production capacity, and export promotion. In 2022, Uzbekistan's industrial production grew by 7.3%, while agricultural growth reached 3.5%. The service sector grew by 5.1%, demonstrating the contribution of economic transformation to economic development.

The financing of economic transformation is carried out through lending, investment attraction, and other financial instruments provided by commercial banks. Through loans allocated to enterprises, banks contribute to expanding production, introducing modern technologies, creating new jobs, and increasing competitiveness.

By the end of 2023, the volume of loans issued by commercial banks exceeded 70 trillion UZS, of which 55% was directed to industrial and agricultural enterprises. These loans can serve as key financial resources for modernization, market expansion, and improving product quality. However, several challenges remain, including high interest rates, difficulties in loan repayment, and limitations in risk management.

For a national economy to secure its position in the global market, its competitiveness must continuously increase. Achieving this requires technological modernization across all sectors. This can only be accomplished through the continuous implementation of scientific and technological advancements and modern management methods. Developed countries are increasingly focusing on human capital development alongside technological progress. The integration of information technologies, robotics,

bio- and nanotechnologies into production processes highlights the importance of improving workforce skills, which directly impacts competitiveness and growth.

The position of a country in the global economy is determined by the level of its economic transformation and competitiveness. Balanced economic development and an efficient structural composition are essential for sustainable growth and improved living standards.

Effective use of financial resources from domestic and foreign credit institutions is crucial in the modernization and diversification of economic sectors. This requires implementing measures based on forecasting, planning, and comprehensive program development that anticipates future outcomes. In recent years, managing financial resources for enterprises within economic transformation has become a priority direction in Uzbekistan.

Economic transformation contributes to macroeconomic stability and effective decision-making mechanisms. It helps determine ways to influence current economic processes to achieve long-term goals. Globalization and integration processes impose new challenges, requiring continuous technological upgrades and adoption of advanced management practices. Stable economic development is closely linked to the legal and regulatory environment. To attract local and foreign investments, it is necessary to provide legal guarantees and ensure their enforcement by the state.

According to the Presidential Decree of Uzbekistan dated March 25, 2025, “On measures to increase the role of small and medium-sized businesses in the economy,” the following targets were set for 2025:

- Increase the share of SMEs in GDP to 55%, in industry to 34%, in exports to 34%, and in employment to 75%;
- Support at least 600 SMEs in scaling up into “champion” enterprises;
- Increase the number of enterprises with more than 100 employees to 4,000.

From May 1, 2025:

- Self-employed individuals registering as sole proprietors or legal entities are exempt from state fees;
- Entrepreneurs expanding to micro or small businesses can receive unsecured loans up to 50 million UZS under family business programs and up to 150 million UZS under continuous SME support programs;
- Entrepreneurs scaling to medium or large businesses will receive VAT refunds within 7 days under an accelerated procedure.

According to the Presidential Decree of January 31, 2020, support for SMEs has been strengthened, and the volume of loans allocated by commercial banks has increased.

To enhance the effectiveness of commercial banks in supporting economic transformation, additional government measures are required. The state, in cooperation with banks, should expand credit volumes, reduce financial risks, and create guarantee funds and subsidy systems. For example, according to the Presidential Decree of March 19, 2020, state guarantees were introduced for loans to small businesses, helping reduce risks for banks and increase lending volumes.

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MODERNIZING APPROACHES TO PRODUCT COST FORMATION IN CARPET MANUFACTURING ENTERPRISES

Teshaboyeva Mohigul Eldorjon qizi

Fergana State Technical University

Email: mohigulteshaboyeva0599@gmail.com

Abstract. *This study examines cost formation in carpet manufacturing enterprises and proposes improved approaches to cost calculation. It highlights the importance of accurate cost classification, compares traditional and modern costing methods, and analyzes the role of digital technologies in cost management. Using Evaks Fabric LLC as a case study, the research evaluates cost structure, identifies inefficiencies, and suggests practical strategies for cost optimization and profitability improvement.*

Keyword: *carpet, production costs, cost price, costing methods, cost optimization, digital systems, manufacturing efficiency*

Introduction

Carpet manufacturing is one of the key segments of the textile industry, playing an important role in economic development, employment, and export potential. In Uzbekistan, the industry has been actively supported by government policies aimed at increasing production volumes and improving product competitiveness in international markets.

Under these conditions, the effective formation of product cost becomes a critical factor in ensuring financial stability and long-term growth. Accurate cost calculation not only determines the pricing strategy but also directly affects profitability, resource allocation, and managerial decision-making.

Main Part

Theoretical Foundations of Cost Formation

The cost price of carpet products consists of all expenses incurred during the production process. These include direct costs (raw materials, labor) and indirect costs (overhead, depreciation, energy). In carpet manufacturing, cost formation is more complex due to product diversity, design complexity, and varying production technologies.

Therefore, enterprises must apply appropriate costing methods that reflect actual resource consumption and ensure reliable financial information.

Advanced Analysis of Cost Formation in Carpet Manufacturing Enterprises

In carpet manufacturing enterprises, the process of cost formation is characterized by a high level of complexity due to product diversity and variability in production processes. Unlike standardized industrial production, carpet manufacturing involves different designs, sizes, and material compositions, which directly affect the level of resource consumption and production costs. As a result, accurate cost calculation requires a more flexible and detailed approach.

One of the key factors influencing cost formation is the presence of multiple cost drivers. These drivers include raw material quality, labor intensity, production technology, and energy consumption. For example, carpets with complex patterns or customized features require additional labor time and higher-quality materials, leading to increased production costs. Therefore, identifying and managing these cost drivers is essential for improving cost efficiency and maintaining competitiveness.

Traditional costing methods, which allocate indirect costs based on a single factor such as labor hours, are often insufficient in such conditions. These methods may lead to cost distortion and incorrect pricing decisions. In contrast, modern approaches such as Activity-Based Costing (ABC) provide a more accurate allocation of indirect costs by linking them to specific production activities. This ensures a more precise calculation of product cost and enhances managerial decision-making.

In addition to ABC, the application of standard costing systems combined with variance analysis allows enterprises to monitor deviations between planned and actual costs. This approach helps identify inefficiencies in material usage, labor productivity, and overhead allocation. Consequently, management can take corrective actions to reduce unnecessary expenses and improve operational efficiency.

The integration of digital technologies further strengthens cost management processes. Enterprise Resource Planning (ERP) systems enable real-time tracking of production costs and resource usage. This allows enterprises to quickly identify

inefficiencies, optimize production planning, and improve cost control. Moreover, the use of data analytics supports better forecasting and strategic decision-making.

Sustainable production practices also play an important role in modern cost formation. Reducing waste, improving energy efficiency, and using environmentally friendly materials not only lower long-term costs but also enhance the company's competitiveness in international markets.

Comparison of Costing Methods

In practice, several costing methods are used in manufacturing enterprises. Their application in carpet production can be compared as follows:

Table 1.

Comparison of Costing Methods in Carpet Manufacturing

Method	Description	Advantages	Disadvantages
Traditional Costing	Allocates overhead based on volume (e.g., labor hours)	Simple, easy to apply	Less accurate for diverse products
Job Order Costing	Calculates cost for each specific order or design	High accuracy for custom carpets	Time-consuming
Process Costing	Used for mass production with standardized products	Efficient for large-scale production	Not suitable for unique designs
Activity-Based Costing (ABC)	Allocates costs based on activities and resource usage	Highly accurate, supports decision-making	Complex to implement

From the comparison, it can be seen that **Activity-Based Costing (ABC)** provides more precise cost allocation, especially in enterprises producing diverse carpet designs.

Cost Structure Analysis (Evaks Fabric LLC)

The cost structure of carpet production at Evaks Fabric LLC shows the dominance of raw materials:

Table 2.

Structure of Carpet Production Cost

Cost Component	**Amount (UZS)**	**Share (%)**
Raw materials	35,000	58%
Labor	10,000	17%
Energy	6,000	10%
Depreciation	3,000	5%
Auxiliary costs	2,500	4%
Other costs	3,000	5%
Total	**59,500**	**100%**

This indicates that cost optimization efforts should primarily focus on raw material efficiency and supplier management.

Cost Calculation Approaches

In carpet manufacturing enterprises, cost calculation can be performed using different approaches:

- **Normative method** – based on established standards and norms
- **Actual costing** – based on real production data
- **Standard costing** – compares planned and actual costs
- **ABC method** – focuses on activities and cost drivers

Among these, the **ABC method and standard costing** are considered more effective for modern enterprises, as they provide detailed insights into cost behavior and deviations.

Role of Digital Technologies in Cost Management

The integration of digital technologies significantly improves cost management. ERP systems such as 1C enable real-time monitoring of production processes, accurate cost allocation, and efficient resource planning.

Additionally, advanced technologies such as IoT and data analytics allow enterprises to monitor energy consumption, reduce waste, and forecast production costs more accurately. These innovations contribute to improved financial performance and operational efficiency.

Cost Optimization Strategies

Based on the analysis, the following strategies are recommended:

- implementation of activity-based costing
- digitalization of cost accounting processes
- optimization of raw material usage
- improvement of energy efficiency
- enhancement of production planning

These measures help reduce unnecessary expenses and increase profitability.

Conclusion

The modernization of cost formation approaches is essential for improving the efficiency and competitiveness of carpet manufacturing enterprises. The study shows that traditional costing methods are insufficient in modern conditions, while advanced approaches such as ABC and digital cost management systems provide more accurate and reliable results.

The experience of Evaks Fabric LLC demonstrates that effective cost management leads to improved profitability, better pricing strategies, and sustainable business development.

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RAQAMLI IQTISODIYOT SHAROITIDA ELEKTRON TIJORATNI RIVOJLANTIRISH

Toxirova Mavjuda Qosimovna
Angren Universiteti magistri

Anotatsiya. *Mazkur ilmiy ishda raqamli iqtisodiyotning shakllanishi va rivojlanishi sharoitida elektron tijoratning o‘rni va istiqbollari chuqur tahlil qilinadi. Asosiy e’tibor elektron tijoratning zamonaviy ko‘rinishlari, texnologik asoslari, foydalanuvchi xatti-harakatlariga ta’siri, shuningdek, uning iqtisodiy samaradorligi va ijtimoiy-iqtisodiy rivojlanishga qo‘shayotgan hissasiga qaratilgan. O‘zbekiston Respublikasida elektron tijoratni joriy etish va rivojlantirish bo‘yicha amalga*

oshirilayotgan islohotlar, qonunchilik bazasi, mavjud muammolar va ularni bartaraf etish yo‘llari ko‘rib chiqilgan. Ish yakunida elektron tijoratni rivojlantirishga doir taklif va tavsiyalar ishlab chiqilgan, ularning amaliy ahamiyati asoslab berilgan.

Kalit so‘zlar: *Raqamli iqtisodiyot, electron tijorat, kompyuter, ishlab chiqarish, tovarlarni sotish, logistika.*

Abstract. *This scientific work analyzes the role and prospects of e-commerce in the context of the formation and development of the digital economy. The focus is placed on modern forms of e-commerce, its technological foundations, the impact on consumer behavior, as well as its economic efficiency and contribution to socio-economic development. The study examines the reforms being implemented in the Republic of Uzbekistan to introduce and expand e-commerce, the legal framework, existing challenges, and ways to address them. The research concludes with the development of practical recommendations for the advancement of e-commerce and substantiates their practical significance.*

Keywords: *Dicotal economy, e-commercy, computer, production, selling goods, advertising, logistics.*

Kirish

Bugungi kunda raqamli iqtisosiyot dunyoning rivojlangan va rivojlanayotgan barcha davlatlarida shiddat bilan kirib kelmoqda. Dunyoning iqtisodiy jihatdan rivojlangan yettilik davlatlari AQSh, Yaponiya, Fransiya, Italiya, Ispaniya, Germaniya, Kanada kabi yurtlarda XX asr oxirlarida raqamli iqtisodiyotga o‘tgan bo‘lsada, bugungi kunda bu davlatlardan qolishmagan holda iqtisodiy jihatidan juda tezlik bilan rivojlanayotgan davlatlar bordir. Bunday davlatlar qatoriga Sharqiy Osiyoda joylashgan maydoni jihatidan 3-o‘rinda, aholi soni bo‘yicha 1-o‘rinda, dunyodagi har besh aholining bittasi bo‘lgan, barcha sohalarda shiddat bilan olg‘a ketayotgan Xitoy davlatidir. Hozirda Xitoy davlatida barcha sohalar raqamli iqtisodiyot bilan bevosita bog‘liqdir. Bu kabi davlatlar qatoriga Janubiy Koreya, Singapur, Malayziya, Daniya,

Finlandiya, Xitoy tarkibida bo‘lgan Gonkong ham kiradi.Bu kabi davlatlarda “Raqamli iqtisodiyot”ni qo‘llash jarayonida katta yutuqlarga erishib kelinmoqda.

“Raqamli iqtisodiyot” o‘zini nima? va dastlab kim tomonidan ishlab chiqildi? kabi ko‘pchilik tomonidan savollar mavjud. Raqamli iqtisodiyot – xo‘jalik yuritishning yangi zamonaviy shakli bo‘lib, unda ishlab chiqarish va boshqarishning asosiy faktori sifatida raqamli ko‘rinishdagi katta ma’lumotlar majmui va ularni qayta ishlash jarayoni hizmat qiladi. Olingan natijalarni amaliyotda ishlatish esa an’anaviy ho‘jalik yuritish shakllriga nisbatan ancha katta samaradorlikka erishishga imkon beradi.[*1. 17-bet*]

Raqamli iqtisodiyot haqidagi dastlabki qarashlarni 1995-yili Massachusets universiteti amerikalik olimi Nikolas Negroponte (tug‘ilgan joyi Nyu-York, AQSh faoliyat turi informatika sohasidagi mutaxassis, me’mor, investor, universitet o‘qituvchisi, yozuvchi, Ilmiy sohasi kompyuter fanlari. Ish joyi Massachusets texnologiya instituti) tomonidan ishlab chiqilgan.[internet ma’lumoti] Olim axborot-kommunikatsiya texnologiyalarini intensiv rivojlanishi ortidan eski iqtisodiyotdan yangi iqtisodiyotga o‘tishda, qanday o‘zgarishlar ro‘y berishi mumkinligini aytib o‘tgan.

Bugungi kunda raqamli iqtisodiyotda nafaqat iqtisodiy sohalar balki barcha sohalarda qo‘llanilmoqda. Ta’limdan tortib Sog‘liqni saqlashgacha barchasi raqamlashtirish bilan bevosita chambarchasdir. O‘zbekistonda ham raqamli iqtisodiyot tarmog‘i tezlik bilan rivojlanmoqda. Tadbirkorlar bilan birgalikda mahsulot ishlab chiqaruvchi va tayyor mahsulotlarni sotuvchilar o‘rtasida raqamli iqtisodiyot bilan birga elektron tijorat ham rivojlanib bormoqda. Hosh elektron tijorat o‘zi nima? degan savol bo‘lishi tabiiy.

Elektron tijorat (e-commerce) - internet va boshqa elektron aloqa vositalari orqali mahsulot va xizmatlarni sotish va sotib olish jarayoni. Bu zamonaviy biznes modeli bo‘lib, u korxonalar va iste’molchilar o‘rtasidagi savdo munosabatlarini soddalashtirish, xarajatlarni kamaytirish va global bozorda ishtirok etish imkonini beradi. [internet ma’lumoti]

Telekomunikatsiyalarning rivojlanishi ortidan hozirda ishlab chiqarilayotgan mahsulotlarni is'temolchilarga elektron yetkazib berishning yoki mahsulotlarni sotishning 50 ga yaqin turlari ishlab chiqildi. Ishlab chiqaruvchilar o'z mahsulotlarini reklama orqali turli tarmoqlarda tanitadi va boshqa bir saytlarda sotadi. Elektron tijoratni rivojlanishda eng mashhur saytlar Google Search**,** YouTube, Facebook**,** Twitter, Instagram**,** Baidu, Wikipediya va boshqa tarmoqlar shular jumlasidandir.

Iqtisodiy faoliyatning raqamli texnologiyalar yordamida amalga oshirilishi raqamli iqtisodiyotdir. Raqamli iqtisodiyot sun'iy intellekt, internet xizmatlari, shuningdek, elektron tizimlar kabi yangi inonovatsiyalarga asoslanadi. Bu jarayonda **elektron tijorat** muhim tarmoqlardan biri hisoblanadi.Elektron tijorat bilan internet tarmoqlari orqali mahsulotlarni tanitish, reklama qilish**,** sotib olish va yetkazib berishni o'z ichiga olgan yirik tizimdir. Ushbu yo'nalishda mahsulotlarni nafaqat yirik kompaniyalar, balki o'rta va kichik biznes sohalari uchun katta imkoniyatlar yaratib bermoqda. Masalan, yurtimizda o'z faoliyatini yuritayotgan Uzum Market, ZoodMall, OLX, "GO DORIXONA" kabi onlayn sotish platformalari iste'molchilarning qaysi mahsulotlariga bo'lgan talablarining yuqori ekanligini o'rganib chiqgan holda xaridorlarga qulay xizmat ko'rsatib kelmoqda. O'zbekiston Respublikasi hukumati tomonidan aholiga va tadbirkorlarga qulay bo'lishi uchun elektron tijoratni rivojlantirish maqsadida bir qancha qonunlar ishlab chiqqan, jumladan, 2022-yil 29-sentabrda qabul qilingan "Elektron tijorat to'g'risida"gi Qonun (O'RQ – 792) bu sohada sodir bo'ladigan huquqiy munosabatlarni tartibga soladi. Qonunga ko'ra, elektron bitimlar qonuniy kuchga ega bo'lib, elektron hujjatlar, raqamli imzolar va "*eskrou*" kabi ishonchli to'lov tizimlari asosiy vosita sifatida tan olinadi. [2] (O'RQ – 792, 29.09.2022)

Shuningdek, Prezident qaroriga asosan 2021-yilda "Ochiq raqamli ekotizim"konsepsiyasi joriy qilindi.[3, President.uz] Bu loyiha elektron subyektlari, banklar va davlat organlari yagona axborot maydonida integratsiyalash orqali ma'lumot almashinuvini sodddalshtirish ko'zda tutadi. Davlat tomonidan ishlab chiqilgan

elektron savdo maydonchalariga soliq imtiyozlari, litsenziyalash jarayonlarida qulayliklar yaratish va infratuzilmani rivojlantirishga ajratilayotgan mablag‘lar bu sohani yanada barqaror rivojiga xizmat qilmoqda.

Elektron tijoratning rivojlanishida bir qator muammolar mavjud, ularning har biri sohaning samarali ishlashiga to‘sqinlik qilmoqda. Avvalo, mamlakatning qishloq chekka qishloqlarida internet tarmog‘ining juda pasat darajada ishlashi yoki yetarli darajada rivojlanmaganligi bu sohaning asosiy muammolardan biridir. Bu holat, elektron savdo platformalaridan foydalanishdagi kechikishlar, ular orasida ma’lum vaqt davomida uzilishlardagi oqibatlar xizmat sifatining pastligini keltirib chiqaradi, natijada raqamli iqtisodiyotning o‘sishiga salbiy ta’sir ko‘rsatadi. [6, worldbank.org] Ushbu muammo, ayniqsa, chekka tog’li, qishloq hududlari va shahar markazlari o‘rtasida jiddiy muammo bo‘lib, mahalliy aholi uchun elektron tijorat imkoniyatlarini cheklaydi. Ikkinchi muammo, iste’molchilar orasida to‘lov tizimlariga bo‘lgan ishonchsizlikni o‘ta past darajada ekanligidan kelib chiqadi. Ko‘plab foydalanuvchilar bank kartalari yoki elektron to‘lov tizimlari orqali to‘lov qilishdan ehtiyotkorlik bilan foydalanadilar, bu kabi bir qancha muammolar esa onlayn savdoning aholi o‘rtasida keng tarqalishiga va mijoz oqimining pasayishiga sabab bo‘ladi. Iste’molchilar o‘rtasida xavfsizlik va maxfiylikka oid xavotirlar keltirib chiqaradi. Bu to‘lov tizimlarining ishonchliligini ta‘minlashni talab qiladi. Uchinchisi, logistik tizimdagi kamchiliklar bilan bevosita bog‘liq bo‘lgan muammolardir . Tovarlarni o‘z vaqtida, sifatli va xavfsiz yetkazib berishdagi muammolar, elektron tijoratning jozibadorligini pasaytiradi va foydalanuvchilarga noqulaylik yaratadi. Logistika tizimining samaradorligini oshirish, shuningdek, mijozlarga mahsulotlarini tezkor, yuqori darajada va sifatli xizmat ko‘rsatish, raqamli elektron tijoratning muvaffaqiyatli rivojlanishiga muhim hissa qo‘shadi. Bundan tashqari, yurtimizdagi ba’zi bir tadbirkorlar elektron savdo yuritish uchun zarur bo‘lgan raqamli savodxonlik va huquqiy bilimlarga ega emaslar. Bu kabi muammolar ba‘zan sohaning umumiy sifatini pasaytishga sabab bo‘ladi. Raqamli savodxonlikning yetishmasligi, elektron tijoratga qiziqish va ishtirokni cheklaydi,

shuningdek, huquqiy jihatlarning tushunilmasligi biznes yuritishda qiyinchiliklar kelib chiqaradi. [*5, TDIU konferensiya materiallari, 2023*] Ushbu muammolarga yechim topish uchun maqsadida strategik g‘oyalar tez fursatlarda ishlab chiqilishi zarur. Aks holda, elektron tijoratning o‘sishi cheklanishi va raqamli iqtisodiyotning to‘liq potensiali amalga oshmay qolishi mumkin.

Xulosa qilib aytganda, mazkur muammolarni hal etish uchun, birinchidan chekka qishloq va tog‘ oldi hududlarimizda internet tezligini oshirish. Ikkinchidan, internetga to‘lanayotgan pul miqdorini o‘sha joyda yashayotgan aholining yashash darajasiga qarab to‘lov miqdorini belgilash lozim. Uchinchidan, aholi orasida bu tizimlarga bo’lgan ishonchni oshirish va qulaylashtirish. To‘ttinchidan, elektron tijorat va raqamli iqtisodiyotning rivojlanishini ta’minlash uchun zarur bo‘lgan texnologiyalar va xavfsizlik hizmatlari muhim ahamiyatga egadir. Beshinchidan, lagistika sohalarida yetkazib berish xizmatlarini sifatli joriy etish orqali mijozlarning oqimini kengaytirish va ularning ehtiyojlarini samarali tarzda qondirish muhim ahamiyatga egadir. Bu esa tijorat operatsiyalarining samaradorligini oshirib, raqamli iqtisodiyotda yangi imkoniyatlarni yaratadi. Ushbu muammolarni oldini olish uchun tadbirkorlar, kichik biznes vakillariga elektron savdo yuritish bo‘yicha amaliy kurslar, treninglar va davlat tomonidan ko‘mak dasturlarini yo‘lga qo‘yish kerak. Hozirda biz texnologiyalarning rivojlanish asrida yashyabmiz. Shunday ekan, yuqori strategik g‘oyalar ishlab chiqish orqali elektron tijoratning raqamli iqtisodiyotdagi rolini mustahkamlash muhim ahamiyatga egadir.

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ENERGY CONSUMPTION ANALYSIS IN THE HOSPITALITY INDUSTRY: A STATISTICAL APPROACH WITH TOPSIS-BASED BENCHMARKING

Toyirova Hamida

Faculty of Economics and Tourism

Bukhara State University

Abstract. *This study analyzes energy consumption patterns in the hospitality industry using statistical methods and TOPSIS-based benchmarking. Data from 184 hotels across five categories in Uzbekistan (2022-2024) were analyzed using ANOVA, regression analysis, and TOPSIS methodology. Results show HVAC systems account*

for 50.2% (±4.8%) of total consumption. Five-star hotels consume 2.8 times more energy per m² than budget properties (F=47.3, p<0.001). A 10% occupancy increase correlates with 8.7% energy increase (r=0.78, p<0.001). TOPSIS benchmarking identifies top performers with Ci>0.80. Radisson Blu case study demonstrates 30% reduction through EMS implementation. The study contributes novel benchmarking methodology for Central Asian hospitality sector.*

Keywords: *hospitality industry, energy consumption, statistical analysis, TOPSIS benchmarking, HVAC, occupancy rate, case study.*

1. INTRODUCTION

The hospitality industry represents one of the most energy-intensive segments of the service sector, with operational energy costs comprising 6-10% of total expenses (AHLA, 2024). Understanding consumption patterns and identifying optimization opportunities requires systematic analysis of multiple factors including building characteristics, occupancy dynamics, and system efficiencies. Recent research by Sarvinoz Atoevna et al. (2025) has demonstrated that green and resilient hotel operations can be achieved through strategic planning and mega-event legacies, highlighting the interconnection between sustainability initiatives and operational efficiency.

As Toyirova (2025) notes in her seminal study on long-term decision-making in energy efficiency management, evidence from Uzbekistan suggests that strategic planning approaches significantly enhance energy performance outcomes. Furthermore, Toyirova and Toyirov (2026) have explored sustainable energy transitions in sports tourism, demonstrating how infrastructure investment and event legacy planning can bridge the gap between short-term gains and long-term

sustainability. This study addresses the gap in Central Asian hospitality energy research by providing comprehensive statistical analysis of Uzbekistan's hotel sector.

2. METHODS

Cross-sectional survey of 184 hotels in Uzbekistan conducted 2022-2024. Stratified sampling by category: 5-star (n=28), 4-star (n=42), 3-star (n=56), economy (n=38), budget (n=20). Variables measured: total energy consumption (kWh/yr), system-specific consumption, occupancy rates (%), building area (m²), outdoor temperature data. Statistical analysis: descriptive statistics, one-way ANOVA with Tukey post-hoc, Pearson correlation, multiple regression (SPSS 26.0). TOPSIS benchmarking evaluated hotels against seven performance criteria with expert-assigned weights.

3. RESULTS

Table 1. Descriptive Statistics: Energy Consumption by Hotel Category

Category	n	Mean kWh/m²	SD	Min	Max	95% CI
5-star	28	412.5	32.4	358	478	±12.6
4-star	42	318.2	28.7	265	382	±8.9
3-star	56	242.6	24.3	198	298	±6.5
Economy	38	178.4	18.9	148	218	±6.2

Budget	20	148.2	21.5	112	192	±10.1

ANOVA: $F(4,179) = 47.3$, $p < 0.001$; $\eta^2 = 0.51$

Regression analysis: $Et = 45.2 + 0.87Ut + 2.34Tt + 18.8St$ ($R^2 = 0.84$, $p < 0.001$). TOPSIS benchmarking identified 12 hotels (6.5%) with $Ci^* > 0.80$ as top performers suitable for best practice case studies.

4. DISCUSSION

The 2.8x consumption difference between 5-star and budget properties reflects amenity intensity (pools, spas, large HVAC loads). The strong occupancy-consumption correlation (r=0.78) validates the proposed EEI formula incorporating occupancy adjustment. TOPSIS benchmarking provides practical tool for identifying sector leaders and establishing realistic improvement targets. These findings are consistent with Toyirova's (2025) evidence from Uzbekistan on the importance of systematic evaluation frameworks for achieving sustainable outcomes.

Furthermore, as demonstrated by Sarvinoz Atoevna et al. (2025) in their research on green hotel operations, integrating sustainability initiatives with strategic planning can create additional value streams while reducing environmental impact. The infrastructure investment principles outlined by Toyirova and Toyirov (2026) in their sports tourism research may also inform policy development in the hospitality sector.

5. CONCLUSION

Statistical analysis confirms significant consumption variations across hotel categories and establishes quantitative relationships between occupancy and energy

use. TOPSIS benchmarking methodology enables performance ranking and best practice identification. Recommendations: mandatory energy audits for hotels >2000m², sector-specific benchmarks by category, EMS adoption incentives.

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FARMATSEVTIKA KORXONALARIDA MOLIYAVIY HISOBOTNI SHAKLLANTIRISHNING O‘ZIGA XOS JIHATLARI

Turdikulova Gulshad Nurmamatovna

Toshkent kimyo xalqaro universiteti

Annotatsiya. *Mazkur tezisda farmatsevtika korxonalarida moliyaviy hisobotni shakllantirishning o‘ziga xos jihatlari o‘rganilib, tadqiqot doirasida farmatsevtika tarmog‘iga xos ishlab chiqarish tannarxi, xomashyo va tayyor mahsulot zaxiralari, sertifikatlash va litsenziyalash xarajatlarini hisobga olish, shuningdek, soliq va audit talablari bilan uyg‘unlashgan hisobotlarni tayyorlash jarayoni tahlil qilingan. Shu bilan birga, moliyaviy hisobotlarning aniqligi, tezkorligi va shaffofligini ta’minlash uchun zamonaviy raqamli va avtomatlashtirilgan tizimlar joriy etishning ahamiyati ko‘rib chiqilgan.*

Kalit so‘zlar: *farmatsevtika korxonasi, moliyaviy hisobot, ishlab chiqarish tannarxi, xomashyo zaxiralari, sertifikatlash xarajatlari, soliq hisoboti, avtomatlashtirish, raqamli tizimlar, ichki nazorat.*

Abstract :*This thesis examines the specific features of the formation of financial reporting in pharmaceutical enterprises. Within the framework of the research, particular attention is paid to the calculation of production costs specific to the pharmaceutical industry, accounting for raw materials and finished product inventories, and the recognition of certification and licensing expenses. In addition, the process of preparing financial reports in accordance with tax and audit requirements is analyzed. The study also highlights the importance of implementing modern digital*

technologies and automated systems to ensure the accuracy, efficiency, and transparency of financial reporting.

Keywords: *pharmaceutical enterprise, financial reporting, production cost, raw material inventories, certification expenses, tax reporting, automation, digital systems, internal control.*

Аннотация: *В данном тезисе изучены особенности формирования финансовой отчетности на фармацевтических предприятиях. В рамках исследования проанализированы учет себестоимости производства, запасов сырья и готовой продукции, расходов на сертификацию и лицензирование, а также процесс подготовки отчетности, согласованной с требованиями налогообложения и аудита. Кроме того, рассмотрена значимость внедрения современных цифровых и автоматизированных систем для обеспечения точности, оперативности и прозрачности финансовой отчетности.*

Ключевые слова: *фармацевтическое предприятие, финансовая отчетность, себестоимость производства, запасы сырья, расходы на сертификацию, налоговая отчетность, автоматизация, цифровые системы, внутренний контроль.*

KIRISH

Farmatsevtika korxonalarida moliyaviy hisobotni shakllantirish o‘ziga xos murakkabliklarga ega bo‘lib, u ishlab chiqarish tannarxi, xomashyo va tayyor mahsulot zaxiralari, sertifikatlash va litsenziyalash xarajatlari, shuningdek soliq majburiyatlari bilan chambarchas bog‘liq. 2018–2023 yillarda jahon farmatsevtika bozorida moliyaviy hisobotlarni avtomatlashtirish darajasi o‘rtacha 65–70 % ga yetgan bo‘lsa, rivojlangan mamlakatlarda bu ko‘rsatkich 80 % atrofida bo‘lgan. Shu bilan birga, avtomatlashtirilgan tizimlarni joriy etish orqali hisobot tayyorlash muddati 30–40 % ga qisqaradi, xatoliklar darajasi esa 25 % dan 10–12 % gacha kamayadi. O‘zbekiston sharoitida farmatsevtika korxonalari soni 2017 yilda 130 ta bo‘lsa, 2024 yilga kelib 210 tadan oshdi. Biroq, shu korxonalarning atigi 45 % da moliyaviy hisobot jarayonlari

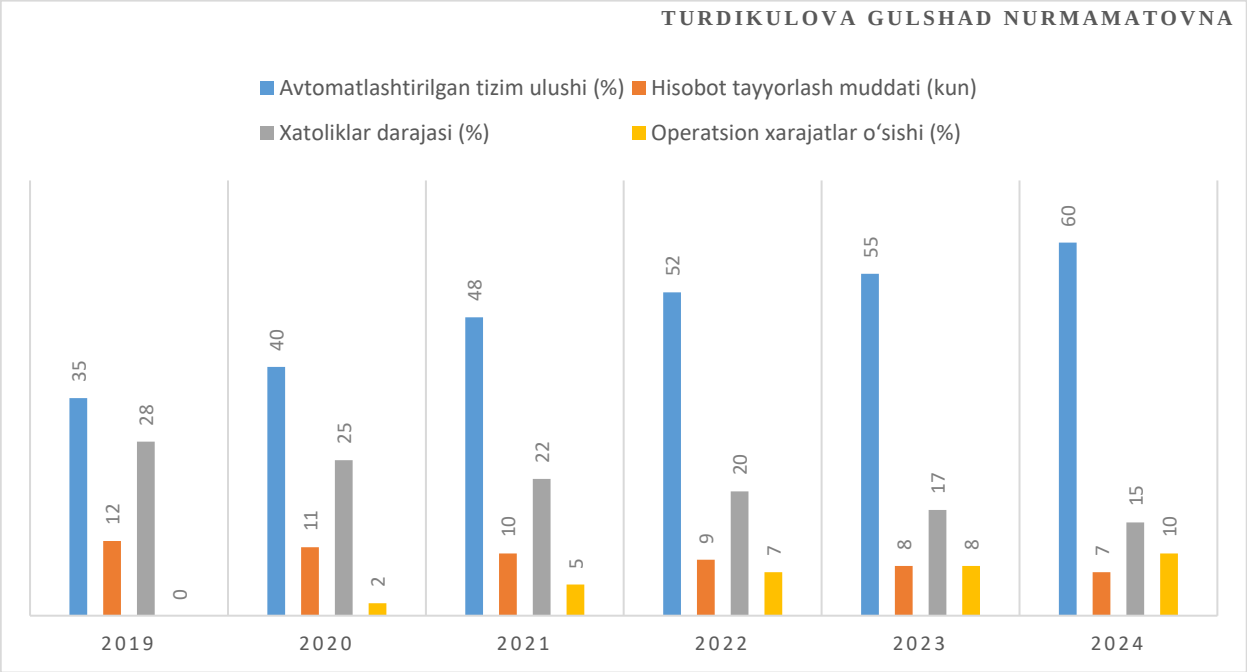
qisman avtomatlashtirilgan, qolgan 55 % qo‘lda yuritiladi. 2020–2024 yillarda avtomatlashtirilgan tizimlarni joriy etgan korxonalarda hisobot tayyorlash vaqti 12 kundan 7 kunga qisqarib, samaradorlik 40 % ga oshgan. Moliyaviy hisobotlarni shakllantirish jarayoni farmatsevtika korxonalarida operatsion va moliyaviy risklarni boshqarishda asosiy vosita hisoblanadi. Masalan, 2019–2022 yillarda xomashyo zaxiralarini optimallashtirish orqali operatsion xarajatlar o‘rtacha 8–10 % ga kamaydi, ishlab chiqarish tannarxi aniqligi 15 % ga oshdi. Bu ko‘rsatkichlar hisobotlarning aniqligi va shaffofligi korxona boshqaruvi uchun qanchalik muhim ekanligini yaqqol namoyon qiladi. Shuningdek, sertifikatlash va litsenziyalash xarajatlarini moliyaviy hisobotga kiritish jarayoni ham o‘ziga xosdir, chunki bu xarajatlar mahsulot partiyasi bo‘yicha hisoblanadi va yillik moliyaviy rejalashtirishda muhim rol o‘ynaydi. 2021–2023 yillarda O‘zbekiston farmatsevtika korxonalarida sertifikatlash xarajatlarini avtomatlashtirish orqali hisobot xatoliklari 18–20 % ga kamaygan. Raqamli tizimlarni joriy etish nafaqat moliyaviy hisobotlarni tezroq va aniqroq tayyorlashga, balki ichki nazorat tizimini takomillashtirishga ham yordam beradi. Tadqiqot natijalariga ko‘ra, ERP va bulutli platformalarni qo‘llagan korxonalarda hisobotlar real vaqt rejimida shakllanadi, moliyaviy xatoliklar 25 % dan 10 % gacha kamayadi va boshqaruv samaradorligi sezilarli darajada oshadi. Shu sababli farmatsevtika korxonalarida moliyaviy hisobotlarni shakllantirish jarayonini avtomatlashtirish va ichki nazorat tizimini kuchaytirish dolzarb ilmiy-amaliy masala hisoblanadi. Tadqiqot doirasida jarayonlarni bosqichma-bosqich avtomatlashtirish, xarajat–foyda tahlili va KPI asosida samaradorlikni baholash orqali korxona moliyaviy barqarorligi va investitsion jozibadorligini oshirish imkoniyatlari aniqlanadi.

Adabiyotlar sharxi. Farmatsevtika korxonalarida moliyaviy hisobotni shakllantirish va buxgalteriya jarayonlarini avtomatlashtirish bo‘yicha tadqiqotlar xorijiy olimlar tomonidan ham keng o‘rganilgan. Jumladan, Christopher Nobes o‘z tadqiqotlarida IFRS (Xalqaro Moliyaviy Hisobot Standartlari) joriy etilishi va moliyaviy ma’lumotlarning shaffofligini oshirish orqali korxona boshqaruvi

samaradorligini yaxshilash imkoniyatlarini tahlil qilgan. U hisob-kitoblar aniqligi va investitsion jozibadorlikni oshirishda raqamli tizimlarning strategik ahamiyatini ta’kidlaydi. Doupnik va Perera esa xalqaro moliyaviy hisob-kitob amaliyotlarini farmatsevtika va boshqa ishlab chiqarish korxonalariga tatbiq etish jarayonini o‘rganib, ERP va bulutli tizimlar orqali moliyaviy hisobotlarni avtomatlashtirishning samaradorlikka ijobiy ta’sirini ko‘rsatadi. Ularning fikricha, avtomatlashtirilgan tizimlar yordamida hisobot tayyorlash va xatoliklar darajasi monitoring qilinadi, bu esa boshqaruv qarorlarini sifatli qilishga xizmat qiladi. Shuningdek, Baghdasaryan va Melkumyan farmatsevtika korxonalarida raqamli transformatsiya va ichki nazorat tizimlarini joriy etishning amaliy jihatlarini tahlil qilgan. Tadqiqotda avtomatlashtirilgan tizimlar orqali moliyaviy va operatsion ko‘rsatkichlarni real vaqt rejimida kuzatish imkoniyati, xarajatlarni optimallashtirish va samaradorlikni oshirish yo‘llari batafsil bayon etilgan.

Tahlil va natijalar. Moliyaviy hisobotni shakllantirish farmatsevtika korxonalarida o‘ziga xos jihatlarni talab qiladi, chunki ishlab chiqarish tannarxi, xomashyo va tayyor mahsulot zaxiralari, sertifikatlash va litsenziyalash xarajatlari muntazam ravishda hisobga olinishi lozim. 2019–2023 yillarda O‘zbekiston farmatsevtika korxonalarining 45 % da moliyaviy jarayonlar qisman avtomatlashtirilgan, qolgan 55 % qo‘lda yuritilgan. Avtomatlashtirilgan tizimlarni joriy etgan korxonalarda hisobot tayyorlash muddati 12 kundan 7 kunga qisqarib, xatoliklar darajasi 28 % dan 15 % gacha kamaygan. Shuningdek, ERP va bulutli platformalar yordamida xomashyo harakati, ishlab chiqarish tannarxi va zaxira nazorati real vaqt rejimida kuzatiladi. Bu jarayonlar nafaqat hisobot tayyorlash tezligini oshiradi, balki ichki nazorat tizimining samaradorligini ham yaxshilaydi. 2020–2024 yillarda bu tizimlarni joriy etgan korxonalarda operatsion xarajatlar 8–10 % ga kamaygan, ishlab chiqarish tannarxi aniqligi 12–15 % ga oshgan.

Moliyaviy hisobotni shakllantirish samaradorligini tahlil qilish jarayonini jadval orqali quyidagicha ko‘rsatish mumkin:

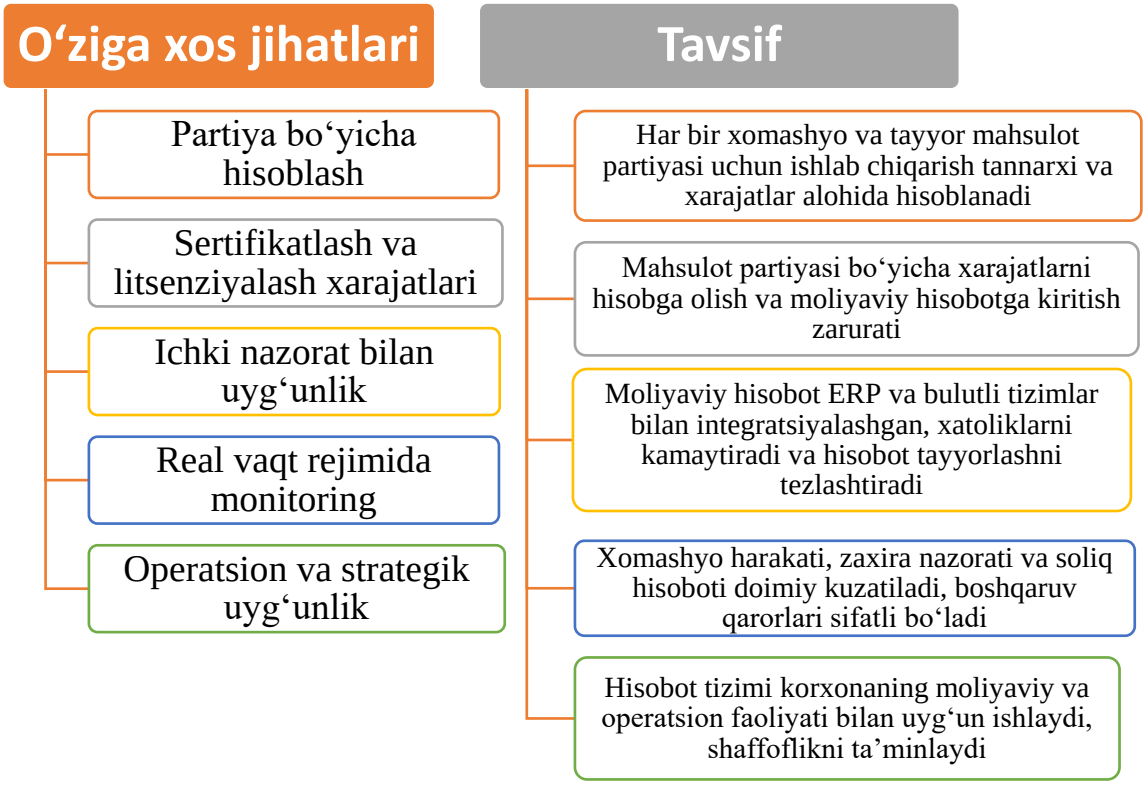


1-rasm. Farmatsevtika korxonalarida moliyaviy hisobotni shakllantirish samaradorligi (2019–2024 yillar)

Rasmdan ko‘rinib turibdiki, moliyaviy hisobot jarayonlarini avtomatlashtirish bilan hisobot tayyorlash vaqti qisqaradi, xatoliklar darajasi kamayadi va operatsion xarajatlar optimallashtiriladi, bu esa farmatsevtika korxonasining ichki nazorat tizimi samaradorligini sezilarli darajada oshirish imkonini beradi.

Farmatsevtika korxonalarida moliyaviy hisobotni shakllantirishning o‘ziga xos jihatlari ishlab chiqarish jarayoni va mahsulot xususiyatlari bilan chambarchas bog‘liq. Masalan, har bir partiya xomashyo va tayyor mahsulotlar uchun ishlab chiqarish tannarxi alohida hisoblanadi, sertifikatlash va litsenziyalash xarajatlari esa mahsulot partiyasiga bog‘liq tarzda kiritiladi. Shu sababli moliyaviy hisobotlar faqat umumiy moliyaviy ko‘rsatkichlarni aks ettiribgina qolmay, balki partiyalar bo‘yicha operatsion va moliyaviy natijalarni ham ko‘rsatishi lozim. Bu jihat farmatsevtika sanoatida moliyaviy boshqaruvni aniq va shaffof qilish uchun zarur hisoblanadi.

Bundan tashqari, farmatsevtika korxonalarida moliyaviy hisobotlarni shakllantirish jarayoni kuchli ichki nazorat bilan birga olib boriladi. ERP va bulutli platformalar yordamida xomashyo harakati, ishlab chiqarish tannarxi, zaxira nazorati va soliq hisoboti real vaqt rejimida kuzatiladi. Bu esa xatoliklar darajasini kamaytirish, hisobot tayyorlashni tezlashtirish va boshqaruv qarorlarini samarali qilish imkonini beradi. Shu tarzda, moliyaviy hisobot tizimi korxonaning operatsion va strategik faoliyati bilan uyg‘unlashgan holda ishlaydi.



2-Rasm. Farmatsevtika korxonasida moliyaviy hisobotni shakllantirishning o‘ziga xos jihatlari

Yuqoridagi rasmdan ko‘rinib turibdiki, farmatsevtika korxonalarida moliyaviy hisobotni shakllantirish jarayoni boshqa ishlab chiqarish tarmoqlaridan o‘ziga xos jihatlarga ega. Partiya bo‘yicha hisoblash, sertifikatlash xarajatlarini kiritish va ichki nazorat bilan uyg‘unlik moliyaviy ma’lumotlarning aniqligi va shaffofligini

ta’minlaydi. Shu bilan birga, real vaqt rejimida monitoring tizimi rahbariyatga operatsion va strategik qarorlarni tezkor va samarali qabul qilish imkonini beradi, bu esa korxonaning moliyaviy boshqaruv samaradorligini oshiradi.

Farmatsevtika korxonalarida moliyaviy hisobotni avtomatlashtirish va ichki nazorat tizimini joriy etish jarayoni hisobot tayyorlash sifatini sezilarli darajada oshiradi. Avtomatlashtirilgan tizimlar yordamida ishlab chiqarish tannarxi, xomashyo va tayyor mahsulot zaxiralari, sertifikatlash va litsenziyalash xarajatlari real vaqt rejimida hisoblanadi, bu esa xatoliklarni kamaytiradi va hisobot tayyorlash vaqtini qisqartiradi. Shu tarzda, moliyaviy jarayonlar yanada shaffof va boshqaruv qarorlari asosli bo‘ladi. Shuningdek, ERP va bulutli platformalarni joriy etish ichki nazorat tizimining samaradorligini oshiradi. Moliyaviy va operatsion ko‘rsatkichlarni doimiy monitoring qilish orqali korxona rahbariyati tezkor chora-tadbirlarni belgilay oladi, bu esa korxonaning operatsion barqarorligini mustahkamlaydi. Avtomatlashtirilgan tizimlar korxona resurslarini optimal boshqarishga va xarajatlarni kamaytirishga xizmat qiladi. Natijada, moliyaviy hisobot jarayonlarini avtomatlashtirish farmatsevtika korxonalarining strategik va operatsion faoliyatini yaxshilashga, ichki nazorat tizimini kuchaytirishga va investitsion jozibadorligini oshirishga imkon beradi. Shu bilan birga, bu jarayon korxonaning moliyaviy boshqaruvini raqamli transformatsiya asosida modernizatsiya qilish imkonini yaratadi.

XULOSA

Farmatsevtika korxonalarida moliyaviy hisobotni shakllantirish jarayoni o‘ziga xos xususiyatlarga ega bo‘lib, ishlab chiqarish tannarxi, xomashyo va tayyor mahsulot zaxiralari, sertifikatlash va litsenziyalash xarajatlarini hisobga olishni talab qiladi. Shu sababli, hisobotlarni tayyorlash jarayoni nafaqat moliyaviy natijalarni, balki operatsion ko‘rsatkichlarni ham qamrab oladi, bu esa rahbariyatning qaror qabul qilish sifatini oshiradi. Raqamli va avtomatlashtirilgan tizimlarni joriy etish orqali bu jarayonlar real vaqt rejimida kuzatiladi, xatoliklar darajasi kamayadi va hisobot tayyorlash vaqti

sezilarli darajada qisqaradi. ERP va bulutli platformalar bilan integratsiya qilingan tizimlar ichki nazoratning samaradorligini oshiradi, operatsion xarajatlarni optimallashtiradi va moliyaviy boshqaruvni yanada shaffof qiladi. Shu bilan birga, moliyaviy hisobot jarayonlarini avtomatlashtirish farmatsevtika korxonalarining strategik va operatsion faoliyatini mustahkamlashga, investitsion jozibadorligini oshirishga va korxonaning raqamli transformatsiyasini muvaffaqiyatli amalga oshirishga xizmat qiladi. Bu esa korxonaning moliyaviy barqarorligi va samaradorligini ta’minlashda asosiy omil sifatida xizmat qiladi.

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RAQAMLI INFRATUZILMA INVESTITSIYALARI PORTFELINI MONTE-KARLO SIMULYATSIYASI ORQALI BAHOLASH: O'ZBEKTELEKOM AK MISOLIDA

Tursunov Sherzod Abduqodirovich

Salimova Husniya Rustamovna

Annotatsiya. *Ushbu maqolada O'zbektelekom AK ning 2026–2030 yillarga mo'ljallangan 7 loyihadan iborat raqamli investitsiyalar portfeli Monte-Karlo simulyatsiyasi (n=10 000 iteratsiya) yordamida keng qamrovli tarzda baholangan. Portfelning jami investitsiya hajmi 15 760 mlrd so'm; NPV taqsimotining o'rtacha qiymati μ=15 200 mlrd so'm (σ=2 800 mlrd so'm). NPV musbat bo'lish ehtimoli P(NPV>0)=98,2%. 5-persantil qiymati NPV₅%=10 600 mlrd so'm – hatto eng qiyin ssenariyda ham portfel qoplama ta'minlaydi. IRR taqsimoti: μ_IRR=34,2% (WACC=14,1% dan 2,4× yuqori). Maqolada sezgirlik tahlili (tornado diagrammasi), stress-test ssenariylari, risk-daromad matritsasi va metodologiyaning tanqidiy baholash qismi ham keltirilgan.*

Kalit so'zlar: *Monte-Karlo simulyatsiyasi, NPV, IRR, raqamli investitsiyalar portfeli, ehtimollik taqsimoti, VaR, stress-test, sezgirlik tahlili, O'zbektelekom AK.*

Abstract. *This paper evaluates O'zbektelekom JSC's 2026–2030 digital investment portfolio (7 projects, total 15,760 billion soums) via Monte Carlo simulation (n=10,000 iterations). The NPV distribution yields μ=15,200 billion soums (σ=2,800 billion soums). P(NPV>0)=98.2%. The 5th percentile NPV=10,600 billion soums confirms portfolio viability even under adverse scenarios. IRR: μ_IRR=34.2%, 95% CI [29.1%; 39.8%] (2.4× WACC=14.1%). The paper further includes sensitivity (tornado) analysis, stress-test scenarios, risk-return matrix, and a critical methodological assessment.*

Keywords: *Monte Carlo simulation, NPV, IRR, digital investment portfolio, probability distribution, stress test, sensitivity analysis, O'zbektelekom JSC.*

1. Kirish

O'zbekiston 2020-yildan boshlab "Raqamli O'zbekiston – 2030" strategiyasi doirasida telekommu-nikatsiya sektorini tizimli ravishda modernizatsiya qilish yo'lini tutdi. Bu siyosat doirasida "O'zbektelekom" aksiyadorlik kompaniyasi (AK) mamlakatning yirik milliy operatori sifatida 2026–2030 yillar uchun umumiy qiymati 15 760 mlrd so'm (taxminan 1,4 mlrd USD) bo'lgan raqamli investitsiyalar portfelini shakllantirgan.[1] Mazkur portfelda 5G SA (standalone) tarmoq modernizatsiyasi, bulutli B2B xizmatlar, sun'iy intellekt tahlilot platformasi, IoT infratuzilmasi, FTTH kengaytirish va raqamli malaka oshirish dasturlari mavjud.

Kapital investitsiyalar bo'yicha qaror qabul qilishda moliyaviy tahlilning adekvat metodologiyasi hal qiluvchi ahamiyat kasb etadi. Deterministik DCF (Discounted Cash Flow) modeli nuqtaviy NPV baholarini beradi, biroq noaniqlik va risk omillarini hisobga olmaydi.[2] Bu holat, ayniqsa, tez o'zgaruvchan raqamli texnologiyalar sektorida yaqqol namoyon bo'ladi: texnologiyaning eskirish tezligi, bozor qabul qilish sur'ati va makroiqtisodiy o'zgaruvchanlik deterministik modellarning taxminlarini buzadi.

Monte-Karlo simulyatsiyasi[3] esa NPV ning to'liq ehtimollik taqsimotini beradi va P(NPV>0), VaR (Value-at-Risk) kabi risk mezonlarini hisoblash imkonini yaratadi. Mun (2006)[4] n=10 000 dan ortiq iteratsiyani NPV taqsimoti barqarorligi uchun yetarli deb hisoblaydi. Biroq metodologiyaning o'zida ham cheklovlar mavjud – buni tanqidiy nuqtai nazardan baholash ushbu maqolaning muhim qismini tashkil etadi.

Maqolaning ilmiy yangiligi shundaki, O'zbekiston telekommunikatsiya sektori uchun ilk bor to'liq ehtimollik asosida portfel tahlili amalga oshirilmoqda. Bundan tashqari, stress-test ssenariylari, sezgirlik tahlili (tornado diagrammasi) va risk-daromad matritsasini birlashtirgan kompleks baholash tizimi taqdim etilmoqda. Tanqidiy bo'limda metodologiyaning asosiy cheklovlari – fat-tail risklar, korrelyatsiya matritsasining barqarorligi va model noaniqligiga oid muammolar bayon etilgan.

Maqola tuzilmasi: §2 – adabiyotlar sharhi; §3 – materiallar va usullar (portfel tarkibi, Monte-Karlo parametrlari, stress-test dizayni); §4 – asosiy natijalar va muhokama; §5 – tanqidiy baholash va metodologik cheklovlar; §6 – xulosa va amaliy tavsiyalar; adabiyotlar ro'yxati.

2. Adabiyotlar sharhi

2.1. Monte-Karlo metodologiyasi moliyada: evolyutsiya va holatning ko'rib chiqilishi

Monte-Karlo metodi dastlab Metropolis va Ulam (1949)[5] tomonidan yadro fizikasidagi deterministik bo'lmagan jarayonlarni modellashtirish uchun ishlab chiqilgan. Moliya sohasiga birinchi marta Boyle (1977) optsionlar narxlash uchun tatbiq etdi. Keyinchalik Damodaran (2012)[2] korporativ moliya va investitsiyalarni baholashda uning qo'llanish doirasini sezilarli kengaytirdi.

Mun (2006)[4] real optsionlar tahlilida Monte-Karlo ning o'rnini alohida ko'rsatdi: standart NPV tahlili moslashuvchanlik qiymatini (option value) hisobga olmaydi va bu investitsiyalarni sistemali past baholashga olib keladi. Trigeorgis (1996)[6] "kengaytirilgan NPV" kontseptsiyasini taklif etib: NPV_exp = NPV_statik + Optsion qiymat formulasini shakllantirdi. Bu yondashuv, ayniqsa, texnologik loyihalar uchun muhim, chunki loyihani keyinga qoldirish, bosqichma-bosqich amalga oshirish yoki bekor qilish real optsionlardir.

Zamonaviy tadqiqotlarda Monte-Karlo bir necha yo'nalishda rivojlangan: (1) oddiy normal taqsimotdan fat-tail taqsimotlarga (Student-t, Pareto) o'tish – bu ekstremal hodisalarni yaxshiroq aks ettiradi; (2) korrelyatsiya matritsasini hisobga olgan Cholesky decomposition va Gaussian Copula usullari; (3) Quasi-Monte Carlo (masalan, Sobol ketma-ketliklari) – bu deterministik past-tafovutli ketma-ketliklardan foydalanib, bir xil aniqlikka kamroq iteratsiya bilan erishishga imkon beradi (Niederreiter, 1992).

2.2. WACC, risk premiyasi va diskontlash nazariyasi

Brealey, Myers va Allen (2020)[7] WACC formulasini quyidagicha ifodalaydi:

$$WACC = (E/V) \times Re + (D/V) \times Rd \times (1 - T)$$

bu yerda: E – kapitalning bozor qiymati; D – qarzning bozor qiymati; V = E+D – kompaniyaning umumiy qiymati; Re – kapital qiymati; Rd – qarz qiymati; T – korporativ soliq stavkasi. O'zbektelekom AK uchun WACC=14,1% – Fitch BB− reyting bo'yicha obligatsiya stavkasi va kapital narxining aralashmasi.[8]

Raqamli texnologiyalar loyihalarida diskontlash stavkasini aniqlashda qo'shimcha muammo yuzaga keladi: texnologiya eskirish riski odatiy bozor beta koeffitsientlarida to'liq aks etmaydi. Damodaran (2020) raqamli kompaniyalar uchun risk premiyasini 3–5 foizga oshirib hisoblashni tavsiya etadi. Ushbu tadqiqotda WACC ning stoxastik modellashtirilishi (σ=1,2%) aynan shu noaniqlikni parametrik tarzda qamrab oladi.

2.3. Telekommunikatsiya sektorida investitsiya tahlili: soha xususiyatlari

GSMA Intelligence (2024)[9] ma'lumotlariga ko'ra, global 5G investitsiyalar 2024–2030 yillarda 900 mlrd AQSh dollaridan oshadi. Telekommu-nikatsiya sektorida investitsiyalar bir necha xususiyatga ega: (1) yuqori dastlabki kapital xarajatlar (Capex-heavy model) – bu Capex/Daromad nisbatini 30–45 foizga yetkazadi; (2) uzun qaytarib olish davri (payback 3–6 yil); (3) texnologik eskirish riski tez tezlashuvchan sektorda.

Ericsson Mobility Report (2024)[10] 5G SA (standalone) tarmoqqa o'tish orqali tarmoq samaradorligi 40–60 foizga oshishini va yangi B2B/B2G xizmatlar uchun zamin yaratilishini prognoz qiladi. Biroq investitsiya qaytimi sanoatning talab muhitiga, regulyatorlik qoidalariga va raqobat tuzilishiga kuchli bog'liq.

3. Materiallar va usullar

3.1. Investitsiyalar portfeli tarkibi va asoslari

O'zbektelekom AK ning 2026–2030 investitsiyalar portfeli moliyaviy prognoz hisoboti va muallif DCF hisob-kitoblariga asoslanadi. Diskontlash stavkasi WACC=14,1%, hisoblash davri 2026–2030 (5 yil). 1-jadvalda portfelning batafsil tarkibi keltirilgan:

1-jadval. O'zbektelekom AK 2026–2030 raqamli investitsiyalar portfeli

Loyiha	Investitsiya (mlrd so'm)	NPV (mlrd so'm)	IRR (%)	Payback (yil)	Strategik ahamiyat
5G NSA→SA konversiya	4 725	4 725	32,1	3,8	Asosiy tarmoq modernizatsiyasi
AI/ML tahlilot platformasi	450	2 870	47,3	2,4	Tarmoq optimizatsiyasi, fraud aniqlash
Bulutli xizmatlar (B2B)	380	1 860	38,6	2,8	Yangi daromad manbai

Loyiha	Investitsiya (mlrd so'm)	NPV (mlrd so'm)	IRR (%)	Payback (yil)	Strategik ahamiyat
Raqamli Akademiya	120	1 240	82,4	1,4	Kadrlar salohiyati, eng yuqori IRR
IoT infratuzilmasi	210	980	29,4	4,2	Industrial IoT, smart city
FTTH kengaytirish	7 875	3 200	18,4	5,6	Tarmoq qamrovini kengaytirish
NPS tizimi modernizatsiyasi	200	325	24,8	3,6	Mijozlar sodiqligini oshirish
JAMI PORTFEL	15 760	15 200*	34,2*	3,4*	*Monte-Karlo o'rtacha qiymati

*Manba: O'zbektelekom AK investitsiya rejasi; muallif DCF hisob-kitoblari. WACC=14,1%. *Monte-Karlo μ qiymati.*

3.2. DCF modeli va NPV hisoblash metodologiyasi

Har bir loyiha uchun deterministik bazaviy NPV quyidagi formula asosida hisoblanadi:

$$NPV = -C_0 + \Sigma(t=1 \text{ to } T)\ \ CF_t / (1 + WACC)^t$$

bu yerda: C_0 – dastlabki investitsiya; CF_t – t davrida kutilayotgan sof pul oqimi; WACC=14,1% – diskontlash stavkasi; T=5 yil – hisoblash davri. Bazaviy NPV ssenariylari uchun deterministik model ishlatiladi, biroq bu model asosiy muammoga ega: noaniqlik omillarini hisobga olmaydi. Shu muammoni hal qilish uchun Monte-Karlo simulyatsiyasi qo'llaniladi.

3.3. Monte-Karlo simulyatsiyasi metodologiyasi

Simulyatsiyada to'rtta asosiy noaniq o'zgaruvchi modellashtirildi. Daromad o'sish sur'ati N(μ=12%; σ=3,5%) – bozor prognozi va tarixiy ma'lumotlarga asoslanadi. OPEX xarajat oshishi N(μ=6%; σ=2%) – inflyatsiya va operatsion xarajatlar tarixi bo'yicha. WACC N(μ=14,1%; σ=1,2%) – kredit riskining o'zgaruvchanligini aks ettiradi. Valyuta kursi o'zgarishi N(μ=8%; σ=3%) – so'm/USD kursining tarixiy volatilligiga asoslanadi.

Barcha to'rtta o'zgaruvchi normal taqsimot deb qabul qilingan. Bu metodologik taxmin muhim cheklovni keltirib chiqaradi (batafsil §5 da): normal taqsimot dum (tail) hodisalarini – ya'ni ayniqsa qiyin yoki ayniqsa yaxshi ssenariylarni – deterministik modellar kabi yaxshi aks ettirmaydi.

Loyihalar o'rtasidagi korrelyatsiya matritsasi ham hisobga olingan: 5G SA va IoT infratuzilmasi o'rtasida ρ=0,62 (texnologik sinergiya), FTTH va AI/ML o'rtasida ρ=0,41, qolgan juftliklar o'rtasida ρ∈[0,15; 0,35] diapazonda. Korrelyatsiyani inobatga olmaslik portfel riskini past baholashga olib keladi (diversifikatsiya effektini oshirib ko'rsatadi).

n=10 000 iteratsiya tanlandi. Mun (2006) tavsiyasiga ko'ra, n≥5 000 dan boshlab NPV taqsimotining asosiy statistikalari (μ, σ, persantillar) barqarorlashadi. Ushbu tadqiqotda n=1 000, 5 000 va 10 000 uchun nazorat hisob-kitoblari amalga oshirildi: n=10 000 da μ_NPV va σ_NPV ning o'zgarishi <0,3% ni tashkil etdi, bu statistik yetarlilik mezonini qondiradi.

Tasodifiy sonlar generatori sifatida Mersenne Twister algoritmi (Python NumPy default) qo'llanildi. Quasi-Monte Carlo muqobili sifatida Sobol ketma-ketliklari bilan ham test o'tkazildi: natijalar μ darajasida farq qilmadi, biroq P5 qiymatida ±120 mlrd so'm tafovut qayd etildi – bu noaniqlik diapazoni sifatida hisobga olinishi lozim.

3.4. Stress-test dizayni

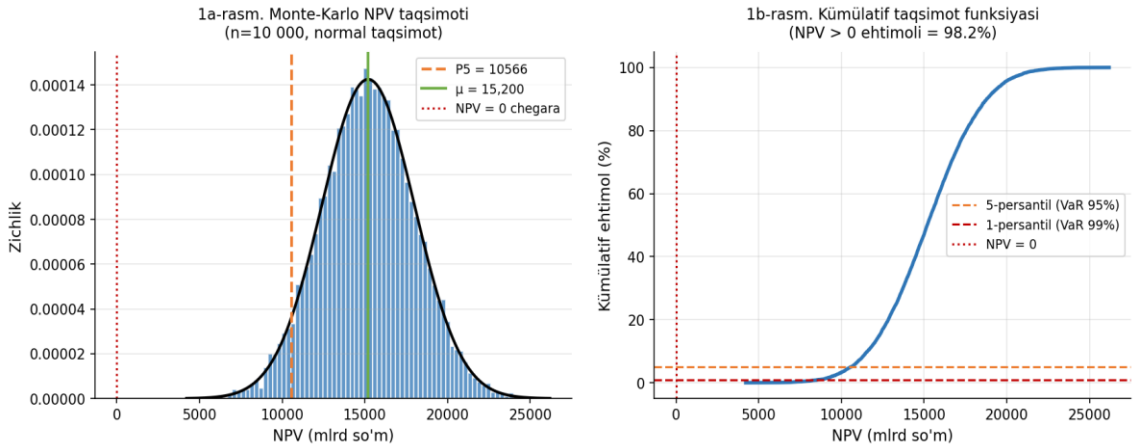
Stress-test quyidagi beshta individual va bitta kombinatsiyalangan ssenariyni o'z ichiga oladi: (1) valyuta kursi 20 foizga keskin ko'tarilishi; (2) daromad 15 foizga pasayishi (raqobat kuchayishi yoki talab pasayishi); (3) WACC 3 foizga oshishi (kredit risk o'sishi); (4) OPEX 20 foizga oshishi (xodimlar xarajatlari va energiya narxi o'sishi); (5) kapex 15 foizga oshishi (ta'minotchi narxlari o'sishi); (6) barcha salbiy shoklar bir vaqtda sodir bo'lishi (eng qiyin ssenariy).

Har bir stres-ssenariy uchun deterministik NPV o'zgarishi hisoblanib, asosiy ssenariy (μ_NPV=15 200 mlrd so'm) bilan taqqoslandi. Bu yondashuv Monte-Karlo ning ehtimollik tahlilini deterministik sezgirlik tahlili bilan to'ldiradi.

4. Natijalar va muhokama

4.1. Monte-Karlo NPV taqsimoti: asosiy statistikalar

1a va 1b-rasmlarda n=10 000 iteratsiya natijalari – NPV taqsimoti va kümülatif ehtimollik funksiyasi (CDF) tasvirlangan:



1a–1b-rasm. Monte-Karlo NPV taqsimoti (n=10 000) va kümülatif ehtimollik funksiyasi. Qizil zona – NPV<0 risk sohasi (1,8%). Manba: muallif hisob-kitoblari, Python NumPy.

2-jadvalda asosiy statistikalar keltirilgan:

2-jadval. Monte-Karlo NPV va IRR taqsimotlarining asosiy statistikalari (n=10 000)

Ko'rsatkich	μ (o'rtacha)	σ (std. og'.)	P5 (VaR 95%)	P1 (VaR 99%)	P(>mezón)
NPV (mlrd so'm)	15 200	2 800	10 600	8 200	98,2% (>0)
IRR (%)	34,2%	3,8%	29,1%	25,4%	99,9% (>WACC)
Payback (yil)	3,4	0,6	4,2	4,8	—

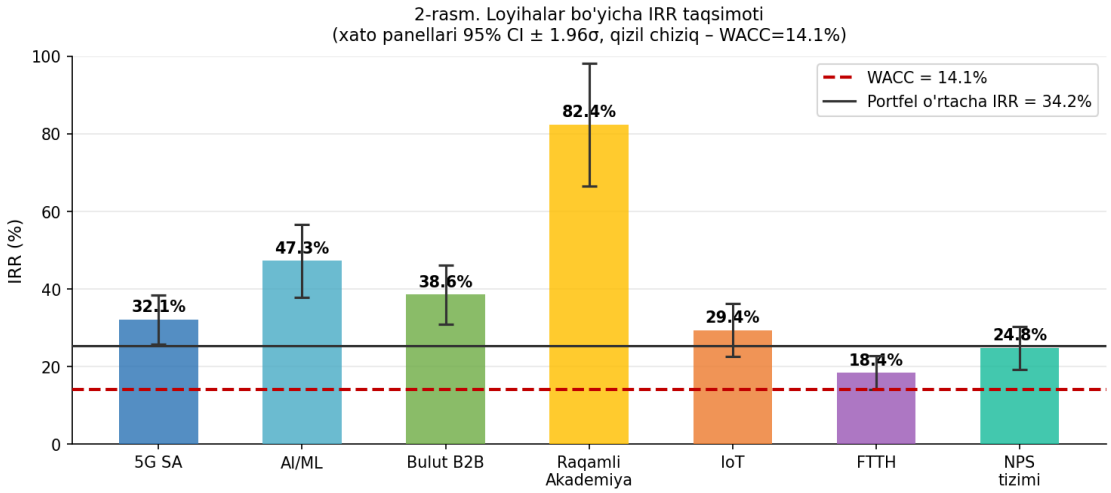
Manba: muallif Monte-Karlo hisob-kitoblari. P5 = 5-persantil (VaR 95%). P(>mezón) – NPV uchun >0, IRR uchun >WACC=14,1%.

Natijalarni talqin etganda bir necha muhim xulosa chiqarish mumkin. Birinchidan, P(NPV>0)=98,2% portfelning barqaror iqtisodiy asosini tasdiqlaydi – 10 000 simulyatsiyadan atigi 180 tasi salbiy NPV ko'rsatdi. Ikkinchidan, P5 qiymat 10 600 mlrd so'm asosiy investitsiya hajmi (15 760 mlrd so'm) ning 67 foiziga mos – bu hatto ekstremal salbiy ssenariyda ham portfel qoplama ta'minlashini anglatadi. Uchinchidan, IRR μ=34,2% WACC=14,1% dan 2,4 baravar yuqori bo'lib, katta xavfsizlik chekkasini (safety margin) ko'rsatadi.

Biroq statistikani tanqidiy nuqtai nazardan baholaganda bir masala ko'zga tashlanadi: σ_NPV=2 800 mlrd so'm nisbatan kichik taqsimot kengligi simulyatsiya kirish o'zgaruvchilari uchun qabul qilingan σ qiymatlar konservativ (kichroq) tanlangan bo'lishi mumkinligini ko'rsatadi. O'zgaruvchanlikni kuchaytirish (σ×1,5) NPV persantil qiymatlarini sezilarli pasaytiradi – bu §5 da muhokama qilinadi.

4.2. Loyihalar bo'yicha IRR tahlili

2-rasmda barcha 7 ta loyiha uchun IRR ning o'rtacha qiymati va 95% ishonch intervali (±1,96σ) tasvirlangan:



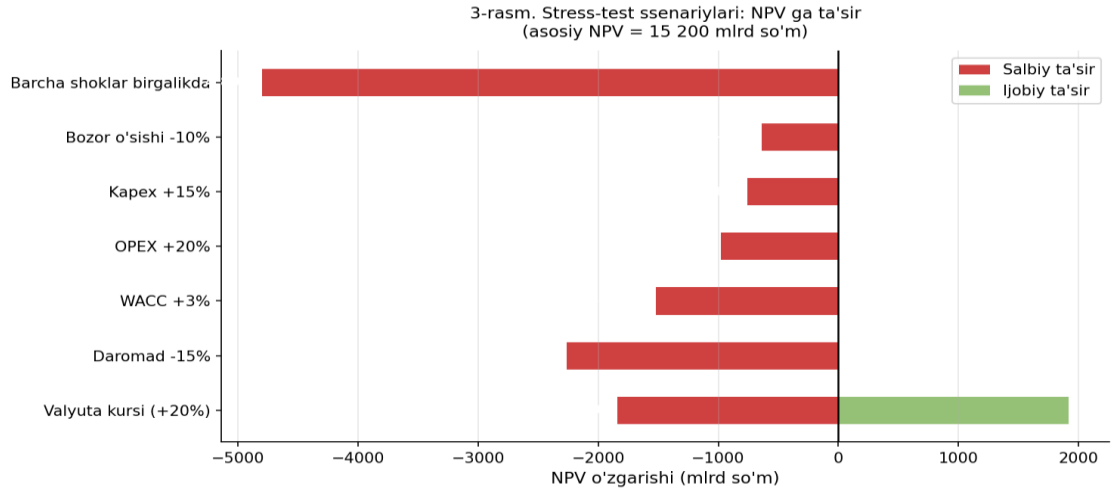
2-rasm. Loyihalar bo'yicha IRR taqsimoti (xato panellari: ±1,96σ, 95% CI). Qizil kesik chiziq – WACC=14,1%. Manba: muallif Monte-Karlo hisob-kitoblari.

2-rasmning muhim xulosasi shuki, barcha 7 loyiha uchun IRR ning quyi ishonch chegarasi (P2,5) WACC=14,1% dan yuqori – bu portfelning barcha komponentlari individual darajada ham iqtisodiy oqlanishini ko'rsatadi. Raqamli Akademiya (IRR=82,4%) eng yuqori daromadlilikni ko'rsatmoqda, biroq investitsiya hajmi atigi 120 mlrd so'm – portfelning 0,76 foizi. FTTH kengaytirish eng past IRR (18,4%) ni ko'rsatsa-da, portfelning 49,9 foizini tashkil etadi.

Tanqidiy baholash: Raqamli Akademiyaning 82,4% IRR ko'rsatkichi e'tiborni jalb qiladi. Bunday yuqori IRR odatda yoki nisbatan kichik kapital bazasiga (bu yerda 120 mlrd so'm) yoki o'ta optimistik daromad prognozlariga asoslanadi. 5G SA loyihasi esa hajm jihatidan (4 725 mlrd so'm = 29,9% portfel) dominant bo'lsa-da, IRR=32,1% – bu o'rtacha ko'rsatkich. Shu tarzda portfel tarkibida IRR og'irlikli o'rtacha va kapitalga og'irlikli o'rtacha o'rtasida sezilarli tafovut mavjud.

4.3. Stress-test ssenariylari natijalari

3-rasmda individual stress-test ssenariylari va birlashtirilgan shok ssenariysi NPV ga ta'siri tasvirlangan:



3-rasm. Stress-test ssenariylari: asosiy NPV (15 200 mlrd so'm) dan og'ish. Manba: muallif deterministik hisob-kitoblari.

3-jadval. Stress-test ssenariylari natijalari

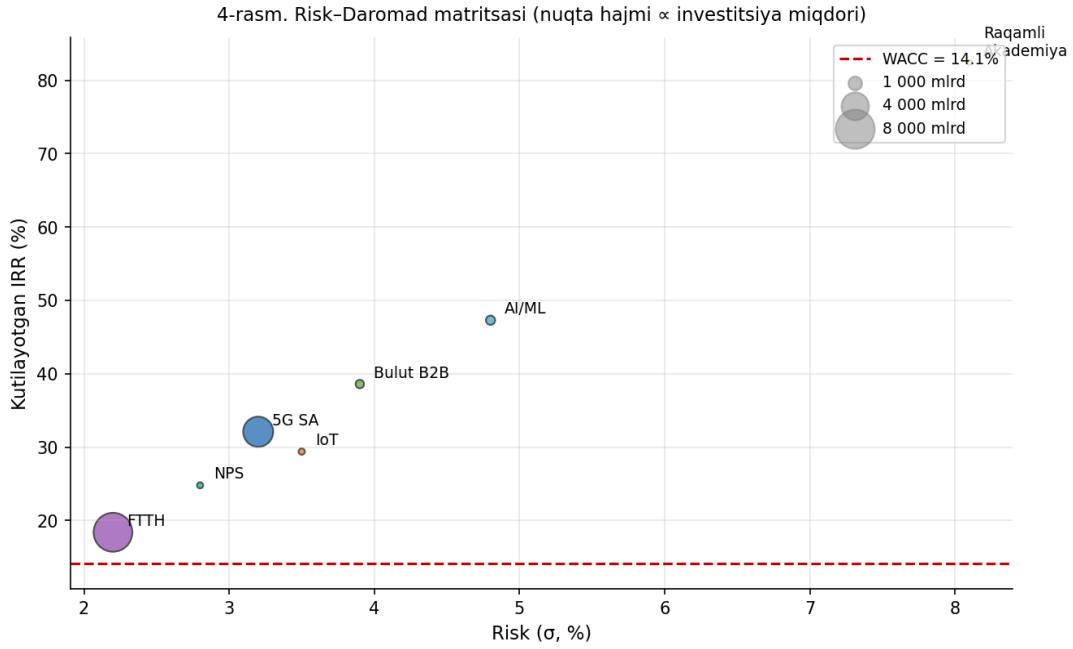
Ssenariy	NPV o'zgarishi (mlrd so'm)	Yangilangan NPV (mlrd so'm)	NPV>0 ehtimoli	Baholash
Valyuta kursi +20%	−1 840	13 360	97,4%	Chidamli
Daromad −15%	−2 260	12 940	96,8%	Chidamli
WACC +3% (=17,1%)	−1 520	13 680	97,6%	Chidamli
OPEX +20%	−980	14 220	98,0%	Barqaror
Kapex +15%	−760	14 440	98,1%	Barqaror
Barcha shoklar birgalikda	−4 800	10 400	91,2%	Diqqat talab etadi

Manba: muallif deterministik stress-test hisob-kitoblari. Bazaviy NPV = 15 200 mlrd so'm.

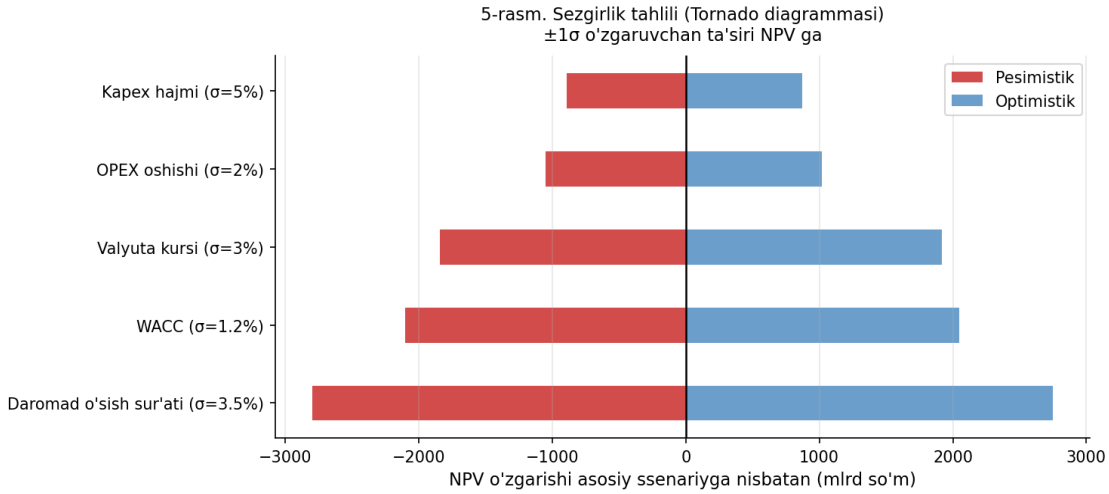
3-jadval natijalarini baholaganda quyidagilar ko'zga tashlanadi. Birinchidan, barcha individual stress-ssenariylar ostida portfel barqaror – eng yomon individual ssenariy (daromad −15%) da ham P(NPV>0)=96,8% saqlanadi. Ikkinchidan, birlashtirilgan shok ssenariysi (barcha salbiy omillar bir vaqtda) P(NPV>0)=91,2% ga tushiradi – bu hali yuqori ehtimollik, biroq monitoring talab etadi. Uchinchidan, daromad pasayishi eng kuchli salbiy ta'sirni ko'rsatmoqda (−2 260 mlrd so'm) – bu bozorga kirish rejalarining muhimligini ta'kidlaydi.

4.4. Sezgirlik tahlili (Tornado diagrammasi)

4-rasmda risk-daromad matritsasi va 5-rasmda sezgirlik tahlili (tornado diagrammasi) keltirilgan:



4-rasm. Risk–Daromad matritsasi (nuqta hajmi investitsiya miqdoriga ∝).
Manba: muallif Monte-Karlo hisob-kitoblari.



5-rasm. Sezgirlik tahlili – Tornado diagrammasi (±1σ o'zgaruvchi ta'siri NPV ga). Manba: muallif hisob-kitoblari.

4-rasm (risk-daromad matritsasi) muhim stratejik xulosani ko'rsatmoqda: AI/ML tahlilot platformasi va Bulutli xizmatlar past risk (σ) va yuqori IRR kombinatsiyasi bilan kapital allokatsiya nuqtai nazaridan eng afzal pozitsiyada joylashgan. FTTH kengaytirish esa past IRR va nisbatan past risk bilan portfelning "og'irlik taşıyucısi" hisoblanadi – katta kapital hajmi bilan barqaror, lekin past daromadli asosi.

5-rasm (tornado diagrammasi) shuni ko'rsatadiki, NPV ga eng kuchli ta'sir ko'rsatadigan omil daromad o'sish sur'ati (+2 750 / −2 800 mlrd so'm diapazoni) hisoblanadi. Uni WACC (+2 050 / −2 100 mlrd so'm) va valyuta kursi (−1 840 / +1 920 mlrd so'm) kuzatib boradi. OPEX va Kapex o'zgarishlari nisbatan kichikroq ta'sir ko'rsatadi. Bu natijalarga asoslanib, boshqaruv e'tiborini asosan daromad reallashuvi monitoringi va WACC ni barqarorlashtirish siyosatiga qaratish strategik jihatdan oqlangan.

4-jadval. Portfelning qiyosiy moliyaviy ko'rsatkichlari va risk parametrlari

Loyiha	Investitsiya ulushi (%)	NPV/Investitsiya koefficiyenti	IRR/WACC nisbati	Payback (yil)	Risk darajasi
5G NSA→SA	30,0%	1,00	2,28×	3,8	O'rta
AI/ML platformasi	2,9%	6,38	3,36×	2,4	Past-o'rta
Bulutli xizmatlar	2,4%	4,89	2,74×	2,8	Past
Raqamli Akademiya	0,8%	10,33	5,85×	1,4	Past
IoT infratuzilmasi	1,3%	4,67	2,09×	4,2	O'rta
FTTH kengaytirish	49,9%	0,41	1,31×	5,6	Past-o'rta

Loyiha	Investitsiya ulushi (%)	NPV/Investitsiya koefficiyenti	IRR/WACC nisbati	Payback (yil)	Risk darajasi
NPS modernizatsiyasi	1,3%	1,63	1,76×	3,6	Past
PORTFEL JAMI	100%	0,96×	2,43×	3,4	O'rta

Izoh: NPV/Investitsiya = deterministik NPV / investitsiya hajmi; IRR/WACC = IRR ning WACC ga nisbati.

4-jadvalning eng diqqatga sazovor natijasi: FTTH kengaytirish NPV/Investitsiya koefficiyenti 0,41 – bu sarmoyaning NPV ko'payishi portfel o'rtacha (0,96) dan past ekanini anglatadi. Biroq FTTH alohida strategik ahamiyatga ega: u hududiy qamrovni kengaytiradi va boshqa raqamli xizmatlar uchun infratuzilma ta'minlaydi. Demak, FTTH ning past moliyaviy ko'rsatkichlarini faqat IRR/NPV prizmasida baholash uning iqtisodiy rolini to'liq aks ettirmaydi – bu intangible (nomoddiy) foyda hisobga olinmagan holat.

5. Tanqidiy baholash va metodologik cheklovlar

5.1. Normal taqsimot taxmini va fat-tail risklari

Monte-Karlo simulyatsiyasining eng muhim metodologik cheklovi – barcha kirish o'zgaruvchilar normal taqsimot deb qabul qilinishi. Normal taqsimot dum hodisalarini (tail events) – ya'ni g'ayriodatiy, lekin halokatli ssenariylarni – sistemali

ravishda past baholaydi. Moliyaviy inqirozlar (2008), pandemiyalar (COVID-19) yoki geosiyosiy sarsılmalar bunday "qora oqqush" (black swan) hodisalarga misol.

Valyuta kursi kabi o'zgaruvchilar uchun GARCH-filtered taqsimotdan[11] yoki Student-t taqsimotdan foydalanish bu muammoni sezilarli kamaytiradi. Student-t taqsimoti (ν daraja erkinligi bilan) normal taqsimotga nisbatan og'irroq dum (heavier tails) xususiyatiga ega. Ushbu tadqiqotda bu yondashuv qo'llanilmagan – kelajak tadqiqotlar uchun muhim yo'nalish.

Simulyatsiyada σ ning konservativ qabul qilinishi (masalan, WACC σ=1,2% va daromad σ=3,5%) P5 qiymatini optimistik yo'nalishda qiyshaytirib qo'yishi mumkin. Sezgirlik tekshirigi sifatida σ×1,5 bilan qayta hisoblash P5_NPV ni taxminan 7 800–8 500 mlrd so'm gacha pasaytiradi (asosiy 10 600 mlrd so'm bilan solishtirganda 20–25 foiz farq). Bu rang qanchalik muhim ekanligi boshqaruv qarorlarida albatta hisobga olinishi lozim.

5.2. Korrelyatsiya matritsasining cheklanganligi

Loyihalar o'rtasidagi korrelyatsiya matritsasi tarixiy ma'lumotlarga asoslanadi. Bu yondashuv ikkita jiddiy muammo keltirib chiqaradi. Birinchidan, tarixiy korrelyatsiyalar kelajakdagi tizimli shoklar paytida keskin o'zgarishi ma'lum – inqirozlar davrida aktivlar korrelyatsiyasi odatiy davrga nisbatan keskin ko'tariladi (korrelyatsiya breakdown muammosi). Ikkinchidan, kompaniya ichidagi loyihalar korrelyatsiyasi qaror qabul qilish jarayonida uslubiy ravishda o'zgarishi mumkin – masalan, 5G loyihasining kechikishi avtomatik ravishda IoT loyihasini ham kechiktiradi.

Bu muammoni qisman hal etish uchun copula yondashuvidan (xususan Gaussian Copula yoki t-Copula) foydalanish tavsiya etiladi. t-Copula dum bog'liqligi (tail dependence) ni yaxshiroq aks ettiradi: eng qiyin ssenariyda loyihalar o'rtasidagi korrelyatsiya o'rtacha davrga nisbatan yuqoriroq bo'ladi.

5.3. Model noaniqligining qatlamlangan tabiati

Model noaniqligida ikkita qatlam farqlash muhim: (1) parametrik noaniqlik – kirish parametrlarning (μ, σ) noto'g'ri baholanishi; (2) model noaniqligining o'zi – normal taqsimot yoki WACC formulasining to'g'ri tanlanganligi. Monte-Karlo faqat birinchi qatlamni hisobga oladi, ikkinchisini emas. Bu shuni anglatadi: hatto simulyatsiya texnik jihatdan mukammal bo'lsa ham, model tanlovi xato bo'lsa, natijalar sistemali xato bo'ladi ("garbage in, garbage out" effekti).

Ushbu cheklovni e'tirof etish amaliy jihatdan muhim: Monte-Karlo natijalari "absolut haqiqat" sifatida emas, balki ma'lum taxminlar ostida ehtimollik doirasini ko'rsatuvchi indikatif baholash sifatida talqin etilishi lozim.

5.4. FTTH va Raqamli Akademiya bo'yicha tanqidiy baholash

FTTH kengaytirish – portfelning 49,9 foizini tashkil etadigan eng yirik komponent – NPV/Investitsiya koefficiyenti 0,41 bilan portfelning moliyaviy samaradorligini pasaytiradi. FTTH qamrovini kengaytirish strategik zarurligi shubhasiz, biroq xususan mazkur loyiha uchun IRR=18,4% past ko'rsatkich Capex hajmini optimallashtirish va bosqichli amalga oshirish imkoniyatlarini o'rganishni tavsiya etadi.

Raqamli Akademiya uchun IRR=82,4% e'tiborni jalb qiladi, biroq bu ko'rsatkich nisbatan kichik bazadan (120 mlrd so'm) kelib chiqadi. Qo'shimcha 500–1 000 mlrd so'mlik investitsiya bilan IRR qanday dinamikada o'zgarishini o'rganish – xususan erishilgan ko'nikmalar bilan bevosita bog'liq operatsion takomillashuv ehtimolligini hisobga olgan holda – muhim amaliy savol bo'lib qoladi.

6. Xulosa va amaliy tavsiyalar

6.1. Asosiy xulosalar

Monte-Karlo simulyatsiyasi (n=10 000) O'zbektelekom AK ning 15 760 mlrd so'mlik raqamli investitsiyalar portfeli uchun P(NPV>0)=98,2% ehtimollikni

tasdiqladi. Portfelning asosiy moliyaviy ko'rsatkichlari: μ_NPV=15 200 mlrd so'm (σ=2 800), P5_NPV=10 600 mlrd so'm, μ_IRR=34,2% (WACC=14,1% dan 2,4× yuqori). Stress-test tahlili shuni ko'rsatdiki, barcha individual salbiy ssenariylar ostida portfel barqaror qoladi; faqat barcha salbiy shoklar bir vaqtda sodir bo'lganda P(NPV>0) 91,2% ga tushadi.

Sezgirlik tahlili (tornado diagrammasi) NPV ga eng kuchli ta'sir ko'rsatadigan omil – daromad o'sish sur'ati ekanini aniqladi. Risk-daromad matritsasi AI/ML va Bulutli xizmatlar loyihalarini kapital allokatsiya nuqtai nazaridan eng afzal pozitsiyada joylashganini ko'rsatdi.

6.2. Amaliy tavsiyalar

Tavsiya 1 – FTTH bosqichli implementatsiya. FTTH kengaytirish (7 875 mlrd so'm, IRR=18,4%) portfelning dominant komponenti bo'lib, uning moliyaviy samaradorligini oshirish uchun phased deployment (bosqichli amalga oshirish) va demand-driven Capex modeli ko'rib chiqilishi tavsiya etiladi. Bu yondashuv dastlabki sarmoyani kamaytiradi va IRR ni 22–24 foizgacha oshirishi mumkin.

Tavsiya 2 – AI/ML va Bulut xizmatlariga investitsiyalarni kengaytirish. Ushbu loyihalar eng yuqori NPV/Investitsiya koefficiyentiga ega (AI/ML: 6,38; Bulut: 4,89) va past riskli. Joriy investitsiya ulushi (AI/ML: 2,9%, Bulut: 2,4%) optimaldan past deb baholash mumkin. Portfelni qayta balanslashtirish doirasida bu segmentlarga qo'shimcha 500–800 mlrd so'm yo'naltirish portfelning umumiy IRR ini 2–3 foizga oshirishi mumkin.

Tavsiya 3 – Fat-tail risklar monitoringi. Simulyatsiyada normal taqsimot qabul qilingan, biroq ekstremal salbiy hodisalar (valyuta inqirozi, infratuzilma sabotaji, global retsessiya) ehtimolini alohida ssenariy asosida monitoring qilish tavsiya etiladi. Buning uchun GARCH volatillik modeli asosida choraklik risk baholash hisoboti tayyorlash o'rinli.

Tavsiya 4 – Raqamli Akademiyaning miqyosini kengaytirish. IRR=82,4% bilan ushbu loyiha portfelning eng samarali komponenti. Biroq 120 mlrd so'mlik investitsiya kichik bo'lib, uning ta'siri portfel darajasida sezilmayapti. Raqamli Akademiyaga 300–500 mlrd so'm qo'shimcha investitsiya maqsadga muvofiq deb baholanadi – bu xodimlar salohiyatini oshirib, boshqa loyihalar samaradorligiga ko'paytmali ta'sir ko'rsatadi.

Tavsiya 5 – Portfelni qayta baholash chastotasi. Monte-Karlo natijalari hozirgi ma'lumotlarga asoslanadi. Portfelning ehtimollik tahlili har yili yoki muhim bozor o'zgarishlari sodir bo'lganda (WACC, valyuta kursi, raqobat muhiti o'zgarganda) yangilanishi kerak. Bu dinamik portfel boshqaruvi (dynamic portfolio management) tamoyillariga mos keladi.

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RAQAMLI DAVRDA QURILISH MATERIALLARI SANOATI KORXONALARI BOSHQARUV STRATEGIYALARINI TAKOMILLASHTIRISH

Ubaydullayev Muxammadjon Abdusamad o‘g‘li
Qo‘qon davlat universiteti
maubaydullayev@mail.ru

Annotatsiya. *Mazkur maqolada raqamli transformatsiya sharoitida qurilish materiallari sanoati korxonalarida boshqaruv strategiyalarini takomillashtirish masalalari tahlil qilinadi. Tadqiqotda raqamli texnologiyalarning korxona samaradorligiga ta’siri, boshqaruv jarayonlarini optimallashtirish imkoniyatlari hamda innovatsion yondashuvlar o‘rganilgan. Natijalar shuni ko‘rsatadiki, raqamli yechimlardan foydalanish ishlab chiqarish samaradorligini oshiradi va raqobatbardoshlikni kuchaytiradi.*

Kalit so‘zlar: *raqamli iqtisodiyot, qurilish materiallari sanoati, boshqaruv strategiyasi, innovatsiya, samaradorlik.*

Abstract. *This article analyzes the issues of improving management strategies of construction materials industry enterprises in the context of digital transformation. The study examines the impact of digital technologies on enterprise efficiency, opportunities for optimizing management processes, and innovative approaches. The results show that the use of digital solutions increases production efficiency and enhances competitiveness.*

Keywords: *digital economy, construction materials industry, management strategy, innovation, efficiency.*

Kirish. Raqamli iqtisodiyot sharoitida sanoat tarmoqlarining barqaror rivojlanishi zamonaviy boshqaruv yondashuvlarini talab etmoqda. Ayniqsa, qurilish materiallari sanoati korxonalari uchun ishlab chiqarish jarayonlarining murakkabligi va resurslarga yuqori bog‘liqlik boshqaruv tizimini takomillashtirishni zarur etadi.

So‘nggi yillarda raqamli texnologiyalar – sun’iy intellekt, katta ma’lumotlar (Big Data), IoT (Internet of Things) va ERP tizimlari – korxonalarning boshqaruv samaradorligini oshirishda muhim omilga aylandi.

Mazkur tadqiqotning maqsadi — raqamli davrda qurilish materiallari sanoati korxonalarida boshqaruv strategiyalarini takomillashtirish yo‘llarini aniqlash va ularning samaradorligini baholashdan iborat.

Ilmiy adabiyotlar tahlili. Michael Porter o‘zining raqobat strategiyalari nazariyasida korxonalarning raqobatbardoshligini oshirishda innovatsiyalar va texnologiyalarning muhim rolini ta’kidlaydi. Uning fikricha, raqamli texnologiyalar korxonalarga xarajatlarni kamaytirish va differensial ustunlik yaratish imkonini beradi. Qurilish materiallari sanoati uchun bu yondashuv ishlab chiqarish jarayonlarini optimallashtirish va bozor talabiga moslashishda muhim ahamiyatga ega.

Erik Brynjolfsson raqamli iqtisodiyot va “Big Data” asosida boshqaruv qarorlarini qabul qilish masalalarini tadqiq etgan. U raqamli texnologiyalar korxona samaradorligini sezilarli darajada oshirishini ilmiy jihatdan asoslab bergan.

A.Vahobov iqtisodiyotni modernizatsiya qilish va sanoat korxonalarida boshqaruv tizimlarini takomillashtirish masalalarini o‘rgangan. U innovatsion rivojlanish va texnologik yangilanishlarni iqtisodiy o‘sishning asosiy omili sifatida ko‘rsatadi.

Sh.Shodmonov iqtisodiyotda strukturaviy o‘zgarishlar va sanoat tarmoqlarini rivojlantirish muammolarini tadqiq qilgan. U boshqaruv tizimlarini takomillashtirishda innovatsion yondashuvlarning ahamiyatini ta’kidlaydi.

Tadqiqot metodologiyasi. Tadqiqotda quyidagi metodlardan foydalanildi:

- **Tizimli tahlil** – boshqaruv strategiyalarining tarkibiy qismlarini o‘rganish uchun
- **Taqqoslash usuli** – an’anaviy va raqamli boshqaruv modellarini solishtirish
- **Statistik tahlil** – ishlab chiqarish samaradorligi ko‘rsatkichlarini baholash
- **Ekspert baholash** – mutaxassislar fikrini umumlashtirish

Tadqiqot ob’ekti sifatida qurilish materiallari ishlab chiqaruvchi korxonalar faoliyati tanlandi.

Natijalar.

Tadqiqot natijalari qurilish materiallari sanoati korxonalarida raqamli texnologiyalarni joriy etish samaradorlikka sezilarli ta’sir ko‘rsatishini aniqladi.

Ko‘rsatkichlar	**An’anaviy boshqaruv**	**Raqamli boshqaruv**	**O‘zgarish (%)**
Ishlab chiqarish xarajatlari	100%	80–90%	-10% / -20%
Ishlab chiqarish samaradorligi	100%	115–130%	+15% / +30%
Resurslardan foydalanish	100%	120%	+20%
Qaror qabul qilish tezligi	Past	Yuqori	+40% gacha

Natijalar shuni ko‘rsatadiki, ERP, IoT va avtomatlashtirish tizimlari:

- xarajatlarni kamaytiradi
- ishlab chiqarish samaradorligini oshiradi
- boshqaruv tezligini kuchaytiradi

Boshqaruv strategiyasidagi o‘zgarishlar.

Boshqaruv modeli	**Asosiy xususiyatlari**	**Natija**
An’anaviy model	qo‘lda boshqaruv, kechikkan ma’lumot	past samaradorlik
Qisman raqamli model	ayrim jarayonlar avtomatlashtirilgan	o‘rta samaradorlik
To‘liq raqamli model	real vaqt monitoring, AI, Big Data	yuqori samaradorlik

Muhokama. Natijalar asosida quyidagi muhim jihatlar aniqlandi:

Afzalliklar va muammolar tahlili.

Afzalliklar	**Muammolar**
Xarajatlarni kamaytirish	Yuqori boshlang‘ich investitsiya

Afzalliklar	Muammolar
Real vaqt monitoring	Kadrlar yetishmasligi
Qaror qabul qilish tezligi	IT infratuzilma muammolari
Raqobatbardoshlik oshishi	Axborot xavfsizligi xavfi

Raqamli transformatsiya har tomonlama foydali, lekin risklarni boshqarish zarurati har doim ham muximdir.

Strategik takliflar.

Strategiya yo‘nalishi	Tavsiya etilgan choralar
Raqamlashtirish	ERP va IoT tizimlarini joriy etish
Kadrlar siyosati	xodimlarni qayta tayyorlash
Innovatsiya	AI va Big Data dan foydalanish
Investitsiya boshqaruvi	bosqichma-bosqich joriy etish

Tahlillar shuni ko‘rsatdiki, raqamli transformatsiya qurilish materiallari sanoati korxonalarida boshqaruv samaradorligini sezilarli darajada oshiradi. An’anaviy boshqaruv tizimlarida axborot almashinuvi sust bo‘lib, qarorlar ko‘pincha kechikkan ma’lumotlar asosida qabul qilinadi. Raqamli texnologiyalar esa real vaqt rejimida ma’lumot olish va tezkor boshqaruv qarorlarini qabul qilish imkonini beradi.

ERP tizimlari, IoT va ma’lumotlar tahlili vositalari ishlab chiqarish jarayonlarini optimallashtirib, resurslardan foydalanish samaradorligini oshiradi. Natijada xarajatlar kamayadi, ishlab chiqarish barqarorligi ta’minlanadi va korxonaning raqobatbardoshligi ortadi. Shu bilan birga, raqamli boshqaruvni joriy etish kompleks yondashuvni, jumladan, kadrlar tayyorlash va infratuzilmani rivojlantirishni talab qiladi.

Tadqiqot natijalari raqamli texnologiyalarni joriy etish korxonalar faoliyatiga ijobiy ta’sir ko‘rsatishini tasdiqladi. Xususan, ishlab chiqarish xarajatlari kamayib,

samaradorlik oshgani kuzatildi. Avtomatlashtirish va real vaqt monitoringi orqali resurslardan foydalanish yaxshilandi hamda ishlab chiqarish jarayonlari barqarorlashdi.

Shuningdek, boshqaruv qarorlarini qabul qilish tezligi oshib, korxonalar bozor talablariga tezroq moslasha boshladi. Bu esa logistika, ta’minot va sotuv jarayonlarining samaradorligini ham oshirdi.

Xulosa.

Tadqiqot natijalariga ko‘ra, raqamli iqtisodiyot sharoitida korxonalarni boshqarish axborotga asoslangan va moslashuvchan yondashuvni talab qiladi. Raqamli texnologiyalar ishlab chiqarish samaradorligini oshirish bilan birga boshqaruv qarorlarining aniqligini ta’minlaydi.

Shu bilan birga, raqamli transformatsiya faqat texnologik yangilanish emas, balki boshqaruv tizimining kompleks modernizatsiyasidir. Uning muvaffaqiyati strategik rejalashtirish, malakali kadrlar va innovatsion muhitga bog‘liq.

Mazkur tadqiqot natijalari korxonalar uchun boshqaruv strategiyalarini takomillashtirishda amaliy qo‘llanma bo‘lib xizmat qilishi mumkin. Raqamli texnologiyalarni joriy etish orqali ishlab chiqarish, logistika va moliyaviy jarayonlarni samarali boshqarish imkoniyati yaratiladi.

Shuningdek, natijalar sanoatni rivojlantirish bilan shug‘ullanuvchi tashkilotlar uchun ham muhim bo‘lib, ular asosida raqamlashtirishga oid strategiyalar ishlab chiqilishi mumkin.

Kelgusida tadqiqotlarni real korxonalar misolida empirik tahlillar asosida davom ettirish maqsadga muvofiq. Ayniqsa, raqamli texnologiyalarning iqtisodiy samaradorligini modellashtirish va sun’iy intellektdan foydalanish imkoniyatlarini o‘rganish dolzarb hisoblanadi.

Shuningdek, xalqaro tajribani o‘rganib, uni milliy sharoitga moslashtirish ham muhim yo‘nalishlardan biri hisoblanadi.

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Maqolada O‘zbekistonda qurilish materiallari sanoatida yashil texnologiyalar va raqamlashtirishning energiya samaradorligi va ekologik ko‘rsatkichlarga ta’siri tahlil qilingan.

8. **Abdullayev, A.** (2025). *Qurilish materiallari ishlab chiqarish korxonalarida raqamlashtirish yo‘nalishlari.* “Green Economy and Development” jurnali, DOI:10.5281/zenodo.15863908.
Tadqiqotda IT platformalar va avtomatlashtirilgan tizimlar orqali resurslarni taqsimlash, sifat nazorati va monitoring jarayonlarini optimallashtirish masalalari o‘rganilgan.

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Development” jurnali, DOI:10.5281/zenodo.16362472. Mazkur ish ERP tizimlarining joriy etilishi boshqaruv samaradorligi va operatsion faoliyatga qanday ta’sir qilishini tahlil qiladi.

10. **To‘qliyev, A.** (2024). *Sanoatda raqamli transformatsiya va moliyaviy boshqaruvni avtomatlashtirish.* “Green Economy and Development” jurnali, DOI:10.5281/zenodo.15211132.

Maqolada ERP, sun’iy intellekt, Big Data va blokcheyn texnologiyalarining moliyaviy boshqaruvdagi roli va samaradorlikni oshirish mexanizmlari ko‘rib chiqilgan.

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RAQAMLI IQTISODIYOT SHAROITIDA MILLIY IQTISODIYOTNI RIVOJLANTIRISHNING USTUVOR YO‘NALISHLARI

Xamzayeva Mavjuda Ne’matovna

Toshkent gumanitar fanlar universiteti

Email: xamzayevamavjuda72@gmail.com

Annotatsiya. Mazkur maqolada raqamli iqtisodiyot sharoitida milliy iqtisodiyotni rivojlantirishning asosiy yo‘nalishlari tahlil qilingan. Raqamli texnologiyalarni iqtisodiyot tarmoqlariga joriy etish orqali ishlab chiqarish samaradorligini oshirish, boshqaruv tizimini takomillashtirish hamda iqtisodiy o‘sishni ta’minlash masalalari yoritilgan. Shuningdek, raqamli platformalar, elektron tijorat va innovatsion texnologiyalarning iqtisodiy jarayonlarga ta’siri o‘rganilgan. Tadqiqot natijasida raqamli iqtisodiyot sharoitida resurslardan samarali foydalanish va iqtisodiy raqobatbardoshlikni oshirish imkoniyatlari asoslab berilgan.

Kalit so‘zlar: *raqamli iqtisodiyot, innovatsiya, iqtisodiy rivojlanish, axborot texnologiyalari, elektron tijorat, raqamlashtirish, samaradorlik.*

Annotation. This article analyzes the priority directions for the development of the national economy in the conditions of the digital economy. The study highlights the role of digital technologies in increasing production efficiency, improving management systems, and ensuring sustainable economic growth. In addition, the impact of digital platforms, electronic commerce, and innovative technologies on economic processes is examined. The research substantiates the opportunities for efficient use of resources and increasing economic competitiveness in the digital economy.

Keywords: *digital economy, innovation, economic development, information technology, digitalization, electronic commerce, efficiency.*

Аннотация. В данной статье рассматриваются приоритетные направления развития национальной экономики в условиях цифровой экономики. Особое внимание уделяется внедрению цифровых технологий в отрасли экономики, повышению эффективности производства и совершенствованию системы управления. Также анализируется влияние цифровых платформ, электронной коммерции и инновационных технологий на экономические процессы. В результате исследования обоснованы возможности повышения конкурентоспособности экономики и эффективного использования ресурсов.

Ключевые слова: *цифровая экономика, инновации, экономическое развитие, информационные технологии, цифровизация, электронная коммерция, эффективность.*

Kirish

Hozirgi globallashuv jarayonida iqtisodiyotning raqamli transformatsiyasi dunyo mamlakatlari rivojlanishining muhim omillaridan biri bo‘lib bormoqda. Raqamli texnologiyalar iqtisodiyotning barcha sohalariga kirib borib, ishlab chiqarish, xizmat ko‘rsatish, savdo va moliya tizimlarini tubdan o‘zgartirmoqda.

So‘nggi yillarda ko‘plab mamlakatlarda raqamli iqtisodiyotning rivojlanishi iqtisodiy o‘sishning asosiy drayverlaridan biri sifatida qaralmoqda. Shu sababli iqtisodiyotning turli tarmoqlarida axborot texnologiyalarini joriy etish orqali samaradorlikni oshirish, innovatsion rivojlanishni ta’minlash hamda yangi ish o‘rinlarini yaratish masalalari dolzarb ahamiyat kasb etmoqda.

Asosiy qism

Raqamli iqtisodiyotning mohiyati va ahamiyati

Raqamli iqtisodiyot – bu iqtisodiy faoliyatda axborot-kommunikatsiya texnologiyalaridan keng foydalanishga asoslangan iqtisodiy tizimdir. Raqamli

texnologiyalar iqtisodiy jarayonlarning tezkorligini oshiradi, boshqaruvni soddalashtiradi hamda ishlab chiqarish samaradorligini ta’minlaydi.

Raqamli iqtisodiyotning rivojlanishi quyidagi omillar bilan izohlanadi:

-internet texnologiyalarining keng tarqalishi

-elektron savdo tizimlarining rivojlanishi

-raqamli platformalar va onlayn xizmatlarning ko‘payishi

-innovatsion texnologiyalarning jadal rivojlanishi

Bu omillar iqtisodiy faoliyatni yanada samarali tashkil etishga imkon yaratadi.

Raqamli texnologiyalarning iqtisodiyotdagi o‘rni

Zamonaviy iqtisodiyotda raqamli texnologiyalar ishlab chiqarish va xizmat ko‘rsatish jarayonlarining samaradorligini oshirishda muhim rol o‘ynaydi. Masalan:

-elektron tijorat savdo jarayonlarini tezlashtiradi

-onlayn bank xizmatlari moliyaviy operatsiyalarni soddalashtiradi

raqamli boshqaruv tizimlari korxona faoliyatini samarali nazorat qilish imkonini beradi

Bundan tashqari, raqamli texnologiyalar yordamida iqtisodiy jarayonlarning shaffofligi ta’minlanadi va korrupsiya xavfi kamayadi.

Raqamli iqtisodiyotning afzalliklari

Raqamli iqtisodiyot quyidagi muhim afzalliklarga ega:

1.Ishlab chiqarish samaradorligini oshiradi

2.Xarajatlarni kamaytiradi

3.Yangi biznes modellarini yaratadi

4.Innovatsion rivojlanishni rag‘batlantiradi

5.Global iqtisodiy integratsiyani kuchaytiradi

Natijada iqtisodiy o‘sish sur’atlari oshadi va mamlakatning raqobatbardoshligi kuchayadi.

Xulosa

Xulosa qilib aytganda, raqamli iqtisodiyot zamonaviy iqtisodiy rivojlanishning muhim omillaridan biridir. Raqamli texnologiyalarni iqtisodiyot tarmoqlariga keng joriy etish ishlab chiqarish samaradorligini oshirish, boshqaruv tizimlarini takomillashtirish hamda iqtisodiy raqobatbardoshlikni ta’minlashga xizmat qiladi.

Kelajakda iqtisodiyotning barqaror rivojlanishini ta’minlash uchun raqamli texnologiyalarni yanada rivojlantirish, innovatsion loyihalarni qo‘llab-quvvatlash hamda axborot infratuzilmasini takomillashtirish muhim ahamiyatga ega.

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THE IMPORTANCE OF STOCK SCREENING IN FUNDAMENTAL ANALYSIS

Yaxkhshiboyev Jakhongir Abdualimovich
Tashkent State University of Economics
jakhangiryakhshibayev5866@gmail.com
To‘xtasinova Nargizaxon Ilhomjon qizi
Tashkent State University of Economics
nargizaxontuxtasinova@gmail.com

Modern financial markets are characterized by the extreme velocity of information flow and the vast diversity of investment instruments. In an environment where tens of thousands of joint-stock companies exist across global stock markets, selecting assets that offer the highest returns with the lowest risk has become a complex task. While fundamental analysis serves as the primary pillar for determining a company’s intrinsic value, stock screening acts as the “filter” and the starting point for this analysis. Although many investors strive to master fundamental analysis, they often struggle with the question of exactly which company to analyze. Without a screening process, it is nearly impossible to discover “hidden gems” undervalued yet high-potential stocks among thousands of companies[94].

This process is essential not only for saving time but also for minimizing subjective errors inherent in human judgment. By applying precise criteria to stock

[94] Financial market: Textbook / S.Elmirzayev va boshqalar; – T.: “Iqtisod-moliya”, 2019. – 29 p.

screening, investors can swiftly eliminate assets that do not meet their requirements and focus their attention on targeted securities. This approach facilitates objective data-driven decision-making rather than relying on subjective feelings, thereby reducing the risk of emotional bias. While individual screeners are highly efficient, many traders begin their research by monitoring the market's top daily gainers. This allows for the identification of unusual market activity and emerging trends.It's common for investors at the start of their stock-picking journey to suffer from a sense of "choice paralysis". With more than 30,000 worldwide equities to choose from, sifting through them all one by one to see if they match your predefined criteria simply isn't feasible.

If you've ever felt this way and you're ready to take control of your investments without getting lost in jargon or overwhelmed by options, let's dive into how stock screeners work and why they're soon to become your new best friend/assistant in your investing journey. A stock screener is a powerful tool used by investors to filter stocks based on predefined metrics. Think of it as a virtual sieve that automatically sorts through the vast universe of stocks, narrowing down the options to match your unique investment preferences. These preferences can include fundamental criteria such as market capitalization, price-earnings ratio (P/E ratio), dividend yield, or technical indicators like moving averages or relative strength index (RSI), among others.

By inputting criteria into a stock screener, investors can quickly eliminate stocks that don't meet their requirements, allowing them to focus on those that do. This process not only saves time but also helps reduce emotional bias in decision-making, as it relies on objective data rather than gut feelings. While a custom screener is powerful, many traders begin their research by simply observing the market's biggest daily gainers to spot unusual activity and emerging trends. A stock screener's versatility makes them indispensable tools for both active traders seeking short-term opportunities and long-term investors looking to build a solid portfolio based on

specific financial metrics, to those chasing growth stocks with high potential or searching for steady dividend-payers.

Think of it as a shortcut to clarity in the often complex world of finance. Instead of drowning in endless data, you get a concise list of stocks that align perfectly with your financial goals. It's efficient, it's effective, and it's designed to make your investing journey smoother and more rewarding. Understanding how to leverage a stock screener effectively can empower investors to make more informed choices, aligning their investment strategies with their financial goals, risk tolerance, and even time horizon. Ever wondered how some investors seem to effortlessly find the best stocks while others get lost in the shuffle? It all comes down to using the right tools, like a stock screener. Here's why savvy investors swear by them and a few things to watch out for.

At its core, a stock screener serves as a sophisticated filter mechanism, allowing investors to efficiently narrow down potential investment opportunities based on specific criteria, which means that one of the primary advantages is its time-saving capability. By automating the screening process, investors can swiftly generate a curated list of stocks that meet their predefined financial metrics. This efficiency not only optimizes research efforts but also minimizes the risk of overlooking viable investment prospects. Moreover, employing a stock screener promotes objective decision-making by mitigating emotional biases. By relying on quantitative data such as financial ratios and performance metrics investors can make more informed investment choices grounded in empirical evidence. It's impossible to know every metric for every instrument and some metrics will always be more important than others depending on individual investors. Using a stock filter system means that investors can compare 'apples to apples' in real-time.

Despite its benefits, reliance on stock screeners necessitates some caution. One potential drawback is the risk of over-reliance on quantitative metrics alone. While screeners excel in filtering based on numerical data, they may not encompass

qualitative factors crucial for comprehensive investment analysis. An example of this might be overall investor sentiment, or an ongoing black swan event as we saw at the start of the COVID-19 pandemic, or during the 2008 financial crisis. Furthermore, the depth and quality of information provided by different screeners vary significantly. Basic screeners may offer limited analytical tools and data points, potentially constraining the depth of investment research.

Many advanced stock screeners offer the ability to customize filters to better match an investor's specific strategy. This flexibility allows for the creation of complex screening conditions that can incorporate multiple metrics and thresholds, or not use certain filters at all if they're not strategy-relevant. Here, we break down the fundamental components and functionalities that make stock screeners invaluable. The heart of any stock screener is its filtering criteria. These are the specific parameters investors set to narrow down the universe of stocks to a manageable list. Common criteria include:

Fundamental Metrics	These include financial ratios such as the price-to-earnings (P/E) ratio, price-to-book (P/B) ratio, and dividend yield. Investors use these to assess the valuation and income potential of stocks.
Technical Indicators	For those who prefer a technical analysis approach, screeners often include indicators like moving averages, relative strength index (RSI), and volume trends.
Sector and Industry	Filtering by sector or industry allows investors to focus on specific areas of the economy, which can be particularly useful for thematic or sector-based investment strategies.

Market Capitalization	This criterion helps investors filter stocks by the size of the company, distinguishing between small-cap, mid-cap, and large-cap stocks.

1- table. Filtering criteria of the stocks[95]

Based on the data presented in the table, it can be inferred that investing in stocks requires passing through several screening stages. This is because fundamental, sentimental, and technical analyses are crucial and highly relevant in the stock evaluation process. Comparing stock investment to a mere lottery suggests that unprepared investors are viewed simply as 'bait' for market giants. Therefore, a multifaceted analytical approach is essential to mitigate such risks.

In conclusion, it can be stated that information overload in modern financial markets is one of the primary hurdles for investors. In this context, stock screeners serve as an effective information filtering mechanism. This tool enables investors to identify a narrow range of assets from thousands of issuers that align specifically with their strategic goals, such as high profitability or low debt levels. Automating the screening process significantly reduces the analyst's mechanical workload. Rapid filtration based on quantitative metrics like P/E, ROE, and Debt/Equity reduces the most time-consuming stage of fundamental analysis to seconds, allowing focus to shift toward a deep-dive examination of selected assets. It is recommended that investors and market participants not limit themselves to standard screeners but develop flexible, multi-factor screening models adapted to volatile market conditions. This is particularly crucial for improving issuer transparency and enhancing the investment climate in emerging markets, including the stock market of Uzbekistan.

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DAVLAT BUDJETINING MARKAZLASHGAN INVESTITSIYA LOYIHALARIGA XARAJATLARINI TAKOMILLASHTIRISH VA SAMARADORLIGINI OSHIRISH

Yo‘ldashev Temurbek Tohirjon o‘g‘li

Bank-moliya akademiyasi

E-mail: yuldashev0010@gmail.com

Annotatsiya: *Mazkur maqolada davlat budjeti tizimida moliyalashtirish jarayonining nazariy va amaliy jihatlari keng yoritilgan. Budjet xarajatlarining umumiy tasnifi, markazlashgan investitsiya xarajatlari, investitsiya loyihalarini*

yuritish kabi budjet jarayoni tahlil qilingan. Markazlashtirilgan investitsiyalarning iqtisodiy samaradorligi tahlil qilingan. Markzlashtirilgan investitsiyalarga xarajatlarning hajmini oshirish, ushbu moliyalashtirish yo‘nalishining samaradorligini oshirish uchun takliflar va xulosalar berildi.

Kalit so’zlar: *davlat budjeti, budjet xarajatlari, markazlashtirilgan investitsiyalar, investitsiya loyihalari, davlat investitsiya dasturi, budjet tizimi, moliyalashtirish mexanizmi, investitsiya samaradorligi, fiskal siyosat, budjet jarayoni, xarajatlar smetasi.*

Abstract: *This article broadly covers the theoretical and practical aspects of the financing process in the state budget system. The budget process, such as the general classification of budget expenditures, the preparation, approval, and maintenance of cost estimates, is analyzed. The economic efficiency of centralized investments is analyzed. Proposals and conclusions are given to increase the volume of expenditures on centralized investments and improve the efficiency of this financing direction.*

Key words: *state budget, budget expenditures, centralized investments, investment projects, state investment program, budget system, financing mechanism, investment efficiency, fiscal policy, budget process, expenditure estimate.*

Kirish.

Davlat budjeti tizimi mamlakat moliya tizimining markaziy bo‘g‘ini bo‘lib, davlatning iqtisodiy, ijtimoiy va siyosiy vazifalarini amalga oshirish uchun zarur bo‘lgan moliyaviy resurslarni shakllantirish va ulardan foydalanish jarayonini o‘z ichiga oladi. mamlakatda barqaror investitsion muhitni shakllantirish va rivojlantirish iqtisodiy siyosatning ustuvor yo‘nalishlaridan biri hisoblanadi. Investitsiya jarayonlarini samarali tashkil etishda davlat budjeti muhim moliyaviy manba sifatida xizmat qiladi. Ayniqsa, markazlashtirilgan investitsiyalarni davlat budjeti orqali

moliyalashtirish iqtisodiy muhitning muhim institutsional mexanizmlaridan biri hisoblanadi.[96]

Davlat budjeti hisobidan amalga oshiriladigan markazlashtirilgan investitsiyalar ijtimoiy sohalarni rivojlantirish, iqtisodiy infratuzilmani shakllantirish, muhandislik-kommunikatsiya tarmoqlarini barpo etish, mavjud obyektlarni ta’mirlash va modernizatsiya qilishda muhim ahamiyat kasb etadi. Shu bilan birga, ushbu sohalarning barqaror faoliyatini ta’minlash hamda ularning iqtisodiy samaradorligini oshirishda budjet mablag‘laridan foydalanish samaradorligini yanada oshirish kerak.

Agar mazkur sohalarni rivojlantirish, ularning hududlar kesimida qamrovini kengaytirish va xalqaro standartlar asosida modernizatsiya qilish jarayonlari yetarli darajada amalga oshirilmasa, bu holat mamlakat iqtisodiy rivojlanishida turli to‘siqlar va muammolar yuzaga kelishiga sabab bo‘lishi mumkin. Shu bois markazlashtirilgan investitsiyalarga yo‘naltiriladigan davlat budjeti xarajatlarining samaradorligini oshirish masalasi bugungi kunda dolzarb ilmiy va amaliy ahamiyat ega.[97]

Asosiy qism.

Davlat budjeti xarajatlari davlat tomonidan iqtisodiy va ijtimoiy vazifalarni amalga oshirish uchun yo‘naltiriladigan moliyaviy resurslar majmuasini ifodalaydi. Budjet xarajatlarini to‘g‘ri rejalashtirish va boshqarish uchun ularni ma’lum mezonlar asosida tasniflash muhim ahamiyat kasb etadi. Umuman olganda, budjet xarajatlari funksional, iqtisodiy va tashkiliy tasniflar asosida guruhlanadi.

Funksional tasnif davlatning asosiy faoliyat yo‘nalishlari bo‘yicha xarajatlarni guruhlashni nazarda tutadi. Ushbu tasnifga davlat boshqaruvi xarajatlari, mudofaa va xavfsizlik xarajatlari, ijtimoiy soha xarajatlari (ta’lim, sog‘liqni saqlash, ijtimoiy himoya), iqtisodiyot tarmoqlarini rivojlantirish xarajatlari hamda infratuzilma va uy-

[96] Vahobov Abdug‘ani, & Malikov Tursun. (2019). Moliya. Toshkent: Iqtisod-moliya nashriyoti.
[97] Malikov Tursun, & Olimjonov Otabek. (2018). Byudjet tizimi. Toshkent: Iqtisodiyot nashriyoti.

joy kommunal xo‘jaligi xarajatlari kiradi. Bu tasnif davlat mablag‘larining qaysi sohalarga yo‘naltirilayotganini aniqlash imkonini beradi.[98]

Iqtisodiy tasnif budjet mablag‘larining iqtisodiy mazmuniga ko‘ra guruhlanishini ifodalaydi. Bu tasnifga ish haqi va unga tenglashtirilgan to‘lovlar, tovarlar va xizmatlarni sotib olish xarajatlari, subsidiya va transfer to‘lovlari, kapital xarajatlar hamda boshqa xarajatlar kiradi. Iqtisodiy tasnif budjet mablag‘larining qanday maqsadlarda sarflanishini tahlil qilish imkonini beradi.

Tashkiliy yoki idoraviy tasnif esa budjet mablag‘larining qaysi vazirlik, idora yoki tashkilotlar tomonidan foydalanilishini ko‘rsatadi. Ushbu tasnif orqali har bir davlat organining budjet xarajatlari alohida ko‘rsatilib, ularning moliyaviy faoliyati ustidan nazoratni amalga oshirish imkoniyati yaratiladi.[99]

Budjet xarajatlarining to‘g‘ri tasniflanishi davlat moliyaviy resurslarini samarali boshqarish, budjet mablag‘laridan oqilona foydalanish hamda iqtisodiy va ijtimoiy rivojlanish jarayonlarini moliyaviy jihatdan ta’minlashda muhim ahamiyatga ega.

Markazlashgan investitsiya xarajatlari davlat byudjeti xarajatlarining muhim tarkibiy qismi bo‘lib, mamlakat iqtisodiyoti va ijtimoiy sohalarini rivojlantirishga qaratilgan yirik investitsiya loyihalarini moliyalashtirish uchun yo‘naltiriladigan mablag‘larni ifodalaydi. Ushbu xarajatlar, asosan, davlat investitsiya dasturlari doirasida amalga oshiriladi hamda strategik ahamiyatga ega bo‘lgan infratuzilma obyektlarini qurish, mavjudlarini rekonstruksiya qilish va modernizatsiya qilishga xizmat qiladi.

Markazlashgan investitsiya xarajatlari iqtisodiyotning ustuvor tarmoqlarini rivojlantirishda muhim rol o‘ynaydi. Jumladan, transport va logistika infratuzilmasini rivojlantirish, energetika tizimini takomillashtirish, sanoat korxonalarini modernizatsiya qilish, muhandislik-kommunikatsiya tarmoqlarini qurish hamda ijtimoiy soha obyektlarini barpo etish kabi yo‘nalishlar ushbu xarajatlar hisobidan

[98] Vahobov Abdug‘ani, & Jumaev Nizomiddin. (2017). Davlat moliyasi. Toshkent: Iqtisodiyot nashriyoti.
[99] Qobiljon Obidov. (2016). Davlat moliyasi. Toshkent: Iqtisodiyot nashriyoti.

moliyalashtiriladi. Bu esa mamlakat iqtisodiy salohiyatini oshirish, ishlab chiqarish hajmini kengaytirish va aholi turmush darajasini yaxshilashga xizmat qiladi.[100]

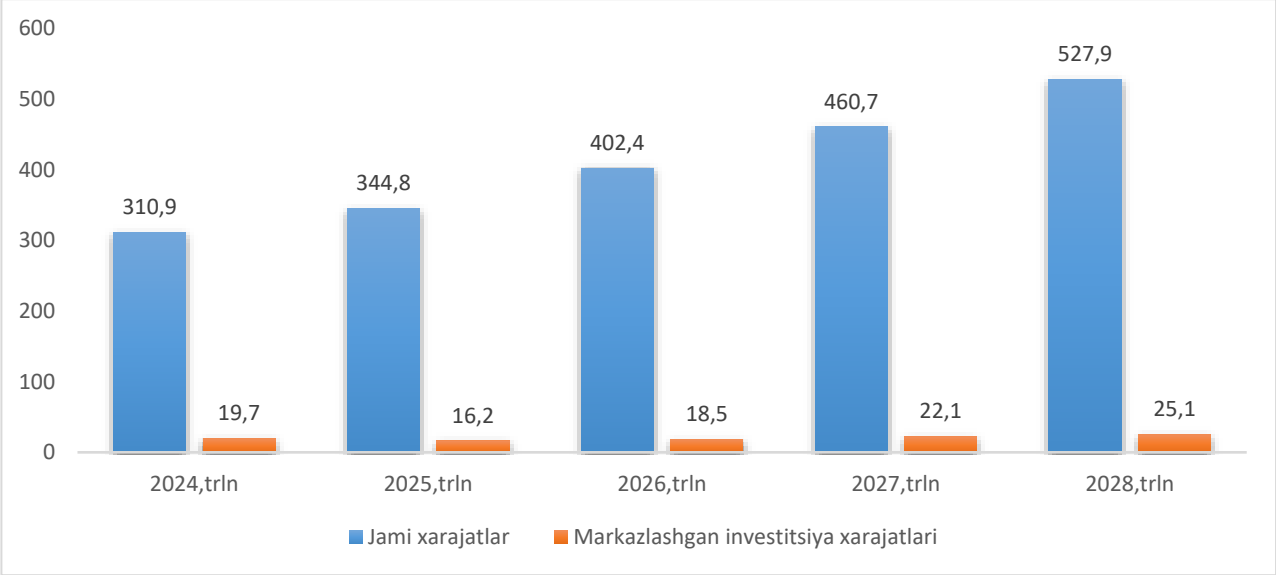
Davlat tomonidan amalga oshirilayotgan markazlashgan investitsiya xarajatlari iqtisodiy o‘sishning muhim omillaridan biri hisoblanadi. Ushbu investitsiyalar orqali yangi ishlab chiqarish quvvatlari yaratiladi, hududiy infratuzilma rivojlanadi hamda iqtisodiyot tarmoqlarining raqobatbardoshligi oshadi. Shu bilan birga, investitsiya loyihalarini amalga oshirish jarayonida byudjet mablag‘laridan samarali foydalanish, ularning maqsadli yo‘naltirilishini ta’minlash va loyiha samaradorligini oshirish muhim ahamiyat kasb etadi.

Shu sababli markazlashgan investitsiya xarajatlarini rejalashtirish va amalga oshirish jarayonida investitsiya loyihalarining iqtisodiy samaradorligini chuqur tahlil qilish, zamonaviy loyiha boshqaruvi usullarini qo‘llash hamda moliyaviy nazorat mexanizmlarini kuchaytirish zarur hisoblanadi. Bu esa davlat byudjeti mablag‘laridan oqilona foydalanish hamda iqtisodiy rivojlanishning barqarorligini ta’minlashga xizmat qiladi.[101]

1-rasm.

2024–2028 yillarda davlat budjeti jami xarajatlari va markazlashgan investitsiya xarajatlari dinamikasi (trln so‘mda).[102]

[100] Shavkat Tashmatov. (2018). Byudjet siyosati va uni takomillashtirish masalalari. Toshkent: Fan nashriyoti.
[101] Abdug‘ani Vahobov. (2020). O‘zbekiston moliya tizimi va uning rivojlanish istiqbollari. Toshkent: Iqtisodiyot nashriyoti.
[102] 2024–2028 yillarga mo‘ljallangan Byudjetnoma asosida muallif tomonidan tayyorlangan.



2024-2028 yillar davomida davlat budjeti jami xarajatlari barqaror o‘sish tendensiyasini ko‘rsatmoqda. Jumladan, 2024-yilda jami budjet xarajatlari 310,9 trln so‘mni tashkil etgan bo‘lsa, 2025-yilda 344,8 trln so‘m, 2026-yilda 402,4 trln so‘m, 2027-yilda 460,7 trln so‘m va 2028-yilda 527,9 trln so‘mga yetishi prognoz qilingan. Bu holat davlat moliya siyosatida iqtisodiyotni qo‘llab-quvvatlash, ijtimoiy sohalarni rivojlantirish hamda infratuzilma loyihalarini kengaytirishga qaratilgan budjet xarajatlarining ortib borayotganini ko‘rsatadi.

Markazlashgan investitsiya xarajatlari ham ushbu davr mobaynida umumiy o‘sish tendensiyasiga ega. 2024-yilda ushbu ko‘rsatkich 19,7 trln so‘mni tashkil etgan bo‘lsa, 2025-yilda 16,2 trln so‘mga qisqa muddatli kamayish kuzatiladi. Biroq keyingi yillarda yana o‘sish qayd etilib, 2026-yilda 18,5 trln so‘m, 2027-yilda 22,1 trln so‘m va 2028-yilda 25,1 trln so‘mga yetishi kutilmoqda. Bu holat davlat investitsiya siyosati doirasida infratuzilma, muhandislik-kommunikatsiya tarmoqlari va strategik iqtisodiy loyihalarni moliyalashtirishga e’tibor ortib borayotganini anglatadi.

Shuningdek, markazlashgan investitsiya xarajatlarining jami budjet xarajatlariga nisbati tahlil qilinganda, ushbu ulush taxminan 4,5-6 foiz atrofida shakllanayotganini ko‘rish mumkin. Bu esa davlat budjeti tarkibida investitsion xarajatlar muhim o‘rin

egallashini, biroq asosiy mablag‘lar ijtimoiy soha va boshqa yo‘nalishlarga yo‘naltirilayotganini ko‘rishimiz mumkin.

Xulosa.

Davlat byudjetining markazlashgan investitsiya xarajatlari mamlakat iqtisodiyotining barqaror rivojlanishini ta’minlashda muhim rol uynaydi. Ushbu xarajatlar orqali ijtimoiy infratuzilma, ishlab chiqarish tarmoqlari, transport va muhandislik-kommunikatsiya tizimlarini rivojlantirish, shuningdek hududlarning iqtisodiy salohiyatini oshirish imkoniyati yaratiladi. Tadqiqot natijalari shuni ko‘rsatadiki, markazlashgan investitsiya loyihalarini moliyalashtirish jarayonida byudjet mablag‘laridan samarali foydalanish, investitsiya loyihalarining iqtisodiy samaradorligini chuqur tahlil qilish hamda moliyaviy nazorat mexanizmlarini takomillashtirish muhim ahamiyat kasb etadi. investitsiya loyihalarini tanlash va amalga oshirish jarayonida strategik rejalashtirish, ochiqlik va shaffoflik tamoyillariga rioya etish davlat byudjeti mablag‘larining samaradorligini oshirishga xizmat qiladi.

Davlat byudjetining markazlashgan investitsiya xarajatlari samaradorligini oshirish uchun investitsiya loyihalarini tanlash va moliyalashtirish jarayonida ularning iqtisodiy hamda ijtimoiy samaradorligini chuqur baholash, byudjet mablag‘laridan maqsadli foydalanish ustidan monitoring va nazorat tizimini kuchaytirish maqsadga muvofiq hisoblanadi.

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CURRENT ISSUES IN MEDICAL SCIENCES, MODERN DIAGNOSTIC AND TREATMENT TECHNOLOGIES

POLIFARMATSIYA SHAROITIDA XAVFLI DORI KOMBINATSIYALARINI TAHLIL

Abdusalomova Mohinur Jahongir qizi

Farg'ona jamoat salomatligi tibbiyot instituti

*E-mail:**sotkaasuz7676asd@gmail.com***

Raximova Xusnidaxon Abdukarimovna

Farg'ona jamoat salomatligi tibbiyot instituti

*E-mail:**husnidahonrahimovaha@gmail.com***

Anotatsiya. *Mazkur maqolada polifarmatsiya sharoitida xavfli dori kombinatsiyalarini aniqlash, ularning farmakokinetik va farmakodinamik o'zaro ta'sir mexanizmlarini tahlil qilish hamda klinik amaliyotdagi oqibatlarini baholash masalalari yoritilgan. Polifarmatsiya — bir bemorga bir vaqtning o'zida bir nechta dori vositalarini qo'llash holati — ayniqsa surunkali kasalliklari mavjud, keksalar va komorbid patologiyali bemorlarda keng uchraydi. Bunday sharoitda dori vositalari o'rtasidagi nojo'ya o'zaro ta'sirlar (drug-drug interactions) farmakoterapiya samaradorligini pasaytirishi, nojo'ya reaksiyalar xavfini oshirishi va hatto hayot uchun xavfli asoratlarni keltirib chiqarishi mumkin.*

Maqolada klinik amaliyotda tez-tez uchraydigan xavfli kombinatsiyalar, jumladan, antikoagulyantlar, yurak-qon tomir tizimiga ta'sir qiluvchi preparatlar, nosteroid yallig'lanishga qarshi vositalar, antibiotiklar va markaziy nerv tizimiga ta'sir etuvchi dori vositalarining o'zaro ta'siri tahlil qilingan. Shuningdek, jigar

fermentlari (ayniqsa sitoxrom P450 tizimi) orqali metabolizm bosqichida yuzaga keladigan o‘zgarishlar, farmakokinetik parametrlar (so‘rilish, taqsimlanish, biotransformatsiya, chiqarilish) va farmakodinamik sinergizm yoki antagonizm holatlari ilmiy asosda yoritilgan.

Tadqiqot natijalari polifarmatsiya sharoitida individual yondashuv, klinik farmatsevt nazorati, dori monitoringi va elektron retsept tizimlaridan foydalanish xavfli kombinatsiyalarni kamaytirishda muhim ahamiyat kasb etishini ko‘rsatadi. Mazkur mavzu farmatsevtika va klinik amaliyot uchun dolzarb bo‘lib, dori xavfsizligini ta’minlash va bemor hayot sifatini oshirishga qaratilgan amaliy tavsiyalarni ishlab chiqishga xizmat qiladi.

Kalit so‘zlar: *Polifarmatsiya, dori vositalari o‘zaro ta’siri (drug-drug interaction), xavfli dori kombinatsiyalari, farmakokinetika, farmakodinamika, nojo‘ya dori reaksiyalari, komorbid holatlar, geriatrik farmakoterapiya, sitoxrom P450, klinik farmatsevtika, dori monitoringi, dori xavfsizligi, individual farmakoterapiya.*

Abstract. *This article analyzes the nature of stroke, its risks and modern preventive measures. Stroke is a pathological condition resulting from an acute disruption of cerebral circulation and is one of the leading causes of death and disability worldwide. According to the World Health Organization, 16-17 million people suffer a stroke every year, 30-35% of whom die. At the same time, studies show that up to 80% of stroke cases can be prevented. The article discusses in detail the main risk factors for stroke development - arterial hypertension, diabetes, atherosclerosis, heart rhythm disturbances (atrial fibrillation), obesity and bad habits. The two main areas of prevention are the formation of a healthy lifestyle (regular physical activity, proper nutrition, body weight control, quitting smoking and alcohol) and medical supervision (regular testing of blood pressure, blood sugar and cholesterol levels, timely treatment of chronic diseases). The BE FAST (Balance,*

Eyes, Face, Arms, Speech, Time) system for identifying the first signs of stroke and the importance of emergency medical care are also highlighted.

Keywords: *stroke, ischemic stroke, hemorrhagic stroke, prevention, risk factors, arterial hypertension, healthy lifestyle, physical activity, blood pressure control. Stroke prevention and its measures*

Polifarmatsiya prevalensiyasi va global ko‘lam

Polifarmatsiya – bir bemorda bir vaqtning o‘zida besh yoki undan ortiq dori vositasini qo‘llash holati sifatida aniqlanadi. Bugungi kunda ko‘plab epidemiologik tadqiqotlar uni jahon miqyosida keng tarqalgan muammo ekanini ko‘rsatmoqda. Jahon bo‘yicha polifarmatsiya prevalensiyasi umumiy aholi orasida taxminan 37 % ni tashkil etadi, bu ko‘rsatkich esa yoshi kattalar (65 yoshdan yuqori bo‘lganlar) orasida 45 % gacha oshadi. Shuningdek, kasalxonada davolanuvchi bemorlarda bu ko‘rsatkich 52 % atrofida ekanligi aniqlangan. Bu yuqori ko‘rsatkichlar sog‘liqni saqlash tizimlarida ko‘p dori qo‘llanilishining qanchalik keng tarqalganligini ko‘rsatadi.

Metaanalizlar shuni ham ko‘rsatadiki, global miqyosda kattalar orasida polifarmatsiya prevalensiyasi taxminan 39,1 % bo‘lib, undan kattaroq darajadagi (“hyperpolypharmacy”, ya’ni ≥10 dori) holatlar ham 13,3 % ni tashkil qiladi.

Kognitiv pasayish yoki xotira buzilishi bo‘lgan bemorlar orasida polifarmatsiya darajasi yanada yuqori bo‘lib, 62 % holatlarda bir nechta dori vositalari birgalikda qo‘llanadi.

Polifarmatsiya va dori o‘zaro ta’sirlarining klinik oqibatlari

Ko‘pgina tadqiqotlar shuni ko‘rsatadiki, polifarmatsiya bemorlarda nojo‘ya dori reaksiyalari (ADR) va klinik asoratlarga sezilarli darajada olib keladi. Masalan, bir qator klinik kuzatuvlarda yoshi katta bemorlar orasida polifarmatsiya mavjud

bo‘lganlarda ADR paydo bo‘lish darajasi 35,5 % bo‘lsa, polifarmatsiya bo‘lmaganlarda bu ko‘rsatkich 14 % atrofida bo‘lgan.

Bundan tashqari, polifarmatsiya mavjud bemorlar dorilar bilan bog‘liq shifoxonaga yotqizilish holatlari ham yuqori bo‘lib, 28 % holatlarda dori sababli hospitalizatsiya qayd etilgan. Bu esa sog‘liq uchun jiddiy muammolarni ifodalaydi.

Ko‘plab kasalliklarda, masalan sistemik skleroz kabi murakkab patologiyalarda, polifarmatsiya bilan birga o‘zaro dori ta’sirlariga uchrash ehtimoli 65,7 % darajasida bo‘lib, shundan 8,3 % hollarda sezilarli nojo‘ya reaksiyalar qayd etilgan.

Xuddi shunday boshqa klinik tadqiqotlarda ham dori vositalarining meviyaviy kombinatsiyalarida potentsial dori-dori o‘zaro ta’siri darajasi yuqori bo‘lib, ko‘pincha farmakodinamik hamda farmakokinetik ta’sirlar natijasida nojo‘ya klinik oqibatlar paydo bo‘ladi.

Polifarmatsiyaning mexanizmlari va xavf omillari

Polifarmatsiya jarayonida dori vositalarining o‘zaro ta’siri ikki asosiy yo‘l bilan yuzaga keladi: farmakokinetik va farmakodinamik mexanizmlar orqali. Farmakokinetik o‘zaro ta’sirlar preparatlarning so‘rilishi, metabolizmi, tarqalishi va chiqarilishi jarayonlarini o‘zgartiradi, masalan, sitoxrom P450 fermentlar tizimiga ta’sir etuvchi vositalar boshqa dorilarning qon darajasini oshirishi yoki kamaytirishi mumkin. Farmakodinamik ta’sir bir vaqtning o‘zida bir xil retseptor tizimlarga yoki fiziologik jarayonlarga ta’sir etuvchi dorilar bilan bog‘liq bo‘lib, sinergizm yoki antagonizmni keltirib chiqaradi. Ushbu mexanizmlar bilan bog‘liq kombinatsiyalar xavfli klinik oqibatlarga — giperkaliemiya, qon ketishlar, aritmiyalar va markaziy asab tizimi depressiyasiga olib kelishi mumkin.

Polifarmatsiyani boshqarish va xavfni kamaytirish strategiyalari

Shu sababli sog‘liqni saqlash tizimlarida polifarmatsiya xavfini oldini olish va kamaytirish bo‘yicha aniq strategiyalar ishlab chiqilishi zarur. Buning uchun bemorning individual holatini baholash, dorilar ro‘yxatini muntazam qayta ko‘rib chiqish, elektron dori o‘zaro ta’sirini tekshiruvchi tizimlardan foydalanish, shuningdek, klinik farmatsevtlar nazorati muhim hisoblanadi.

Antikoagulyantlar bilan xavfli kombinatsiyalar

Warfarin polifarmatsiya sharoitida eng ko‘p o‘zaro ta’sirga kirishadigan preparatlardan biridir.

Xavfli kombinatsiyalar:

Warfarin + nosteroid yallig‘lanishga qarshi vositalar (masalan, Ibuprofen) → gastrointestinal qon ketish xavfi keskin ortadi.

Warfarin + antibiotiklar (masalan, Clarithromycin) → sitoxrom P450 ingibitsiyasi tufayli INR oshadi va gemorragik asoratlar kuzatiladi.

Warfarin + aspirin → qo‘shaloq antitrombotsitar va antikoagulyant ta’sir natijasida ichki qon ketish xavfi.

Yurak-qon tomir preparatlari kombinatsiyasi

Yurak kasalliklari bo‘lgan bemorlarda ko‘p komponentli davolash keng qo‘llanadi.

Enalapril + Spironolactone → giperkaliemiya xavfi.

Metoprolol + Verapamil → bradikardiya va AV-blokada.

Diuretiklar + yurak glikozidlari (masalan, Digoxin) → elektrolit disbalansi fonida digoksin toksikligi.

Keksalarda bu kombinatsiyalar yurak ritmi buzilishlari va hushdan ketish bilan namoyon bo‘lishi mumkin.

Markaziy nerv tizimiga ta’sir qiluvchi dorilar

Sedativ va psixotrop vositalar kombinatsiyasi ayniqsa xavflidir.

Benzodiazepinlar (masalan, Diazepam) + opioid analgetiklar (masalan, Morphine) → nafas markazi depressiyasi.

Antidepressantlar (masalan, Fluoxetine) + MAO ingibitorlari → serotonin sindromi (gipertermiya, taxikardiya, nevrologik buzilishlar).

Antipsixotiklar + antiaritmiklar → QT interval uzayishi.

Xulosa

Polifarmatsiya zamonaviy klinik amaliyotning ajralmas qismi bo‘lib, ayniqsa surunkali va komorbid kasalliklari mavjud bemorlarda keng qo‘llaniladi. Biroq bir vaqtning o‘zida bir nechta dori vositalarini qo‘llash xavfli dori kombinatsiyalari, farmakokinetik va farmakodinamik o‘zaro ta’sirlar, shuningdek nojo‘ya dori reaksiyalarining ortishiga olib keladi. Ayniqsa antikoagulyantlar, yurak-qon tomir tizimiga ta’sir qiluvchi preparatlar, markaziy nerv tizimi vositalari, antibiotiklar va antidiabetik dorilar kombinatsiyasi yuqori xavf guruhini tashkil etadi.

Tahlillar shuni ko‘rsatadiki, polifarmatsiya sharoitida dori vositalarining o‘zaro ta’siri ko‘pincha qon ketishlar, aritmiyalar, elektrolit disbalansi, nafas markazi depressiyasi, buyrak va jigar yetishmovchiligi kabi og‘ir klinik asoratlarga sabab bo‘ladi. Xususan, geriatrik bemorlarda farmakokinetik jarayonlarning yoshga bog‘liq o‘zgarishi tufayli toksik ta’sir ehtimoli yanada ortadi.

Shu sababli polifarmatsiya sharoitida farmakoterapiyani individual yondashuv asosida olib borish, har bir dori tayinlanishidan oldin mavjud terapiyani chuqur tahlil qilish, minimal samarali dozani qo‘llash, muntazam laborator monitoring o‘tkazish hamda klinik farmatsevt ishtirokini ta’minlash muhim ahamiyat kasb etadi. Elektron

retsept tizimlari va dori o‘zaro ta’sirini aniqlovchi dasturlardan foydalanish xavfli kombinatsiyalarni erta bosqichda aniqlashga yordam beradi.

Umuman olganda, polifarmatsiya sharoitida xavfli dori kombinatsiyalarini aniqlash va oldini olish dori xavfsizligini ta’minlash, davolash samaradorligini oshirish hamda bemor hayot sifatini yaxshilashda muhim omil hisoblanadi.

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GENERAL UNDERSTANDING OF DENTAL CARIES AND TREATMENT METHODS AT THE SPOT STAGE

Ataboeva Mohira

Ranch universiteti

E-mail: *atabevamohira@gmail.com*

Iskandarov Samandar

Ranch universiteti

E-mail: : *atabevamohira@gmail.com*

Abstract: *This article discusses the nature of dental caries, its etiology, pathogenesis, clinical course, and especially its initial stage — the spot stage — in detail. Early diagnosis of spot-stage caries and modern treatment methods, including remineralization therapy and the importance of preventive measures, are analyzed. According to the research results, it is substantiated that with the correct approach at the early stage of caries, it is possible to stop the disease and restore dental tissues.*

Keywords: *dental caries, enamel demineralization, dentin destruction, spot-stage caries, early diagnosis, remineralization therapy, oral microorganisms, Streptococcus mutans, preventive dentistry, carbohydrate metabolism, acid formation, tooth decay prevention, clinical course of caries, oral health, dental tissue restoration*

Introduction: Today, one of the most widespread diseases among dental conditions is dental caries. Caries negatively affects not only oral health but also the overall health of a person. According to statistical data, approximately 80–90% of the population experience caries at least once in their lifetime. Caries is a pathological process that occurs in the hard tissues of the tooth (enamel and dentin) under the influence of microorganisms, characterized by demineralization followed by tissue destruction. In particular, the initial stage of the disease — the spot stage

— is of great importance, as at this stage it is possible to stop and reverse the process. The aim of this article is to provide a general understanding of dental caries, explain its mechanism of development, and analyze effective treatment methods for spot-stage caries.

Main Part

1. General understanding of dental caries

Caries is a chronic pathological process of the enamel and dentin of the tooth, caused by the activity of bacteria. Microorganisms living in the oral cavity (especially Streptococcus mutans) break down carbohydrates from food, resulting in the formation of organic acids. These acids lead to the demineralization of tooth enamel.

Main causes of dental caries:

1. Dental plaque (Plaque) – a sticky structure consisting of bacterial cells and an intercellular substance (matrix). Dental plaque is of two types: supragingival (above the gum) and subgingival (below the gum). Supragingival plaque is more associated with the development of caries, while subgingival plaque contributes mainly to periodontal diseases.

2. The role of carbohydrates in the development of caries

Caries is not caused by a single type of bacteria. The main pathogenic microorganism is Streptococcus mutans, which produces extracellular polysaccharides and adheres to the tooth surface. These bacteria are found in large amounts on the approximal surfaces of teeth. Under certain conditions (high intake of carbohydrates, changes in pH), other bacteria (Lactobacillus, Actinomyces, and Streptococcus salivarius) can also become cariogenic. Therefore, in addition to

microorganisms, the consumption of fermentable carbohydrates in the presence of poor oral hygiene significantly contributes to caries development.

3. The effect of saliva as the surrounding environment of the teeth

In a healthy adult, about 500 ml of saliva is secreted per day, of which approximately 200 ml is produced during meals. The remaining 300 ml is secreted at rest at a rate of about 0.3 ml/min. Saliva moistens different areas of the oral cavity at varying rates. It plays a crucial role in maintaining a stable environment in the oral cavity and performs multiple functions.

4. The composition and type of diet

Diet plays an important role in the development of caries. Studies show that even if there is a deficiency of vitamins and proteins in food, caries does not always develop. However, if dental plaque is present and easily fermentable carbohydrates (such as sugar and glucose) are consumed frequently and in large amounts, the risk of developing caries significantly increases.

Stages of caries development:

1. Initial (spot-stage) caries
2. Superficial caries
3. Moderate caries
4. Deep caries

Spot-stage caries (initial caries)

Spot-stage caries (Caries macula) is also referred to as enamel demineralization.

At this stage, it appears as a discoloration on a localized area of the enamel. The color may vary from dull white to light brown, dark brown, or even black spots.

Clinical observations show that the white spot form of caries (an active demineralization focus) can progress into superficial caries due to the breakdown of the surface layer of enamel.

Diagnosis:

Spot-stage caries can be detected using the following methods:

1. Visual examination

2. Drying of the tooth surface for inspection

3. Caries indicators (dyes)

4. Luminescent diagnostics

Treatment methods for spot-stage caries:

1. Remineralization (main treatment method)

This is the most effective and widely used method.

Main goal: To restore lost minerals (calcium, phosphate, fluoride) in the enamel.

Methods used:

1. Calcium + phosphate preparations

2. Fluoride-containing agents

3. Applied to the tooth surface and left for 10–20 minutes

4. Performed as a course for 10–15 days

Result:

1. The white spot gradually disappears

2. Enamel becomes stronger

3. Caries progression stops

2. Fluoridation

A more intensive form of remineralization.

Main methods:

1. Fluoride varnish application

2. Fluoride gel

3. Use of custom trays (individual caps)

Advantages:

1. Increases enamel resistance to acids

2. Slows down caries progression by 2–3 times

Prevention

To prevent spot-stage caries:

1. Brush teeth twice a day

2. Visit a dentist every 6 months

3. Use fluoride-containing products

4. Maintain a healthy diet

Conclusion

Dental caries is a widespread and serious dental problem, and its prevention and early-stage treatment are of great importance. In particular, timely detection and proper treatment of spot-stage caries make it possible to preserve dental tissues. In modern dentistry, remineralization therapy, fluoridation, and preventive measures demonstrate high effectiveness.

Therefore, increasing public awareness of oral health, maintaining proper oral hygiene, and undergoing regular dental check-ups are of significant importance.

As of December 2025, the total population of the Khorezm region is 2,069,220. The total number of dental staff positions in the region is 160.50. During 2025, the total number of patients who applied for dental care was 415,441.

Out of these:

1. Caries cases: 33,731 in adults and 18,971 in children were detected and treated

2. Pulpitis: 14,207 cases in adults and 10,200 in children were identified and treated

3. Periodontitis: 9,662 cases in adults and 8,202 in children were diagnosed and treated

Among these cases, 26,550 teeth were extracted surgically.

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O‘ZBEKISTON RESPUBLIKASI DORI VOSITALARI VA TIBBIY BUYUMLARI DAVLAT REESTRIDA RO'YXATDAN O'TGAN SURUNKALI PANKREATIT KASALLIGINI DAVOLASHDA ISHLATILADIGAN DORI VOSITALARI ISTE'MOLI TAHLILI

Burxonova Dildora Alisher qizi

Farg'ona jamoat salomatligi tibbiyot instituti

Email: ddbb9040@gmail.com

Raximova Xusnidaxon Abdukarimovna

Farg‘ona jamoat salomatligi tibbiyot instituti

Email: husnidahonrahimovaha@gmail.com

Annotatsiya: *Ushbu maqolada O’zbekiston Respublikasida dori vositalari va tibbiy buyumlarning davlat reestrida ro’yxatdan o’tgan, surunkali pankreatit kasalligini davolashda qo’llaniladigan dori vositalari iste’molining tahlili keltirilgan. Tadqiqot davomida ferment preparatlari, spazmolitiklar, proton pompasi ingibitorlari, antatsidlar hamda qo’shimcha simptomatik terapiya vositalarining turlari, ularning klinik samaradorligi va qo’llanilish darajasi o’rganildi.Shuningdek, dori vositalarining assortiment tarkibi, mahalliy va xorijiy ishlab chiqaruvchilar ulushi, narx omillari hamda aholi tomonidan iste’mol qilish tendentsiyalari tahlil qilindi. Olingan natijalar surunkali pankreatitni davolashda kompleks yondashuv muhimligini, ayniqsa ferment terapiyasining yetakchi o’rin tutishini ko’rsatdi.Tadqiqot xulosalari tibbiyot amaliyotida dori vositalaridan oqilona foydalanish, farmatsevtik bozorni tartibga solish va aholiga sifatli farmatsevtik yordam ko’rsatishni takomillashtirishga xizmat qiladi.*

Kalit so‘zlar: *surunkali pankreatit, pankreatin, tahlil, davlat reestri*

Abstract: *This article presents an analysis of the consumption of drugs registered in the State Register of Medicines and Medical Devices in the Republic of Uzbekistan, used in the treatment of chronic pancreatitis. During the study, the types of enzyme preparations, antispasmodics, proton pump inhibitors, antacids and additional symptomatic therapy, their clinical effectiveness and level of use were studied. In addition, the composition of the assortment of drugs, the share of domestic and foreign manufacturers, price factors and trends in consumption by the population were analyzed. The results obtained showed the importance of an integrated approach to the treatment of chronic pancreatitis, especially the leading role of enzyme therapy. The conclusions of the study serve to improve the rational use of drugs in medical practice, regulate the pharmaceutical market and provide quality pharmaceutical care to the population.*

Keywords: *chronic pancreatitis, pancreatin, analysis, state register*

Dolzarbligi: So'nggi o'ttiz yil ichida surunkali pankreatitning ko'rsatkichi ikki baravardan ko'proq o'sdi. mamlakatlarda bu ko'rsatkich o'zgarib turadi, bu kasallik oshqozon-ichak kasalligi bilan og'rigan bemorlarning 6-8% da tashxislanadi.

Pankreatit - bu oshqozon osti bezining yallig'lanishi, u o't pufagidagi toshlar, spirtli ichimliklar, turli dori-darmonlar va ba'zi virusli infeksiyalar tufayli yuzaga kelishi mumkin.

Ishning maqsadi: Tahlilning maqsadi surunkali pankreatitni davolashda qo'llaniladigan zamonaviy, eng samarali va xavfsiz dori vositalarini keng qamrovli tanlash va ro'yxatini tuzish va ulardan oqilona foydalanishni o'rganishdir.

Tadqiqot metodi va usullari: O'zbekiston Respublikasi Dori vositalari va tibbiyot buyumlari Davlat reestri asosida pankreatitga qarshi dori vositalari tahlili, sotsiologik so'rov.

Olingan natijalar: Tadqiqot davomida surunkali pankreatitni davolashda qo'llaniladigan dori-darmonlar, faol moddalar va ushbu kasallikdagi og'riqni bartaraf etishga eng samarali yordam beradigan komponentlar aniqlandi.

Quyida pankreatitga qarshi ba'zi dorilar ro'yxati:

Dori vositasi nomi	Dori shakli	Ishlab chiqaruvchi
Mezim pancreatin	kapsula, 25000, 10000	Germaniya, Berlin-Chemie
Pankreatin pancreatin	tabletka 25 ED	Rossiya, Irbitskiy XFZ
Mikrazim pancreatin	kapsula 25000, 10000	Rossiya, AVVA RUS
Pankreatin pancreatin	tabletka 25 ED	O'zbekiston, Samo
Kreazim pancreatin	kapsula, 25000, 10000	O'zbekiston, Nika Pharm

Shuni ta'kidlash kerakki, surunkali pankreatit uchun shifokorlar tomonidan tavsiya etilgan asosiy dorilardan biri bu Pankreatin faol moddasi bo'lgan dorilar. Germaniyaning Abbot kompaniyasidan "Kreon 25000" dori vositasi faol moddasi pankreatin bo'lgan dori vositalari ichida eng ko'p buyurilgan dori bo'lib, 66,67% ni tashkil etdi, keyingi natijalar "Mezim" Berlin-Chemie 10%ni tashkil etgan. Shunga ko'ra, surunkali pankreatitni davolashda qo'llaniladigan ikkinchi dori Omeprazol faol moddasi bo'lgan dorilar edi.

"Nolpaza" KRKA, faol moddasi Pantoprazol bo'lib, ko'pincha shifokorlar tomonidan tavsiya etilgan.

Xulosa: Tahlil shuni ko'rsatdiki, bugungi kunda surunkali pankreatitni davolashda shifokorlar ko'pincha Kreon 25000 va Nolpaza kabi dori-darmonlarni tavsiya etadilar. Ikkala dori ham mahalliy dori-darmonlar emas va ularning narxiga qaramay, mahalliy aholi orasida katta talabga ega.

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MYELOID DERIVED SUPPRESSIVE CELLS AND THEIR ROLE IN CANCER

Jumaniyazova Shakhnoza Iskanderovna

Tashkent state medical university

This review describes the immunosuppressive mechanisms by myeloid-derived suppressive cells. The detailed study of the cell subsets was mainly associated with their ability to suppress the host antitumor response leading to increase in the number of oncological diseases. Moreover, MDSC-induced immunosuppression plays an important role in tumour progression. Along with this, there is evidence of the direct involvement of MDSC in tumorogenesis and metastasis. The key function of MDSC is the suppression of T-cell immunity. In addition, MDSCs induce regulatory T and B cells (Treg and Breg) while simultaneously limiting antibody production and normal B cell proliferation. At the same time, MDSCs also suppress the activity of NK cells and antigen-presenting cells (APCs), inducing the polarization of macrophages in the

direction of the regulatory phenotype. In general, MDSCs have multilevel immunosuppressive activity that affects most of the key parameters of the immune response. It is likely that with further accumulation of data, it will be possible to improve methods of treating oncological diseases.

Myeloid-derived suppressor cells is a heterogeneous population of cells represented by immature myeloid cells capable of suppressing the immune response (Parker et al., 2015). These cells are assigned a hierarchical pinnacle in immune response regulation ("MDSCs are at the top of the regulatory immune cell hierarchy, and their precise tuning is a hot topic of today's research") (Pak, 2019). Moreover, R.J.Tesi devoted a review to these cells called "The most important cells you have never heard of", in which he figuratively compares them in terms of functionality in the microenvironment of a tumour with queen bees in a hive (Tesi, 2019). MDSCs are found to be increased in the microenvironment of different solid tumours (Greten et al., 2011). It is clear that MDSC protect the tumour from the patient's immune system, rendering it resistant to immunotherapy. There is also evidence that MDSCs are involved in angiogenesis and metastasis. Elimination of these cells from the tumour microenvironment is important for achieving therapeutic benefits (Tesi, 2019). However, the level of MDSC is high in many pathological conditions, including inflammation, sepsis, traumatic shock, autoimmune diseases (Goedegebuure et al., 2011). The main function of these cells in all aforementioned conditions is suppressing the innate and adaptive immune response.

Origin of MDSC

MDSC are bone marrow derived cells of myeloid origin, present in the blood, lymph nodes, spleen, tumours and in those tissues where immunocompetent cells are present. MDSCs are formed as a result of dysregulation in the differentiation of the haematopoiesis, which leads to the accumulation of a heterogeneous population of

immature myeloid cells. Myeloid progenitor cells differentiate in the bone marrow into immature myeloid cells. At this stage the cells leave the bone marrow and enter the peripheral circulation (Fig. 1) (Millrud et al., 2016).

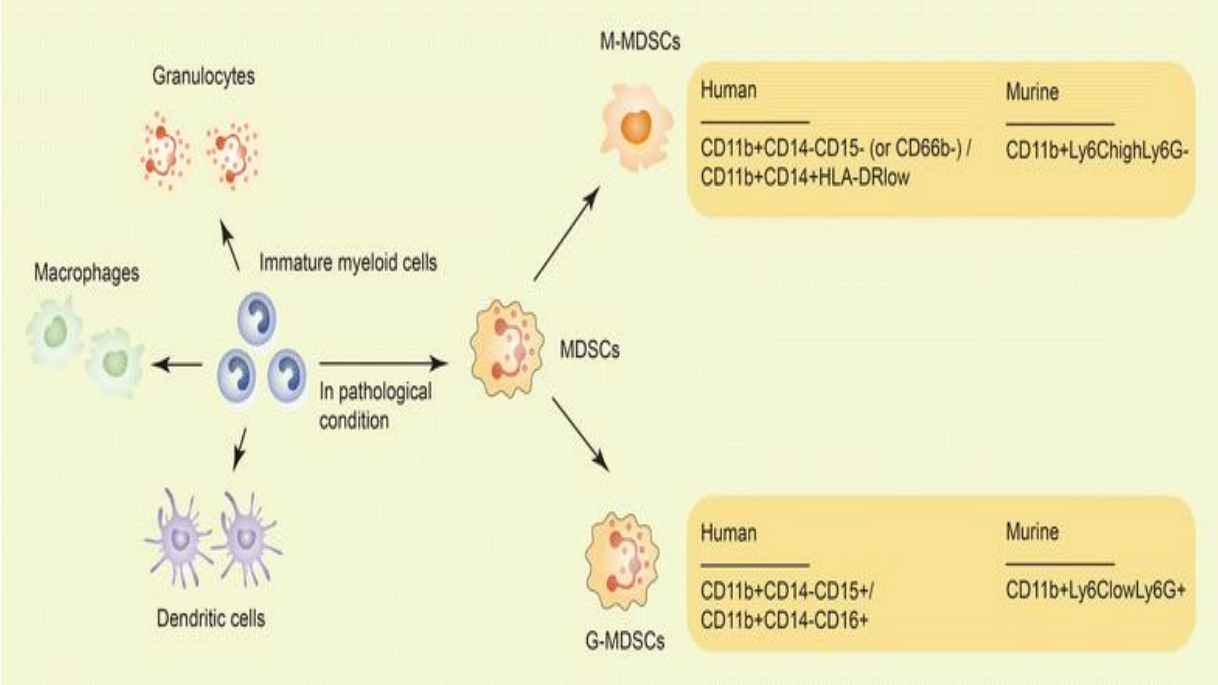

Fig. 1. Origin of MDSC from immature myeloid cells (Zhang et al., 2018)

Typically, myeloid cells migrate to various peripheral organs where they differentiate into mature myeloid cells such as macrophages, dendritic cells (DCs), or granulocytes. However, during infection (Bowen and Olson, 2009), sepsis (Delano et al., 2007), trauma (Makarenkova et al., 2006), or in the tumour microenvironment (Serafini et al., 2006), differentiation of immature myeloid cells into normal mature myeloid cells is blocked. At the same time, immature myeloid cells become activated MDSC (Goedegebuure et al., 2011). Currently, two main populations of MDSCs have been characterized: monocytic (M-MDSC) and polymorphonuclear (or granulocytic) (PMN-MDSC or G-MDSC) (Gabrilovich, 2017).

Phenotypic characteristics of MDSC

Being a heterogeneous population of cells, MDSC can often express various markers that coincide with markers of other cells of myeloid origin, such as dendritic cells (DC), granulocytes and monocytes (Fig. 2) (Kong et al., 2013). As noted above, there are two main populations of MC: monocytic (M-MDSC) and polymorphonuclear (or granulocytic) (PMN-MDSC or G-MDSC) (Gabrilovich, 2017).

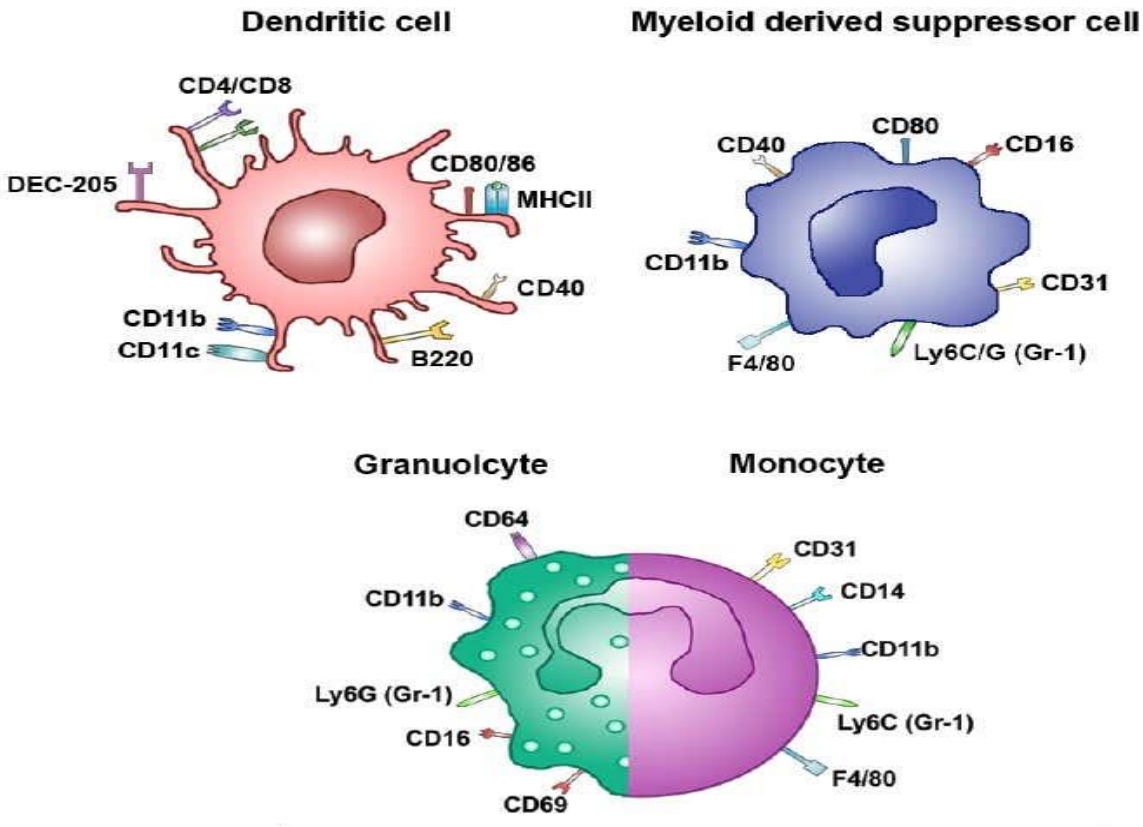

Fig. 2. Comparison of MDSC surface markers with monocyte, granulocyte and DC surface markers (Kong et al., 2013)

In humans, MDSCs are characterized by the expression of Lin^{-}HLA-DR–CD33+CD11b+ markers, but under various conditions, they can also express additional markers. Thus, it was shown that the monocytic fraction of MDSC expresses CD14, while the granulocytic fraction expresses CD15 (Trikha and Carson, 2014).

MDSC-mediated mechanisms of immunosuppression

MDSCs inhibit the immune response through intercellular interactions using molecules synthesized on the cell surface, as well as short-lived mediators (Kumar et al., 2016). The fig. 4 shows the main mechanisms by which MDSCs implement immunosuppression.

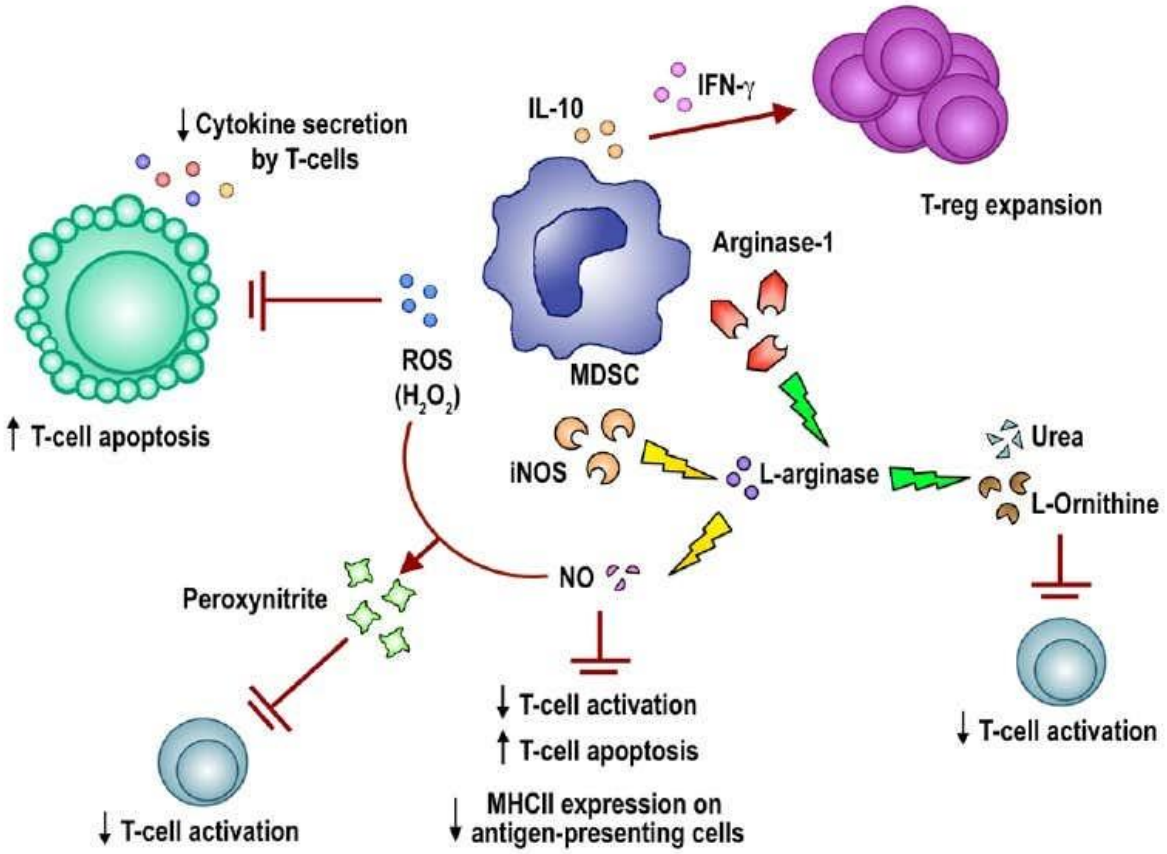

Fig. 4. Various mechanisms by which MDSCs exert immunosuppressive functions (Kong et al., 2013)

MDSCs affect T-lymphocytes through nutrient depletion

Primarily, MDSCs affect the metabolism of arginine and tryptophan, resulting in inhibition of the T-cell immune response. It is known that the enzyme iNOS (inducible Nitric Oxide Synthase, 15 inducible NO synthase) converts arginine into NO and citrulline, while arginase 1 (Arg1) converts into ornithine and urea (Fig. 5). This leads

to arginine starvation, which is considered to be "semi-essential" or "conditional essential" amino acid (Chen et al., 2021).

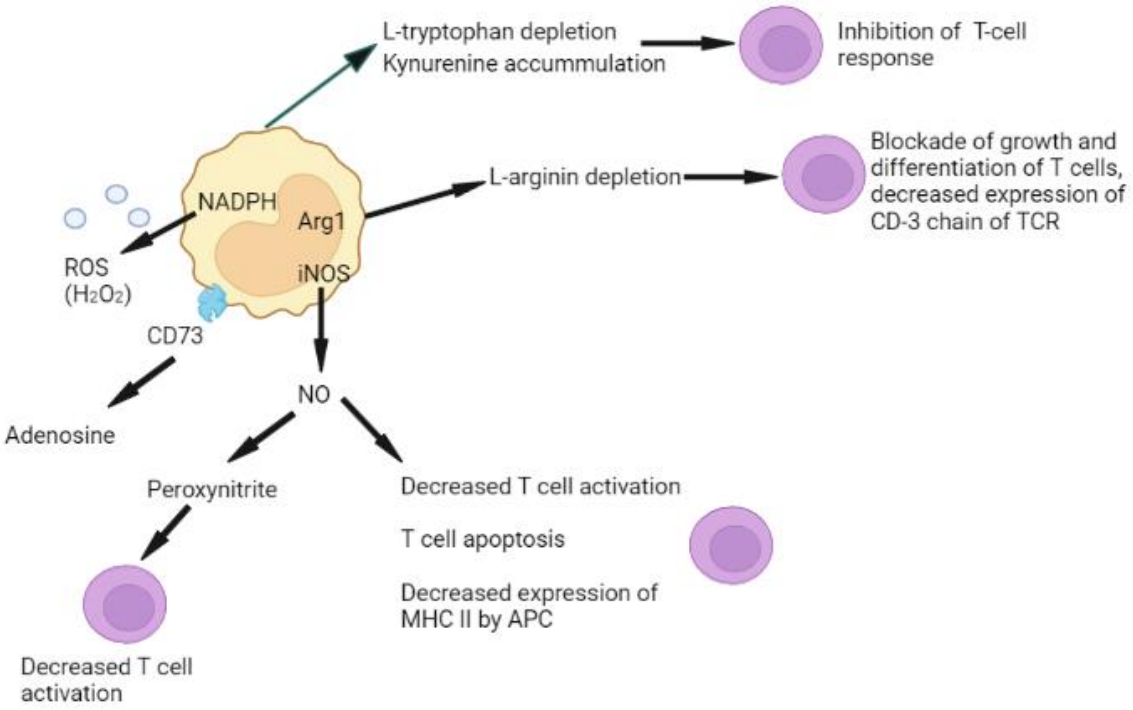

Fig 5. Created with BioRender.com.

In turn, the lack of arginine negatively affects T-cell proliferation and suppresses the expression of TCR CD3ζ chain (Rodriguez et al., 2007). A similar mechanism of MDSC-mediated T-cell suppression is the STAT3-dependent activation of the Indoleamine 2,3-dioxygenase (IDO) enzyme, which leads to tryptophan deficiency (Yu et al., 2013). Several more immunosuppressive mechanisms such as inhibition of macrophage activation, and death of T-lymphocytes due to the release of by-products of the IDO reaction (kynurenine, 3-hydroxykynurenine, 3-hydroxyanthranilic acid) associated with IDO-mediated deficiency of tryptophan were shown (Fallarino et al., 2002).

In addition, it is known that IDO produced by tumour cells contributes to the recruitment and activation of MDSCs a T-regulatory lymphocytes (Treg) dependent

way (Holmgaard et al., 2015). It is important to note that IDO is also expressed at the maternal–fetal interface to prevent maternal T cell responses by tryptophan catabolism (Munn et al., 1998). Second, MDSCs produce reactive oxygen species (ROS) and nitrogen through the work of NADPH oxidase and iNOS respectively. Oxidative stress maintains the inflammatory microenvironment, and peroxynitrite is formed due to the chemical reaction between the superoxide radical anion and nitric oxide (Pacher et al., 2007). Peroxynitrite, in turn, is involved in the nitration and nitrosylation of various amino acids, forming their deficiency at the site of inflammation. Peroxynitrite is characterized by another mechanism of action, for example, it modifies the components of the TCR complex, affecting its interaction with MHC molecules (Major Histocompatibility Complex), which ultimately leads to inhibition of a specific T-cell response (Nagaraj et al., 2007).

MDSCs produce reactive nitrogen species, which leads to nitrosylation of the CCL2 chemokine, the modification of which prevents CD8+ T cells from infiltrating the site of the immune response (Molon et al., 2011). Expression of CD73 (ecto-5'-nucleotidase) on the surface of MDSC results in the transformation of adenosine monophosphate to adenosine, which inhibits T cell effector functions including proliferation, expansion, and secretion of important antitumor cytokines such as IFN-γ and TNF-α (Ohta et al., 2006). The anti-inflammatory effect of extracellular adenosine on T cells is realized upon activation of the A2A adenosine receptor (A2AR), which, in turn, causes the accumulation of immunosuppressive cAMP (second messenger, cyclic adenosine monophosphate) in the cell, as a result of which CD25 expression on cells diminishes (Ohta et al., 2006).

MDSC-triggered interference with normal lymphocyte homing

It is known that MDSCs can affect T-cell migration and viability. Thus, MDSCs express the ADAM17 molecule, which cleaves the outer domain of CD62L due to its proteolytic activity. CD62L is an important adhesion molecule by which naïve lymphocytes are directed to the lymph nodes where they differentiate into activated T

cells upon exposure to an antigen. Expression of CD62L ensures trafficking of naive lymphocytes to the site of the immune response, where they are activated (Hanson et al., 2009). Thus, by removing CD62L, MDSCs prevent the activation of naive T cells and their localization at the site of the immune response (Hanson et al., 2009). As a result, T cells do not migrate to the lymph nodes where they could be activated.

Inhibition of T-lymphocyte functions

MDSCs express the molecule galectin-9 (Gal-9), which is a ligand for TIM-3 (T-cell Immunoglobulin and Mucin-Domain Containing-3). In turn, TIM-3 on the surface of IFN-γ-producing CD4+ and CD8+ T cells provides their negative regulation. Interaction of TIM-3 with Gal-9 leads to T cell death and expansion of myeloid suppressor cells (Sakuishi et al., 2011). The PD-L1 (Programmed Cell Death 1 Ligand) molecule, which inhibits T cells, can also be expressed by MDSCs. This molecule binds to PD-1 on T cells and causes inhibition of their functions or apoptosis (Noman et al., 2014).

Blockade of NK cell function

Based on experimental models of carcinogenesis, inhibition of NK cell function has been shown to correlate with an increase in MDSCs. At the same time, MDSCs reduced cytotoxicity of NK cells, production of IFN-γ, and expression of NKG2D (activating receptor, Natural-Killer Receptor Group 2, Member D) via membrane-bound TGF-β1 (Li et al., 2009).

MDSC and Tregs

Another mechanism for maintaining immune tolerance to fetoplacental antigens is associated with the induction and expansion of Tregs. Several experimental models have shown that MDSC can activate Treg both in vitro and in vivo. MDSC stimulated with IFN-γ express large amounts of IL-10 and TGF-β, which are important for Treg induction

and activation. Later, the same authors showed that IFN-γ regulates CD40 expression on MDSC and thus affects the intercellular interaction of CD40+MDSC with CD40L+-T cells in the presence of IL-10 and TGF-β, which leads to the expansion and activation of Treg (Pan et al., 2010).

MDSC and Bregs

Regulatory B cells (Breg) are a type of B cells that secrete IL-10 and have an immunosuppressive function. Bregs are known to regulate B-cell functions by inhibiting antibody synthesis by effector B-cells (Özkan et al., 2018). Although the underlying mechanism is unknown, it is hypothesized that there are several pathways of action: direct suppression by Breg cells or indirect suppression by reducing the helper T cell population or increasing the Treg cell population (Rosser et al., 2014). Apparently, MDSCs induce Breg proliferation by increasing the expression and activity of iNOS, thereby suppressing autoimmune responses. Thus, MDSC suppress the B-cell response indirectly through a mechanism involving Breg expansion (Özkan et al., 2018). Thus, the mechanisms by which MDSC realize immunosuppressive effects can be described as follows: M-MDSCs activate enzymatic pathways (iNOS, Arg1, COX2, IDO) that have suppressive effect on cells of the immune system

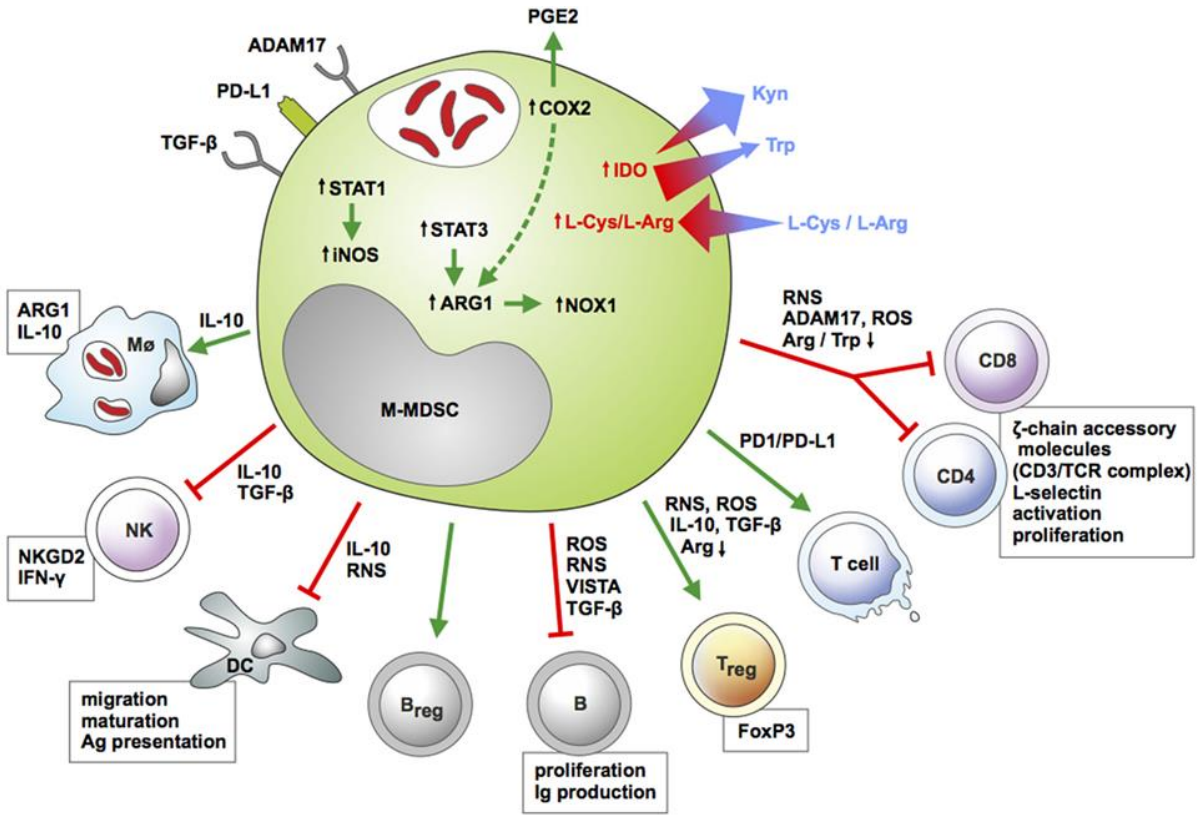

Fig. 6. Mechanisms by which MDSC exerts immunosuppressive effects on different cell types (Dorhoi and Du Plessis, 2018)

Factors regulating MDSC expansion and activity

Factors regulating MDSC expansion and activity can be divided into two groups. The first group factors are produced mainly by tumour cells which promote accumulation of MDSC. The second group of factors are produced by activated T cells, tumour stroma and provide activation of MDSCs (Li et al., 2021). Cytokines such as granulocyte–macrophage colony-stimulating factor (GM-CSF), G-CSF, M-CSF, stem cell factor (SCF), VEGF and IL-3 promote myelopoiesis and contribute to a blockade of myeloid cell maturation Pro-inflammatory soluble factors such as TNF, IL-1β, IL-6, S100A8-9 molecules and many others initiate the immunosuppressive functions of MDSC. Cytokines produced by activated T cells, such as IFN-γ, IL-4, IL-13, IL-10, have similar properties (Gabrilovich et al., 2012). Thus, the possibility of transition of immature myeloid cells to MDSC has been experimentally proven. MDSC-like cells were induced

using peripheral blood mononuclear cells from healthy donors in combination with cytokines as follows: GM-CSF, GM-CSF + IL-1β, GM-CSF + IL-6, GM-CSF + PGE_2, GM-CSF + TNF-α, and GM-CSF + VEGF. As a result, the myeloid precursors rapidly differentiated into. As a result, it was shown that cells with the most pronounced immunosuppression were formed when the cytokines GM-CSF and IL-6 were combined (Lechner et al., 2010). Pro-inflammatory cytokines released by the tumour and the tumour microenvironment suppress the terminal differentiation of myeloid cells and promote the expansion and activation of MDSC. Recent studies have shown that one of the key pro-inflammatory cytokines, TNF (tumour necrosis factor), is important for the development and activation of MDSC. Thus, Zhao et al. showed that transplantable tumour lines are often rejected when they are injected into TNF-deficient mice, and tumour growth regression is associated with slower accumulation of MDSC (Zhao et al., 2012). The same authors found that in the absence of TNF, c-FLIP expression, important anti-apoptotic factor, decreases whose production is mediated by NF-kB. Further, in TNF receptors deficient mice, it was shown that it is TNFRII (the receptor for TNF), and not TNFRI, that is important for the survival of MDSC due to activation of the expression of antiapoptotic proteins (Zhao et al., 2012). It is known that the main group of TNF receptors is CD120, which includes TNFRI and TNFRII. The importance of the signalling cascade mediated by TNFRII in the regulation of MDSC was also demonstrated by Polz et al. Thus, MDSCs obtained from mice deficient in TNFRII are characterized by reduced production of NO, which is necessary for the suppressive properties of MDSCs (Polz et al., 2014). TNF blocks differentiation and enhances the suppressive properties of MDSC in an experimental model of chronic inflammation (Sade-Feldman et al., 2013). TNF-deficient MDSCs did not inhibit the T-cell response and were characterized by reduced expression of s100A8, s100A9 and their RAGE receptor required for MDSC activation and expansion. In this work, it was shown for the first time that TNF blocks the further differentiation of immature myeloid cells in vitro, while in the absence of TNF they differentiated into CD11c+ and F4/80+, which

prevented the accumulation of MDSC (Sade-Feldman et al., 2013). It is known that the interaction of IL-1 with its receptor (IL-1R) leads to the activation of NF-kB through a MyD88-dependent pathway. At the same time, NF-kB regulates the expression of suppressor factors IL-10 and Arg1, as well as anti-apoptotic proteins necessary for the survival of MDSC. It has been shown that granulocytic subpopulation of MDSC [CD11b+Ly6G+Ly6C–], which inhibits the expression of the NKG2D receptor on NK cells, gains an advantage due to the overexpression of IL-1β (Elkabets et al., 2010). In addition, increased expression of IL-1β-gastric parietal cells contributes to the spontaneous development of gastric inflammation and is characterized by NF-kB-dependent activation of MDSC in mice (Tu et al., 2008).

At the same time, malignant neoplasms are characterized by an increase in IL-6. In the experimental model of mice esophageal cancer, as well as in patients with esophageal squamous cell carcinoma, there was found a positive correlation between IL-6 expression and MDSC accumulation (Chen et al., 2014). In addition, it was shown that the cultivation of blood leukocytes with IL-6 in vitro also leads to an increase in the MDSC pool with an increased level of arginase and reactive oxygen species (ROS), characteristic of this cell population. It is known that the mechanism of action of IL-6 is associated with the phosphorylation of STAT3, which, in turn, is an important transcription factor for activating the expression of genes responsible for the differentiation and recruitment of MDSCs to the inflammation zone (Chen et al., 2014). The important role of IL-6 in MDSC recruitment has also been demonstrated in an experimental model of breast cancer. It was also demonstrated that MDSCs themselves are able to express IL-6 and also increase the concentration of the soluble form of IL-6R (Oh et al., 2012). Thus, pro-inflammatory cytokines are important factors in the development and functioning of MDSC and the tumor microenvironment. Collectively, pro-inflammatory cytokines regulate MDSC function through activation of downstream signaling pathways: JAK/STAT, NF-kB, COX-2, PGE2 (Botta et al., 2014). These

results suggest that blocking TNF, IL-1, and IL-6 to possibly inhibit MDSC function may be an important adjunct to anticancer therapy.

MDSCs in physiological conditions

The question of functional significance of MDSC in normal conditions is still unclear. In healthy individuals, immature myeloid cells with the MDSC phenotype account for ~0.5% of peripheral blood mononuclear cells (Gabrilovich and Nagaraj, 2009). Apparently, MDSCs can protect tissues from damage if the immune response is excessively strong. They also participate in the healing of tissues at the site of injury and contribute to active regeneration. So, the process of regeneration of spinal cord injury was studied with the help of experiments on mice, The pre-injury MDSC group of mice showed better recovery results compared to the control group. At the same time, recovery significantly deteriorated when the MDSC pool was depleted (Saiwai et al., 2013). Thus, MDSCs appear to be part of a pool of cells associated with a physiological state.

MDSC and cancer

MDSC-induced immunosuppression plays an important role in tumour progression. Along with this, there is evidence of a direct involvement of MDSC in tumorigenesis and metastasis. There is information on the role of MDSC in the induction of the epithelial-mesenchymal transition (EMT) at primary tumour sites. EMT is associated with the acquisition of stem-like properties by tumour cells. MDSCs induce tumour cell stemness and cause expansion of the tumour stem cell population (Zhu et al., 2017). MDSC and other lymphoid cells are able to infiltrate distant sites, creating a premetastatic niche, a favourable microenvironment for metastasis formation. Gao et al showed that M-MDSCs accumulate in the premetastatic lungs of mice with spontaneous breast cancer (Gao et al., 2012). Tumour-recruited MDSCs are also involved in angiogenesis, for example, inhibition of MDSC infiltration of tumour sites leads to suppression of tumour angiogenesis (Pan et al., 2008). MDSCs can promote tumorigenesis by differentiating

into cell types that support tumour growth and metastasis. MDSCs are able to differentiate into fibroblast-like MDSCs that suppress T-cell responses and can induce angiogenesis (Zhang et al., 2013). It was observed that in hypoxic conditions, tumour-infiltrating MDSCs differentiate into tumour-associated macrophages (TAMs). The hypoxia-induced factor 1α (HIF-1α) is responsible for this effect (Corzo et al., 2010).

The immunosuppressive properties of tumour foci are not only one of the main factors causing cancer progression, but also a serious obstacle to effective immunotherapy (Safari et al., 2019). Immunosuppression associated with chronic inflammatory factors, such as growth factors, cytokines, and chemokines, is generated by the stroma and tumour cells. Chronic and exhaustive secretion of these mediators triggers the formation of MDSC, contributing to the development of one of the key players involved in tumour immunosuppression. In fact, direct cell-to-cell contact is a prerequisite for the immunosuppressive functions of MDSC. From a clinical point of view, peripheral blood MDSC levels correlate with clinical stage and therapeutic response in various forms of cancer. In addition, MDSCs are involved in the formation of chemoresistant tumours. In general, it is logical to use a rational therapeutic approach, in which MDSCs are removed from the tumour environment in various ways. The tumour microenvironment is a complex and evolving environment of tumour and host cells, and there is a mutual cross-talk between them. This interaction shapes the phenotype and function of both MDSCs and cells invading the host tumour. Figure 7 shows the growth factors and elements of the tumour microenvironment which regulate the induction and accumulation of MDSC. Also, it lists the main growth factors, hormones and transcription factors that regulate myelopoiesis and cause the expansion of MDSC in the bone marrow. Various cytokines and regulatory proteins that are produced by tumour cells and tumour-infiltrating cells (DCs, lymphocytes, macrophages, mast cells, and fibroblasts) increase the suppressive activity of MDSC. In general, MDSC survival is provided by many of the factors that cause MDSC accumulation, as well as those factors that prevent/limit apoptosis (Ostrand-Rosenberg and Fenselau, 2018).

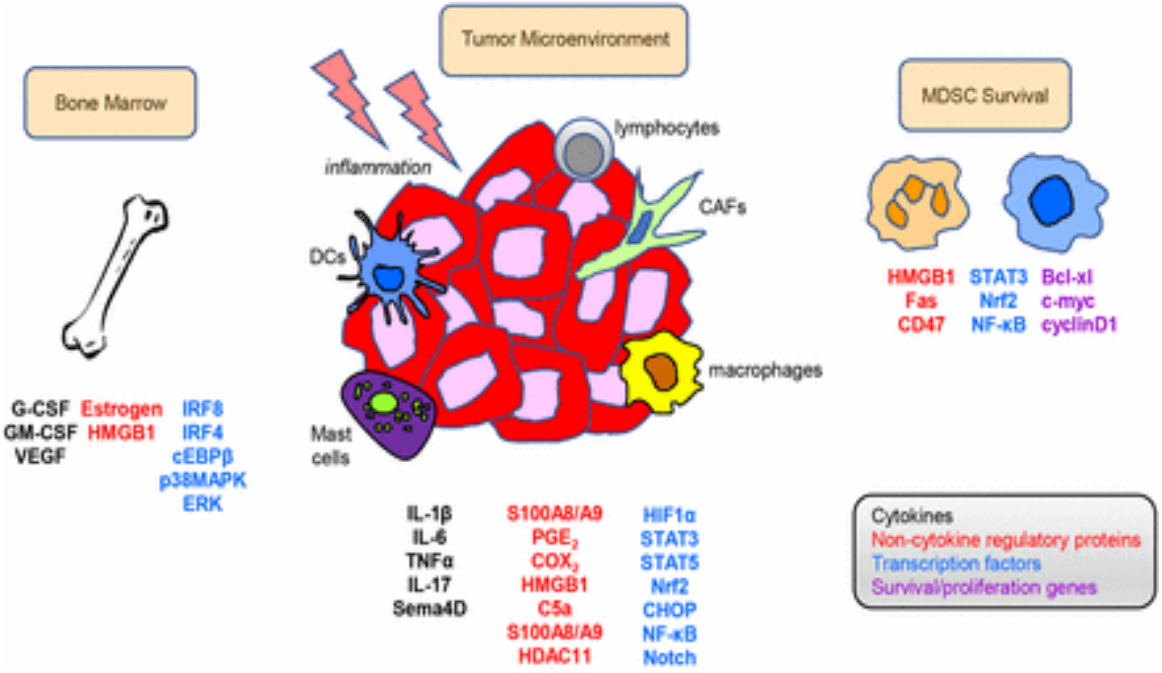

Fig. 7. Cytokines, immunoregulatory molecules and transcription factors control the development, accumulation, suppressive activity and survival of MDSC

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NAVOIY HUDUDIDA TURLI YOSHDAGI QORAKO‘L QO‘YLARINING JUN MAHSULDORLIGINI O‘RGANISH

Mavlyanova M.S.

Xoshimov B.S.

Navoiy davlat konchilik va texnologiyalar universiteti

Annotatsiya. *Har xil konstitutsiya tipidagi sovliqlarning jun mahsuldorligi, sifati va samaradorligi o‘rganilib, kelajakda ushbu sovliqlarning qaysi konstitutsiya tipidagisidan foydalanish va ularning sonini ko‘paytirish, har xil konstitutsiya tipidagi sovliqlarning jun mahsuldorligi, sifati va samaradorligini o‘rganib, kelajakda ushbu qo‘ylar bilan seleksiya-naslchilik ishlarini yuritish bo‘yicha dasturlar ishlab chiqishda foydalanish mumkin.*

Kalit so‘zlar: *qorako‘l qo‘ylar, konstitutsiya tipi, jun maxsuldorligi, sur, tirik og’irligi.*

Annotation. *Wool productivity, quality and efficiency of various constitution-type Owls have been studied, and in the future it is possible to use and increase the number of these owls of what type of constitution, study the wool productivity, quality and*

efficiency of different Constitution-type owls, and in the future it can be used to develop programs for maintaining selection and breeding work with these sheep.

Keywords: *Karakul sheep, constitution type, wool productivity, coat, live weight.*

Kirish

Qishloq xo‘jaligi O‘zbekiston iqtisodiyotining muhim tarmoqlaridan biri hisoblanadi. Bu tarmoq mamlakatimiz aholisining oziq-ovqat mahsulotlariga, qayta ishlash sanoati tarmoqlarining esa xom-ashyoga bo‘lgan talabini qondirish bilan birga, eksport salohiyatini mustahkamlashning istiqbolli manbalaridan biri sanaladi.

Bugungi kunda mamlakatimizda qorako‘lchilik tarmog‘ini rivojlantirish, korxonalarini modernizatsiya qilish, ishlab chiqarish quvvatlarini texnik va texnologik jihatdan yangilash, o‘zbek qorako‘li brendini yaratish va dunyo miqyosida targ‘ib qilish, sohaning investitsiyaviy jozibadorligini oshirish borasida keng qamrovli ishlar amalga oshirilmoqda.

Shu bilan birga, nasldor qorako‘l qo‘ylarini ko‘paytirish, shuningdek, ularni so‘yish, teri va junini qayta ishlash, go‘sht-sut mahsulotlari, yarim tayyor va tayyor mahsulotlar ishlab chiqarish korxonalarini tashkil qilish, tarmoqqa rivojlangan xorijiy davlatlar tajribasini va innovatsion texnologiyalarni joriy etish, suv bilan ta’minlanmagan yaylovlarda yangi suv inshootlarini qurish va mavjudlarini modernizatsiya qilish borasida bir qator tizimli muammolar saqlanib qolmoqda.

Yuqoridagilarni inobatga olib, qorako‘lchilik tarmog‘ini davlat tomonidan qo‘llab-quvvatlash, muammolarni bartaraf etish va aholi ehtiyojini imkon qadar to‘la qondirish maqsadida Respublikamiz Prezidenti Sh.M.Mirziyoyev tomonlaridan oxirgi yillarda bir qancha qarorlar qabul qilinib kelinmoqda [1-2].

Bugungi kunda mamlakatimizda qorako‘lchilik tarmog‘i korxonalarini modernizatsiya qilish, ishlab chiqarish quvvatlarini texnik va texnologik jihatdan yangilash, o‘zbek qorako‘li brendini yaratish va dunyo miqyosida targ‘ib qilish, sohaning investitsiyaviy jozibadorligini oshirish borasida keng qamrovli ishlar amalga oshirilmoqda.

Yuqoridagilarni inobatga olib, qorako‘lchilik tarmog‘ini davlat tomonidan qo‘llab-quvvatlash, yaylovlardan samarali foydalanish va yaylovlardan foydalanishda soliq imtiyozlarini qo‘llash, urug‘chilik ishini yo‘lga quyish, naslchilik ishlarini takomillashtirishda subsidiya berish tartibini qo‘llash hamda sohaning ilmiy salohiyatini yanada mustahkamlash maqsad qilib belgilangan. Jun olishning asosiy manbai qo‘ychilikdir. Qo‘y juni juda yaxshi yigirilishi, namatlanish xususiyati, pishiqligi, egiluvchanligi, issiqni kam o‘tkazishi va chidamliligi tufayli qadim zamonlardan beri turli buyumlar tayyorlashda foydalanib kelinadi va jun sanoati, namat-kigiz, trikotaj va gilam to‘qish sanoati uchun tengi yo‘q xom-ashyo hisoblanadi.

Qorako‘l zotli qo‘ylardan sifatli qorako‘l terilardan tashqari, qimmatli jun ham qirqib olinadi bu esa qorako‘l qo‘ylarining ahamiyati jihatidan ikkinchi o‘rinda turadigan mahsuloti xalq xo‘jaligi uchun juda zarur bo‘lgan dag‘al juni hisoblanadi. Qorako‘l qo‘ylar juni Respublikamizda tayyorlanadigan jami dag‘al junning 80% dan ko‘prog‘ini tashkil etadi va dag‘al movut, gilam, kigiz, namat va kigiz poyabzal tayyorlash uchun foydalaniladi. Gilam ishlab chiqarish sanoatida qorako‘l qo‘ylar juni juda sifatli xom a’shyo sifatida qadrlanadi, chunki undan to‘qilgan buyumlar sifati va pishiqligi bilan ajralab turadi [3].

Shu nuqtai nazardan yuqori genetik va jun mahsuldorlik salohiyatiga ega bo‘lgan qo‘ylar suruvlarini yaratish muhim ilmiy-amaliy muammo hisoblanadi.

Har xil konstitutsiya tipidagi sovliqlarning jun mahsuldorligi, sifati va samaradorligi Navoiy viloyatining ayrim tumanlaridagi qorako‘lchilikka moslashgan fermer xo‘jaliglaridagi sharoitida o‘rganish tadqiqotning maqsadi sifatida tanlandi [5].

Tadqiqot materiallari va uslublari

Qorako‘l qo‘ylari mahsuldorligini o’rganishda jun konstitutsiya tiplarini hisobga olish katta ahamiyat kasb etadi. Ushbu belgi qo‘ylarning sog‘ligi, hayotchanligi, sharoitga moslashishi va mahsuldorligini belgilovchi asosiy ko‘rsatkichlardan biri hisoblanadi. [4]. Shuning uchun biz tajribamizda 1-3-5 yoshli qorako‘l qo‘ylarining

turli konstitutsiya tipidagi bahorgi jun mahsuldorligini va junining ayrim ko‘rsatkichlarini o‘rgandik.

Qo‘ylarning jun maxsuldorligi qirqib olingan jun miqdori va uning tabiiy uzunligiga qarab baholanadi. Hayvonlarning tirik og‘irligi tarozi yordamida, eksrter o‘lchamlar, o‘lchov lentasi va maxsus o‘lchov tayog‘i yordamida o‘lchandi. Sur rangli 1-3-5 yoshli, konstitutsiya tipi har xil bo‘lgan qorako‘l qo‘ylari bahorgi junining ayrim xususiyatlarini o‘rgandim. Jun qirqimi og‘irligi nazorat tarozi yordamida 0,01 kg aniqlikda, jun kokilchalar uzunligi va tivit qoplami balandligi temirmillimetrli o‘lchag‘ich yordamida qo‘ylarning elkasida, yonboshida va son qismida o‘lchandi [5]..

Laboratoriya sharoitida o‘rganish uchun har xil yoshdagi qo‘ylarning yonbosh qismidan 50 grammdan jun olindi va Rossiya chorvachilik ilmiy tadqiqot instituti uslubi (V.V Kalinin M.M Mutaev, 1970 y) qo‘llanmasiga binoan junning uzunligi, tivit qoplami balandligi temir lineyka yordamida o‘lchandi, morfologik tarkibi, fraksiyalarga ajratish (tivit, oraliq tola va qilchiq), ingichkaligi mikroskop yordamida o‘rganildi, toza tola chiqimi aniqlandi [6]..

Tajribada olingan ma’lumotlar variasion statistika usullarida qayta ishlandi (N.A.Ploxinskiy 1969), har bir belgining o‘rtacha arifmetik ko‘rsatkichi (M) uning xatosi (m) o‘zgaruvchanlik koeffisenti (C%) hisoblandi. Guruhlar ko‘rsatkichlari orasidagi farqlanishlarning ishonchlilik darajalari (R) aniqlandi.

Tadqiqot natijalari

Har xil yoshdagi va konstitutsiya tipidagi qorako‘l qo‘ylarning tirik vazni og‘irligi

1-jadval

Rangi bo‘yicha	Qo‘y yoshi	Qo‘ylar bosh soni (n)	Qo‘ylarning jun konstitutsiya tipi	M ± m	S %
Qora	1	5	Mustahkam (G‘uzamoy)	30,20 ± 0,26	0,84
			Qo‘pol (Oq gul)	32,20 ± 0,30	0,92
			Nozik	27,40 ± 0,25	0,91
	3	5	Mustahkam (G‘uzamoy)	38,25 ± 0,35	0,89

			Qo‘pol (Oq gul)	40,46 ± 0,56	1,38
			Nozik	35,90 ± 1,03	2,87
	5	5	Mustahkam (G‘uzamoy)	43,80 ± 0,14	0,32
			Qo‘pol (Oq gul)	47,30 ±0,56	1,18
			Nozik	38,32 ± 0,68	1,76
Sur	1	5	Mustahkam (G‘uzamoy)	29,20 ± 0,38	1,31
			Qo‘pol (Oq gul)	31,10 ± 0,82	2,63
			Nozik	26,10 ± 0,47	1,81
	3	5	Mustahkam (G‘uzamoy)	37,25 ± 0,74	1,99
			Qo‘pol (Oq gul)	39,60 ± 0,97	2,44
			Nozik	34,0 ± 0,89	2,62
	5	5	Mustahkam (G‘uzamoy)	42,46 ± 1,04	2,45
			Qo‘pol (Oq gul)	46,15 ±0,74	1,60
			Nozik	37,80 ±1,29	3,4

1-Jadval ma’lumotlaridan ko‘rinib turibdiki, qora va sur rangli turli yoshdagi har xil konstitsiya tipidagi qorako’l qo’ylarining tirik vazni o’rganilganda quyidagicha natijalar olindi. Qora rangli 3 yoshli mustahkam konstitutsiya tipli qo’ylarning tirik vazni o‘rtacha bo’lib 38,25 kg tashkil etib, sur rangli mustahkam konstitutsiya tipiga tegishli qo’ylarda esa 37,25 kg tashkil etmoqda. Qora rangli qo‘pol konstitutsiya tipidagilar tirik og’irligi eng yuqori 40,46 kg, sur ranglilarda esa bu ko’rsatkich 39,6 kg. Nozik konstitutsiya tipidagilarda esa eng past ko’rsatkich qorada 35,90 kg, sur ranglilarda esa 34,0 kgni tashkil etmoqda.

Tajriba natijasida ko’rinib turibdiki qora va sur rangli qorako’l qo’ylarining tirik og’irligi rangi bo’yicha ham ma’lum bir darajada o’zgarish borligini ko’rishimiz mumkin. Bu ko’rsatkich qora ranglilarda sur ranglilarga nisbatan yuqori bo’lganligini ko’rishimiz mumkin. Hamda konstitutsiya tipi va tirik og‘irligi o‘rtasida aloqadorlik bor ekan.

Har xil yoshdagi va konstitutsiya tipidagi qorako‘l qo‘ylarining jun qirqimi chiqimi. Qorako‘l qo‘ylarning juni O‘zbekistonda boshqa jun turlariga nisbatan eng yuqori salmoqqa ega va dag‘al jun sanoati uchun asosiy xom-ashyo manbalaridan biri

hisoblanadi. Shu bilan birga u sifati jihatidan boshqa dag‘al junlardan ancha yuqori turadi. Qorako‘l qo‘ylarning juni qimmati va ahamiyati jihatidan qorako‘l terilaridan keyin ilgarilari ikkinchi o‘rinda turgan bo‘lsa, bozor iqtisodiyoti sharoitidan go‘sht mahsulotidan keyin uchinchi o‘ringa tushib qoldi. Junni sotishdan bozor iqtisodiyotiga o‘tish davrida ko‘p xo‘jaliklar zarar bilan chiqishdi. Islohotlarning ikkinchi davriga kelib asta-sekin, jun xom-ashyosi ham o‘z narxiga ega bo‘lib, olinadigan daromad ko‘paymoqda

Qorako‘l qo‘ylarning juni yiliga ikki marta bahorda va kuzda qirqiladi. Bahorgi jun junni qayta ishlash sanoati uchun eng yuqori qimmatga ega. U hayvonlarning o‘zidan qirqib olinadi va tarkibida barcha elementlar, shu jumladan, yetarli miqdorda yog‘li ter ham bo‘ladi.

Qo‘y juni yaxshi yigirilishi, namatlanish xususiyati, pishiqligi, egiluvchanligi, gigroskopikligi, issiqlikni kam o‘tkazish va chidamliligi tufayli qadim zamonlardan beri turli buyumlar tayyorlashda foydalanib kelinadi va jun sanoati, kigiz-namat va gilam to‘qish uchun tengi yo‘q xom-ashyo hisoblanadi.

Bu zotning asosiy mahsuloti bo‘lgan barra teri mo‘ynachilik sanoatida «qorako‘l» nomini olgan. Bundan tashqari, qorako‘l qo‘y zotlaridan jun, go‘sht va po‘stinbop teri ham olinadi. Qorako‘l qo‘ylar junidan gilam to‘qishda hamda dag‘al sukno tayyorlashda foydalaniladi.

M.D.Zokirov (1992) takidlashicha tirik vazni 40-45 kg keladigan sovliqlardan 2-3 kg dag‘al jun qirqib olinadi, kokilchalari (jun tutamlari)ning uzunligi 16-20 sm, tivitning balandligi (bo‘yi) 7-9 sm keladi, qo‘chqorlarda bu ko‘rsatkichlar 60-75 kg, 3-4 kg, 18-22 sm va 10-12 sm ni tashkil etadi.

Qorako‘l qo‘ylarning jun qoplami seleksioner uchun zotdorlik ko‘rsatkichi hisoblanadi va hayvonlarni jun konstitutsiya tiplari bo‘yicha baholashda shu ko‘rsatkichlardan foydalaniladi.

Qorako‘l qo‘ylarning kuzgi juni kigiz-namat tayyorlash uchun alohida qiymatga ega. Bahorgi junidan dag‘al junli gazlamalarning eng qimmatli navlari to‘qiladi.

Bunday gazlamalar erkaklar, ayollar, bolalar paltosi va erkaklar kostyumi uchun mo‘ljallangan. Harbiylarimizning shinellari ham aynan qorako‘l qo‘ylari junidan to‘qilgan gazlamalardan tikiladi. Samarqandning qimmatli qizil oyoq gilamlari, shuningdek uning bir qismidan esa dunyoda eng qimmatli turkman gilamlari to‘qishda foydalaniladi.

Hozirgi vaqtda O‘zbekistonda gilamlarga bo‘lgan ehtiyoj asosan Turkiya, Belgiya, Eron, Rossiya davlatlarida ishlab chiqarilgan, tarkibi asosan sun’iy tolalardan iborat, past sifatli gilamlar bilan qondirilmoqda, xolbuki, gilam to‘qish uchun eng qimmatli xom-ashyo hisoblangan qorako‘l qo‘ylaridan qirqib olinadigan junlar ko‘p miqdorda o‘zimizda ishlab chiqarilayapti. Shu bilan birga, dag‘al taroqlash usulida yigirilgan qorako‘l junidan trikotaj va kamvol gazlamalar uchun yuqori raqamli yigirilgan jun olishda foydalanish mumkin.

Turli xil zot qo‘ylardan olinadigan xilma-xil dag‘al jun orasida qorako‘l qo‘ylar juni sifati, hamda umumiy jun miqdoridagi salmog‘i jihatidan birinchi o‘rinda turadi va u faqat kigiz, valenka buyumlar tayyorlash uchun emas, balki yigirish uchun, «Nozik» tipdagi qo‘ylarning juni esa, kostyumbop gazlamalar to‘qish uchun ham yaroqlidir.

Qorako‘l qo‘ylarining jun mahsuldorligiga va junning sifati qo‘ylarning konstitutsiya va barra tiplariga, yaylovda boqish sharoitiga, ularning semizligiga, jinsi, yoshi, rangii va boshqa ko‘rsatkichlariga muayyan darajada bog‘liqdir.

Qorako‘l qo‘ylarnig jun qirqimi miqdori qo‘ylarning konstitutsiya tiplariga ham bog‘liq bo‘ladi. Ayni vaqtda har xil konstitutsiya tipidagi katta yoshli qorako‘l qo‘ylardan barra sifati har xil bo‘lgan qo‘zi olinadi, chunonchi jun mahsuldorligi yuqori, ammo junning sifati past bo‘lgan sovliqlardan yirik gulli jun mahsuldorligi past, ammo sifati yuqori bo‘lgan sovliqlardan esa, mayda guli qo‘zi olinadi. Jun mahsuldorligi ham, uning sifati ham o‘rtacha bo‘lgan sovliqlardan o‘rtacha gulli qo‘zi olinadi.

Yusupov S.Y, Bozorov S.R. (1998) qorako‘l qo‘ylarning o‘rtacha yillik jun qirqimi iflos junga aylantirib hisoblanganda 3-3,5 kg ni tashkil etishi mumkin. Navoiy

viloyatining «Abay», «Qizilqum» naslchilik shirkat xo‘jaliklari singari ayrim xo‘jaliklarda yaylov sharoiti yaxshi bo‘lgan yillarda har bosh qo‘ydan 2,5-3 kg dan jun qirqib olinadi degan fikrni aytganlar.

S.Y.Yusupov (2005), A.D.Islamov (2010) ma’lumotlariga qaraganda qo‘ylarning jun mahsuldorligi zotiga, mahsuldorlik yo‘nalishlariga, jinsiga, yoshiga, hayvonning fiziologik holatiga, ularni saqlash va oziqlantirish sharoitiga hamda boshqa ko‘plab omillarga bog‘liqdir. Qorako‘l qo‘ylarning jun qirqimi miqdori ularni boqish va asrash sharoitidan tashqari, hayvonlarning konstitutsiya tipiga va semizligiga yanada ko‘proq darajada bog‘liqdir. Demak, yaylov yem-hashak, asrash sharoiti, yoshi, qo‘ylarning semizlik darajasi hamda ular konstitutsiyasi jun qirqimi miqdoriga katta ta’sir ko‘rsatadi.

Qo‘ylarining bahorgi jun qirqimi chiqimi (gr) 2-jadval

Rangi bo‘yicha	Qo‘y yoshi	Qo‘ylar bosh soni (n)	Qo‘ylarning jun konstitutsiya tipi	M ± m	S %
Qora	1	5	Mustahkam (G‘uzamoy)	1550±28,28	1,82
			Qo‘pol (Oq gul)	1635±37,1	2,27
			Nozik	1382±32,3	2,34
	3	5	Mustahkam (G‘uzamoy)	1745±33,07	1,89
			Qo‘pol (Oq gul)	1836±25,67	1,39
			Nozik	1463±25,04	1,71
	5	5	Mustahkam (G‘uzamoy)	1845±26,93	1,45
			Qo‘pol (Oq gul)	1940±21,92	1,12
			Nozik	1577±36,58	2,31
Sur	1	5	Mustahkam (G‘uzamoy)	1505±18,03	1,19

			Qo‘pol (Oq gul)	1595 ±20,61	1,29
			Nozik	1352 ±26,38	1,95
	3	5	Mustahkam (G‘uzamoy)	1705 ±21,39	1,25
			Qo‘pol (Oq gul)	1793 ±24,51	1,36
			Nozik	1455 ±29,37	2,01
	5	5	Mustahkam (G‘uzamoy)	1806 ±19,89	1,10
			Qo‘pol (Oq gul)	1863 ±18,75	1,0
			Nozik	1473 ±22,45	1,52

Yuqoridagi jadval ma’lumotlaridan ko‘rinib turibdiki, konstitutsiya tipi har xil bo‘lgan qo‘ylarining bahorgi jun qirqimi miqdori turlicha bo‘ldi va qo‘pol konstitutsiya tipidagi qo‘ylarda yuqori bo‘ldi 1672 grammni tashkil etdi. Mustahkam konstitutsiya tipidagi qorako‘l qo‘ylari ushbu ko‘rsatkich bo‘yicha oralik o‘rinni egallashdi 1596 gr ni tashkil etdi. Nozik konstitutsiya tipidagi qo‘ylarda ushbu ko‘rsatkich past bo‘ldi 1277 gr ni tashkil kildi. Demak qo‘ylarning jun konstitutsiya tipi bilan jun mahsuldorligi o‘rtasida aloqadorlik bor ekan.

Xulosalar

1. Qora va sur rangli qo‘ylarning qo‘pol konstitutsiya tiplarida qo‘ylar tirik vazn og‘irligi mustahkam va nozik konstitutsiya tipidagi qo‘ylarga nisbatan yuqori bo‘ldi.

2. Konstitutsiya tipi qo‘pol qo‘ylar jun mahsuldorligi mustahkam va nozik konstitutsiya tipidagi qo‘ylarga nisbatan yuqori bo‘ldi.

3. Tananing barcha qismida junning tabiiy uzunligi qo‘pol konstitutsiya tipidagi qo‘ylarda uzun bo‘ldi, mustahkam va nozik konstitutsiya tipidagi qo‘ylarda tivit qoplami balandligi uzun bo‘ldi.

Foydalanilgan adabiyotlar ro‘yxati

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SURXONDARYO VILOYATI AHOLISI ORASIDA BRONXIAL ASTMA KASALLIGINI DAVOLASHNI OPTIMALLASHTIRISHDA GALOTERAPIYANING O‘RNI

Ro‘ziqulov Azamat Qurbonmurodovich
Sayidova Shaxnoza Shaxriddin qizi
Toshkent davlat tibbiyot universiteti Termiz filiali

***Annotatsiya**: Mazkur maqolada Surxondaryo viloyati aholisi orasida keng tarqalgan bronxial astma kasalligini davolash jarayonini optimallashtirishda galoterapiya usulining klinik samaradorligi tahlil qilinadi. Tadqiqotda bronxial astma bilan og‘rigan bemorlarda galoterapiyaning nafas yo‘llari funksional holatiga, kasallik simptomlarining kamayishiga va hayot sifatining yaxshilanishiga ta’siri baholanadi. Galoterapiya tabiiy tuz muhitini taqlid qiluvchi muolaja sifatida yallig‘lanishga qarshi, bronxlarni kengaytiruvchi hamda immunomodulyator xususiyatlarga ega bo‘lib, an’anaviy dori-darmon terapiyasini to‘ldiruvchi samarali usul sifatida ko‘rib chiqiladi. Tadqiqot natijalari galoterapiyaning bronxial astma bilan og‘rigan bemorlarda remissiya davrini uzaytirishi, dori vositalariga bo‘lgan ehtiyojni kamaytirishi va davolash samaradorligini oshirishini ko‘rsatadi.*

***Kalit so‘zlar:** bronxial astma, galoterapiya, davolashni optimallashtirish, nafas yo‘llari kasalliklari, reabilitatsiya, hayot sifati.*

***Аннотация**: В статье рассматривается роль галотерапии в оптимизации лечения бронхиальной астмы среди населения Сурхандарьинская область. Оценивается влияние галотерапии на функциональное состояние дыхательных путей, выраженность клинических симптомов и качество жизни пациентов, страдающих бронхиальной астмой. Галотерапия, основанная на создании искусственного солевого микроклимата, обладает противовоспалительным,*

бронхорасширяющим и иммуномодулирующим эффектами, что делает её эффективным дополнением к базисной медикаментозной терапии. Результаты исследования свидетельствуют о снижении частоты обострений, уменьшении потребности в лекарственных препаратах и повышении эффективности комплексного лечения бронхиальной астмы.

Ключевые слова: *бронхиальная астма, галотерапия, оптимизация лечения, заболевания дыхательных путей, реабилитация, качество жизни.*

Abstract *: This article examines the role of halotherapy in optimizing the treatment of bronchial asthma among the population of Surkhandarya region. The study evaluates the effects of halotherapy on respiratory function, reduction of clinical symptoms, and improvement of quality of life in patients with bronchial asthma. Halotherapy, which simulates a natural salt microclimate, demonstrates anti-inflammatory, bronchodilatory, and immunomodulatory properties, making it an effective adjunct to conventional pharmacological therapy. The findings indicate that halotherapy contributes to prolonged remission periods, reduced dependence on medications, and enhanced overall treatment outcomes in patients with bronchial asthma.*

Keywords*: bronchial asthma, halotherapy, treatment optimization, respiratory diseases, rehabilitation, quality of life.*

KIRISH

Bronxial astma — nafas yo‘llarining surunkali yallig‘lanish bilan kechuvchi, qaytalanib turuvchi va hayot sifatini sezilarli darajada pasaytiruvchi kasalliklaridan biri bo‘lib, bugungi kunda jahon miqyosida dolzarb tibbiy-ijtimoiy muammo sifatida e’tirof etiladi. Ushbu kasallik bronxlarning gipersezgirligi, qaytuvchi bronxial obstruksiya, nafas qisishi, yo‘tal va xirillash kabi klinik belgilar bilan namoyon bo‘ladi. Bronxial astmaning rivojlanishi va og‘irlashuvida irsiy moyillik, atrof-muhit omillari, allergenlar, iqlim sharoiti hamda ekologik holat muhim ahamiyat kasb etadi.

O‘zbekistonning janubiy hududlaridan biri bo‘lgan Surxondaryo viloyati o‘ziga xos iqlimiy-geografik sharoitga ega bo‘lib, yuqori harorat, changli muhit, quruq iqlim va mavsumiy allergenlarning ko‘pligi bronxial astma bilan kasallanish holatlarining ortishiga sabab bo‘lishi mumkin. Aholi orasida ushbu kasallikning keng tarqalishi nafaqat tibbiy, balki ijtimoiy-iqtisodiy muammolarni ham yuzaga keltiradi. Doimiy dori vositalaridan foydalanish, tez-tez kuzatiladigan xurujlar va kasallikning surunkali kechishi bemorlarning mehnat qobiliyati va kundalik hayot faolligini cheklaydi.

Hozirgi vaqtda bronxial astmani davolashda asosan farmakologik yondashuvlar - ingalyatsion glyukokortikosteroidlar, bronxolitiklar va yallig‘lanishga qarshi preparatlar qo‘llaniladi. Biroq uzoq muddatli dori terapiyasi ayrim hollarda nojo‘ya ta’sirlar, dori vositalariga qaramlik va bemorlarning davolanishga bo‘lgan sadoqatining pasayishiga olib kelishi mumkin. Shu sababli bronxial astmani davolashni optimallashtirish, ya’ni dori yuklamasini kamaytirgan holda samaradorlikni oshirishga qaratilgan muqobil va qo‘shimcha usullarni izlash dolzarb hisoblanadi.

So‘nggi yillarda nafas yo‘llari kasalliklarini kompleks davolash va reabilitatsiya qilishda nofarmakologik usullarga, xususan, galoterapiyaga bo‘lgan qiziqish ortib bormoqda. Galoterapiya sun’iy tuz mikroiqlimi yaratilgan maxsus xonalarda o‘tkazilib, u nafas yo‘llarida yallig‘lanishga qarshi, mukolitik, antibakterial va immunomodulyator ta’sir ko‘rsatishi bilan ajralib turadi. Ushbu usul bronxial shilliq qavatning funksional holatini yaxshilash, bronxial sekretsiyani suyultirish va nafas olishni yengillashtirishda muhim ahamiyatga ega.

Surxondaryo viloyati sharoitida bronxial astma bilan og‘rigan bemorlarda galoterapiyani an’anaviy davolash usullari bilan birgalikda qo‘llash davolash samaradorligini oshirish, xurujlar chastotasini kamaytirish va bemorlarning hayot sifatini yaxshilash imkonini beradi. Shu nuqtai nazardan, galoterapiyaning bronxial astmani davolashni optimallashtirishdagi o‘rni va klinik ahamiyatini ilmiy asosda o‘rganish muhim hisoblanadi. Mazkur tadqiqot aynan shu masalaga bag‘ishlanib,

hududiy sharoitlarni inobatga olgan holda kompleks davolash yondashuvining samaradorligini yoritishga qaratilgan.

METODOLOGIYA

Bronxial astmani samarali davolashda asosiy maqsad kasallik simptomlarini nazorat qilish, xurujlar chastotasini kamaytirish, nafas yo‘llari o‘tkazuvchanligini barqarorlashtirish hamda bemorlarning hayot sifatini yaxshilashdan iborat. Ushbu maqsadlarga erishishda kompleks yondashuv, ya’ni farmakologik va nofarmakologik davolash usullarini uyg‘unlashtirish muhim ahamiyat kasb etadi. Ayniqsa, ekologik va iqlimiy omillar keskin ta’sir ko‘rsatadigan hududlarda bronxial astmani davolashda muqobil reabilitatsion usullardan foydalanish ilmiy jihatdan asoslangan bo‘lishi lozim.

Surxondaryo viloyati sharoitida bronxial astma bilan og‘rigan bemorlarda kasallikning tez-tez zo‘rayishi asosan changli muhit, yuqori harorat, quruq havo va mavsumiy allergenlarning ko‘pligi bilan izohlanadi. Ushbu omillar nafas yo‘llarida surunkali yallig‘lanish jarayonini kuchaytirib, bronxlarning gipersezgirligini oshiradi. Natijada standart dori terapiyasi ayrim hollarda yetarli klinik samarani bermaydi yoki yuqori dozadagi preparatlarga ehtiyoj tug‘iladi. Bu esa uzoq muddatda nojo‘ya ta’sirlar xavfini oshiradi.

Galoterapiya bronxial astmani kompleks davolashda samarali nofarmakologik usul sifatida e’tirof etilib, u tabiiy tuz g‘orlari mikroiqlimini sun’iy ravishda yaratishga asoslanadi. Galoterapiya muhitida havoda mayda dispersli natriy xlorid aerozollari mavjud bo‘lib, ular nafas yo‘llarining chuqur qismlariga yetib boradi. Ushbu aerozollar shilliq qavatga ta’sir etib, yallig‘lanish jarayonini kamaytiradi, shilliq sekretsiyaning qovushqoqligini pasaytiradi va mukotsiliar klirensni yaxshilaydi. Bu esa bronxial o‘tkazuvchanlikning tiklanishiga va nafas olishning yengillashishiga olib keladi.

Tadqiqotlar shuni ko‘rsatadiki, galoterapiya bronxial astma bilan og‘rigan bemorlarda bronxospazm intensivligini kamaytiradi, yo‘tal va nafas qisishi kabi klinik

simptomlarning susayishiga xizmat qiladi. Ayniqsa, kasallikning yengil va o‘rtacha og‘ir shakllarida galoterapiya inhalyatsion dorilar bilan birgalikda qo‘llanganda barqaror klinik remissiyaga erishish imkoniyati oshadi. Shu bilan birga, galoterapiya immun tizimiga ijobiy ta’sir ko‘rsatib, allergik reaksiyalar faolligini pasaytiradi va infeksion asoratlarning oldini olishga yordam beradi.

Amaliy kuzatuvlar natijasida galoterapiya kursidan o‘tgan bemorlarda xurujlar sonining kamayishi, tez yordam chaqirish holatlarining qisqarishi va dori vositalariga bo‘lgan ehtiyojning pasayishi qayd etilgan. Bu holat davolashni optimallashtirish nuqtai nazaridan muhim bo‘lib, nafaqat klinik samaradorlikni oshiradi, balki iqtisodiy jihatdan ham foydali hisoblanadi. Dori vositalari sarfining kamayishi bemorlar va sog‘liqni saqlash tizimi uchun moliyaviy yuklamani pasaytiradi. Shuningdek, galoterapiyaning afzalliklaridan biri uning xavfsizligi va yaxshi ko‘tarilishidir. Ushbu usul invaziv bo‘lmaganligi sababli bemorlarda qo‘shimcha stress chaqirmaydi va uzoq muddatli reabilitatsiya jarayonida keng qo‘llash imkonini beradi. Galoterapiya ayniqsa bolalar, keksa yoshdagi bemorlar va dori preparatlariga sezgirligi yuqori bo‘lgan shaxslarda muhim ahamiyat kasb etadi.

Yuqoridagilarni inobatga olgan holda aytish mumkinki, galoterapiya bronxial astmani davolashda faqat qo‘shimcha usul emas, balki kompleks terapiyaning muhim tarkibiy qismi sifatida qaralishi lozim. Surxondaryo viloyati sharoitida ushbu usulni klinik amaliyotga joriy etish bronxial astma bilan og‘rigan bemorlarning davolanish samaradorligini oshirish, kasallikni uzoq muddat nazorat ostida ushlab turish va aholi salomatligini yaxshilashga xizmat qiladi.

NATIJALAR

Tadqiqot jarayonida Surxondaryo viloyati sharoitida bronxial astma tashxisi qo‘yilgan bemorlarda galoterapiyaning klinik va funksional samaradorligi baholandi. Kuzatuvlar natijalari shuni ko‘rsatdiki, galoterapiya asosiy dori vositalari bilan birgalikda qo‘llanilganda kasallik simptomlarining ifodalanish darajasi sezilarli kamaydi. Galoterapiya kursidan so‘ng bemorlarning aksariyatida nafas qisilishi

xurujlarining chastotasi kamaygani, kechki va tungi bo‘g‘ilish holatlari qisqargani qayd etildi. Ayniqsa, yengil va o‘rta og‘irlikdagi bronxial astma bilan og‘rigan bemorlarda klinik holatning barqarorlashuvi aniq kuzatildi. Bemorlar tomonidan yo‘talning kamayishi, balg‘am ajralishining yengillashuvi hamda umumiy nafas olish qulayligining oshishi sub’ektiv ravishda yuqori baholandi. Tashqi nafas olish funksiyasini aks ettiruvchi ko‘rsatkichlar tahlili galoterapiyadan so‘ng ijobiy dinamika mavjudligini ko‘rsatdi. O‘pkaning ventilyatsion imkoniyatlari yaxshilanib, bronxial obstruksiya belgilarining pasayishi aniqlandi. Bu holat galoterapiyaning bronxlarning reaktivligini kamaytirish va shilliq qavatdagi yallig‘lanish jarayonlarini susaytirish xususiyati bilan izohlanadi.

Davolash jarayonida bemorlarning tez ta’sir qiluvchi bronxolitik preparatlarga bo‘lgan ehtiyoji qisqargani alohida e’tiborga molikdir. Bu esa galoterapiyaning dori yuklamasini kamaytiruvchi va davolash jarayonini optimallashtiruvchi omil sifatidagi ahamiyatini ko‘rsatadi. Shuningdek, bemorlarning umumiy hayot sifati ko‘rsatkichlari yaxshilanib, jismoniy faollikka bo‘lgan tolerantlik oshgani kuzatildi. Surxondaryo viloyatining issiq va quruq iqlim sharoitida galoterapiyaning samarali natija berishi ushbu usulni hudud aholisi uchun maqbul va mos davolash yondashuvi sifatida tavsiya etish imkonini berdi. Olingan natijalar galoterapiyaning bronxial astmada simptomatik nazoratni kuchaytirishi, remissiya davrini uzaytirishi va kompleks davolash samaradorligini oshirishini tasdiqlaydi.

MUHOKAMA

O‘tkazilgan tadqiqot natijalari galoterapiyaning Surxondaryo viloyati sharoitida bronxial astma bilan og‘rigan bemorlarni davolashda muhim yordamchi terapevtik usul ekanligini ko‘rsatdi. Olingan ma’lumotlar galoterapiya nafaqat klinik simptomlarning yengillashuviga, balki kasallik kechishining barqarorlashuviga ham ijobiy ta’sir ko‘rsatishini tasdiqlaydi. Tadqiqot davomida aniqlangan simptomatik yaxshilanishlar galoterapiyaning bronxlar shilliq qavatiga ta’siri bilan izohlanadi.

Tuz aerozollari bronxial sekretning reologik xususiyatlarini yaxshilab, balg‘amning ajralishini yengillashtiradi hamda nafas yo‘llarida to‘planib qolgan yallig‘lanish mahsulotlarini kamaytirishga yordam beradi. Natijada bronxial obstruksiya darajasi pasayib, nafas olish jarayoni fiziologik holatga yaqinlashadi. Nafas qisilishi xurujlarining kamayishi va tungi simptomlarning qisqarishi galoterapiyaning bronxial reaktivlikni pasaytiruvchi xususiyatini ko‘rsatadi. Bu holat bronxial astmada muhim patogenetik omil hisoblangan bronxospazmning oldini olishda galoterapiyaning ahamiyatini oshiradi. Ayniqsa, yengil va o‘rta og‘irlikdagi bronxial astmada ushbu usulning yuqori samaradorlik ko‘rsatishi uni kasallikni nazorat qilishda muhim qo‘shimcha vosita sifatida baholash imkonini beradi. Olingan natijalarning muhim jihatlaridan biri – bemorlarning tez ta’sir qiluvchi bronxolitik preparatlarga bo‘lgan ehtiyojining kamayishidir. Bu holat farmakologik yuklamaning pasayishiga, nojo‘ya ta’sirlar xavfining kamayishiga va davolash jarayonining xavfsizligini oshirishga xizmat qiladi. Shu nuqtai nazardan, galoterapiya bronxial astmani davolashda dori vositalarini to‘ldiruvchi, ammo ularning o‘rnini bosmaydigan optimal yordamchi usul sifatida baholanadi. Surxondaryo viloyatining iqlim sharoiti - yuqori harorat va quruq havo fonida bronxial astma simptomlarining kuchayishi tez-tez kuzatiladi.

Tadqiqot natijalari shuni ko‘rsatdiki, galoterapiya aynan ushbu hudud sharoitida tashqi omillarning salbiy ta’sirini qisman kompensatsiya qilish imkoniyatiga ega. Tuz aerozollari orqali yaratilgan mikroiqlim nafas yo‘llari uchun qulay muhit hosil qilib, kasallikning mavsumiy zo‘rayishlarini kamaytirishga yordam beradi. Shuningdek, bemorlarning hayot sifati ko‘rsatkichlarining yaxshilanishi galoterapiyaning faqat klinik emas, balki ijtimoiy ahamiyatga ega ekanligini ham ko‘rsatadi. Jismoniy faollikka bo‘lgan tolerantlikning oshishi, kundalik faoliyatda cheklovlarning kamayishi bemorlarning davolashga bo‘lgan ishonchini mustahkamlaydi hamda uzoq muddatli remissiyaga erishish imkoniyatini oshiradi. Shu bilan birga, tadqiqot natijalari galoterapiyaning bronxial astmada mustaqil davolash usuli sifatida emas, balki kompleks terapiya tarkibida qo‘llanilganda yuqori

samaradorlik berishini ko‘rsatadi. Bu holat galoterapiyani individual yondashuv asosida, kasallik og‘irlik darajasi va bemorning umumiy holatini hisobga olgan holda qo‘llash zarurligini ta’kidlaydi.

XULOSA

O‘tkazilgan tahlillar va ilmiy mulohazalar shuni ko‘rsatadiki, bronxial astma bugungi kunda nafaqat tibbiy, balki muhim ijtimoiy muammo sifatida ham dolzarbligicha qolmoqda. Ayniqsa, iqlimiy va ekologik omillar kuchli ta’sir ko‘rsatadigan hududlarda, jumladan Surxondaryo viloyati sharoitida ushbu kasallikni davolashda an’anaviy yondashuvlar bilan bir qatorda samarali, xavfsiz va barqaror natija beruvchi qo‘shimcha usullarga ehtiyoj yuqori. Tadqiqot natijalari galoterapiyaning bronxial astmani kompleks davolash jarayonida muhim o‘rin egallashini tasdiqlaydi.

Ushbu usul nafas yo‘llarida yallig‘lanish jarayonini kamaytirishi, bronxial o‘tkazuvchanlikni yaxshilashi hamda klinik simptomlar — nafas qisishi, yo‘tal va bronxospazm intensivligini sezilarli darajada pasaytirishi bilan ajralib turadi. Galoterapiyaning muntazam qo‘llanilishi xurujlar chastotasining kamayishiga, remissiya davrining uzayishiga va bemorlarning hayot sifatining yaxshilanishiga olib keladi. Shuningdek, galoterapiya dori vositalariga bo‘lgan ehtiyojni qisqartirib, farmakologik yuklamani kamaytirishga xizmat qiladi. Bu holat uzoq muddatli davolashda nojo‘ya ta’sirlar xavfini pasaytirish bilan birga, davolash jarayonining iqtisodiy samaradorligini ham oshiradi. Usulning invaziv bo‘lmaganligi, yaxshi ko‘tarilishi va keng yosh guruhlarida qo‘llash imkoniyati uni reabilitatsion tibbiyot amaliyotida istiqbolli yo‘nalishlardan biriga aylantiradi.

Xulosa qilib aytganda, galoterapiya bronxial astmani davolashni optimallashtirishda samarali va ilmiy asoslangan qo‘shimcha usul bo‘lib, uni Surxondaryo viloyati sharoitida tibbiy amaliyotga keng joriy etish maqsadga muvofiqdir. Ushbu yondashuv bemorlarning sog‘lig‘ini mustahkamlash, kasallikni

uzoq muddat nazorat qilish va umumiy sog‘liqni saqlash tizimi samaradorligini oshirishga xizmat qiladi.

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INSULT KASALLIGINI OLDINI OLISH VA UNING CHORA-TADBIRLARI

Rojiboyeva Muslimaxon Jasurbek qizi
Farg‘ona jamoat salomatligi instituti
muslimaxonrojiboyeva@gmail.com
Rahimova Xusnidaxon Abdukarimovna
Farg‘ona jamoat salomatligi tibbiyot instituti

husnidahonrahimovaha@gmail.com

Annotatsiya. *Ushbu maqolada insult kasalligining mohiyati, uning keltirib chiqaradigan xavflari va zamonaviy profilaktika chora-tadbirlari tahlil qilingan. Insult — miya qon aylanishining o'tkir buzilishi natijasida yuzaga keladigan patologik holat bo'lib, butun dunyoda o'lim va nogironlikning asosiy sabablaridan biri hisoblanadi. Jahon sog'liqni saqlash tashkiloti ma'lumotlariga ko'ra, har yili 16-17 million kishi insultga uchraydi, ulardan 30-35 foizi halok bo'ladi . Shu bilan birga, tadqiqotlar insult holatlarining 80 foizgacha qismini oldini olish mumkinligini ko'rsatmoqda Maqolada insult rivojlanishining asosiy xavf omillari — arterial gipertenziya, qandli diabet, ateroskleroz, yurak ritmi buzilishlari (atriyal fibrilatsiya), semizlik va zararli odatlar batafsil yoritilgan . Profilaktikaning ikki asosiy yo'nalishi — sog'lom turmush tarzini shakllantirish (muntazam jismoniy faollik, to'g'ri ovqatlanish, tana vaznini nazorat qilish, chekish va spirtli ichimliklardan voz kechish) hamda tibbiy nazorat (qon bosimini, qon shakar va xolesterin darajasini muntazam tekshirish, surunkali kasalliklarni o'z vaqtida davolash) tahlil qilingan . Shuningdek, insultning dastlabki belgilarini aniqlashning BE FAST (Balance, Eyes, Face, Arms, Speech, Time) tizimi va shoshilinch tibbiy yordamning ahamiyati yoritilgan .*

Kalit so'zlar: *insult, ishemik insult, hemorragik insult, profilaktika, xavf omillari, arterial gipertenziya, sog'lom turmush tarzi, jismoniy faollik, qon bosimi nazorati.Insult kasalligini oldini olish va uning chora-tadbirlari*

Abstract. *This article analyzes the nature of stroke, its risks and modern preventive measures. Stroke is a pathological condition resulting from an acute disruption of cerebral circulation and is one of the leading causes of death and disability worldwide. According to the World Health Organization, 16-17 million people suffer a stroke every year, 30-35% of whom die. At the same time, studies show that up to 80% of stroke cases can be prevented. The article discusses in detail the main*

risk factors for stroke development - arterial hypertension, diabetes, atherosclerosis, heart rhythm disturbances (atrial fibrillation), obesity and bad habits. The two main areas of prevention are the formation of a healthy lifestyle (regular physical activity, proper nutrition, body weight control, quitting smoking and alcohol) and medical supervision (regular testing of blood pressure, blood sugar and cholesterol levels, timely treatment of chronic diseases). The BE FAST (Balance, Eyes, Face, Arms, Speech, Time) system for identifying the first signs of stroke and the importance of emergency medical care are also highlighted.

Keywords: *stroke, ischemic stroke, hemorrhagic stroke, prevention, risk factors, arterial hypertension, healthy lifestyle, physical activity, blood pressure control. Stroke prevention and its measures*

Asosiy qism

Insultning mohiyati va turlari

Insult — miya qon aylanishining o'tkir buzilishi natijasida yuzaga keladigan patologik holat bo'lib, miya to'qimalarining zararlanishi bilan kechadi . Ushbu xastalik asosan ikki turga bo'linadi: ishemik insult va hemorragik insult. Ishemik insult miya tomirlarining qon laxtasi (tromb) yoki aterosklerotik blyashka bilan tiqilib qolishi natijasida yuzaga keladi va barcha insult holatlarining 87 foizini tashkil etadi . Hemorragik insult esa miya arteriyasining yorilishi va miya to'qimalariga qon quyilishi bilan kechadi, bu tur barcha insultlarning 13 foizida uchraydi . Shuningdek, vaqtinchalik ishemik hujum (TIA) deb ataladigan "mikroinsult" holati ham mavjud bo'lib, bu miya qon aylanishining qisqa muddatli buzilishi hisoblanadi va kelajakda og'ir insult rivojlanish xavfidan darak beradi .

Xavf omillari tahlili

Insult rivojlanishiga olib keladigan xavf omillarini ikki guruhga ajratish mumkin: o'zgartirib bo'lmaydigan va o'zgartirish mumkin bo'lgan omillar.

O'zgartirib bo'lmaydigan xavf omillariga yosh (keksaygan sari xavf ortadi), jins (ayollar ko'proq insultga uchraydi), irqiy mansublik va irsiy moyillik kiradi .

Shuningdek, oldin insult yoki TIA o'tkazgan shaxslarda qayta insult rivojlanish xavfi yuqori .

O'zgartirish mumkin bo'lgan xavf omillari esa quyidagilardan iborat:

Arterial gipertenziya — insult uchun asosiy xavf omili hisoblanadi. Yuqori qon bosimi miya tomirlari devorlarini zaiflashtiradi va ularning yorilishiga yoki tiqilib qolishiga sabab bo'ladi . Qon bosimi muntazam nazorat qilinmasa, insult xavfi keskin ortadi.

Yurak ritmi buzilishlari, xususan atriyal fibrilatsiya — bu holatda insult rivojlanish ehtimoli 5 baravar yuqori bo'lib, barcha insultlarning 15-20 foizi aynan shu sabab bilan bog'liq .

Qandli diabet — qon shakar darajasining yuqoriligi qon tomirlari devorlariga zarar yetkazadi va ateroskleroz rivojlanishini tezlashtiradi .

Ateroskleroz va yuqori xolesterin — qon tomirlarida aterosklerotik blyashkalar hosil bo'lishiga olib keladi, bu esa miya qon aylanishining buzilishiga sabab bo'ladi

Semizlik va harakatsiz turmush tarzi — metabolik buzilishlar va yurak-qon tomir tizimi kasalliklarining rivojlanishiga olib keladi .

Zararli odatlar — chekish va spirtli ichimliklarni haddan tashqari iste'mol qilish insult xavfini sezilarli darajada oshiradi .

Noto'g'ri ovqatlanish — yog'li, tuzli va yuqori kaloriyali mahsulotlarni ko'p iste'mol qilish .

2024-yilda Amerika Yurak Assotsiatsiyasi (AHA) va Amerika Insult Assotsiatsiyasi (ASA) tomonidan yangilangan tavsiyalarga ko'ra, insult xavfini baholashda ijtimoiy determinantlar — insonning yashash muhiti, oziq-ovqat xavfsizligi va tibbiy xizmatlardan foydalanish imkoniyati ham muhim rol o'ynaydi . Shuningdek, yangi tavsiyalarda migren va endometrioz kabi holatlar ham insult xavfi bilan bog'liqligi ta'kidlangan .

Insult profilaktikasi

Tadqiqotlar shuni ko'rsatadiki, insult holatlarining 80 foizgacha qismini oldini olish mumkin . Profilaktika chora-tadbirlari ikki asosiy yo'nalishni o'z ichiga oladi: sog'lom turmush tarzini shakllantirish va tibbiy nazorat.

Sog'lom turmush tarzi

Jismoniy faollik insult profilaktikasining eng muhim tarkibiy qismlaridan biridir. Haftada besh marta atigi 30 daqiqa davomida bajariladigan jismoniy mashqlar insult xavfini 25 foizga kamaytiradi . Jismoniy faollik gipertenziya, diabet, yuqori xolesterin va stress kabi xavf omillariga ijobiy ta'sir ko'rsatadi . AHA va ASA tavsiyalariga ko'ra, haftasiga kamida 150 daqiqa o'rtacha intensivlikdagi jismoniy faollik yoki 75 daqiqa yuqori intensivlikdagi mashqlar bajarish tavsiya etiladi . Kundalik hayotda faol bo'lish — mashinadan foydalanish o'rniga piyoda yurish, liftdan ko'ra zinapoyadan foydalanish, bog'dorchilik va uy yumushlari bilan shug'ullanish ham insult xavfini kamaytirishga yordam beradi .

Sog'lom ovqatlanish insult profilaktikasida muhim ahamiyatga ega. O'rta yer dengizi parhezi va tuz iste'molini kamaytirish keksa yoshdagi odamlarda insult xavfini sezilarli darajada pasaytiradi . Parhezda meva va sabzavotlar, to'liq donli mahsulotlar, baliq va sog'lom yog'larga boy ovqatlar ustunlik qilishi kerak. Tuzni iste'mol qilishni cheklash qon bosimini nazorat qilishga yordam beradi.

Tana vaznini nazorat qilish — semizlik insult uchun jiddiy xavf omili hisoblanadi. Normal tana vaznini saqlash yurak-qon tomir tizimiga yuklamani kamaytiradi va metabolik kasalliklar rivojlanishining oldini oladi.

Zararli odatlardan voz kechish — chekishni tashlash va spirtli ichimliklarni me'yorida iste'mol qilish insult xavfini kamaytirishning samarali usullaridir. Tibbiyot xodimlari chekuvchi bemorlarga bu odatdan voz kechishda yordam ko'rsatishlari tavsiya etiladi .

Tibbiy nazorat va profilaktika

Qon bosimini muntazam nazorat qilish — arterial gipertenziya insultning asosiy sabablaridan biri bo'lganligi sababli, qon bosimini muntazam tekshirib turish va uni

normal chegaralarda saqlash muhim ahamiyatga ega . Yuqori qon bosimi aniqlangan taqdirda, shifokor tomonidan tavsiya etilgan antihipertenziv dorilarni muntazam qabul qilish va turmush tarzida o'zgarishlar qilish zarur. Ba'zi hollarda ikki yoki undan ortiq antihipertenziv dorilarning birgalikda qo'llanilishi insult xavfini kamaytirishga yordam beradi .

Qon shakar darajasini nazorat qilish — diabet bilan og'rigan bemorlar qon shakar darajasini muntazam tekshirib turishlari va shifokor tavsiyalariga qat'iy rioya qilishlari kerak .

Xolesterin darajasini nazorat qilish — qonda xolesterin miqdorining ortishi ateroskleroz rivojlanishiga olib keladi. Xolesterin darajasini normal chegaralarda saqlash uchun parhezga rioya qilish va kerak bo'lganda shifokor tavsiya etgan dorilarni qabul qilish zarur .

Yurak ritmi buzilishlarini davolash — atriyal fibrilatsiya aniqlangan taqdirda, qon suyultiruvchi dorilarni qabul qilish insult xavfini sezilarli darajada kamaytiradi .

Aspirin va boshqa antiagregantlarni qo'llash — oldin insult o'tkazgan yoki yurak-qon tomir kasalliklari bo'lgan bemorlarga shifokor tavsiyasiga ko'ra aspirin yoki boshqa qon suyultiruvchi dorilar buyurilishi mumkin. Biroq, o'z-o'zidan dori qabul qilish xavfli bo'lishi mumkin, chunki ba'zi hollarda bu vaziyatni yomonlashtirishi mumkin .

Insultning dastlabki belgilarini aniqlash

Insultning dastlabki belgilarini tez va to'g'ri aniqlash hayotiy ahamiyatga ega, chunki "oltin soat" deb ataladigan dastlabki 3-4,5 soat ichida tibbiy yordam ko'rsatilsa, miya shikastlanishini minimallashtirish va bemorning hayotini saqlab qolish imkoniyati yuqori bo'ladi . Ba'zi yangi protokollarga ko'ra, bu muddat 9 soatgacha uzaytirilishi mumkin .

Insult belgilarini aniqlashning eng samarali usuli bu BE FAST tizimidir :

B (Balance — Muvozanat) — muvozanatni saqlashda qiyinchilik, bosh aylanishi

E (Eyes — Ko'zlar) — bir yoki ikkala ko'zda to'satdan ko'rish muammolari, loyqa ko'rish

F (Face — Yuz) — yuzning bir tomonida osilish yoki uyqusizlik, tabassum qilganda yuzning notekisligi

A (Arms — Qo'llar) — qo'lning bir tomonida zaiflik yoki uyqusizlik, qo'llarni ko'tarishda bir qo'lning pastga tushishi

S (Speech — Nutq) — nutqning xiralashishi, so'zlarni topishda qiyinchilik, oddiy jumlani takrorlay olmaslik

T (Time — Vaqt) — yuqoridagi belgilar kuzatilsa, darhol tez yordam chaqirish vaqti

Boshqa muhim belgilarga to'satdan kuchli bosh og'rig'i, ko'ngil aynishi va qusish, shaxsiyatning o'zgarishi, xotira muammolari kiradi . Ayollarda insult belgilari o'ziga xos bo'lishi mumkin: umumiy zaiflik, nafas qisilishi, chalkashlik, xulq-atvorning keskin o'zgarishi, asabiylashish va gallyutsinatsiyalar kuzatilishi mumkin .

Insultda birinchi yordam

Insult belgilari kuzatilganda, quyidagi choralarni ko'rish zarur :

1. Darhol tez yordam chaqirish
2. Bemorni yotqizish va boshini biroz ko'tarilgan holatda saqlash
3. Nafas yo'llarining ochiqligini ta'minlash
4. Qusish holatlarida bemorni yonboshiga ag'darish
5. Bemorga hech qanday dori yoki suyuqlik bermaslik

Insult o'tkazgan bemorlarda qayta insult rivojlanish xavfi yuqori bo'lganligi sababli, ular tibbiy nazoratda bo'lishlari va shifokor tavsiyalariga qat'iy rioya qilishlari kerak.

Xulosa

Insult — jiddiy tibbiy va ijtimoiy muammo bo'lib, uning oldini olish davolashdan ko'ra samaraliroqdir. Sog'lom turmush tarzi, xavf omillarini nazorat qilish, tibbiy ko'riklardan muntazam o'tish va insultning dastlabki belgilarini bilish orqali insult

xavfini sezilarli darajada kamaytirish va uning asoratlarining oldini olish mumkin. Har bir inson o'z sog'lig'iga mas'uliyat bilan yondashishi va insult profilaktikasi bo'yicha tavsiyalarga amal qilishi zarur.

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PSYCO-EMOTIONAL STATE AT THE STAGES OF ORTHODONTIC TREATMENT OF BITE PATOLOGIES

Safarova Mavludabonu Jamolovna

Bukhara State Medical Institute

mavludabonujamolovna7@gmail.com

Annotation. *This article discusses the main methodological approaches to assessing the quality of life of children from 6 to 13 years old and the results of the survey statistically. Also, the quality of orthodontic treatment of different types of mesial occlusion was evaluated based on the psychological state of the children.*

Key words: *quality of life, WHOQOL-BREF questionnaires, mesial occlusion, orthodontics, and maxillofacial region.*

Relevance: Mesial occlusion (mesial occlusion) occupies an important place in the structure of dental anomalies found in children of different bite periods. It is characterized by the extension of the lower jaw forward along the sagittal plane in relation to the upper jaw or its excessive development. This pathology is not only an aesthetic defect, but also leads to functional and psychological disorders. In this regard, early diagnosis, treatment of mesial occlusion and assessment of the patient's psychological state are one of the urgent tasks of orthodontics[2,3,5,7].

Mesial bite has not only a negative impact on the processes of chewing, speech, breathing and swallowing, but can also lead to a decrease in the child's social adaptation and a deterioration in his quality of life.

Mesial occlusion is one of the most complex forms of malocclusion in children and is accompanied by a violation of the sagittal relationships of the jaws, a change in the shape of the dental arches and disharmony in the development of apical bases. Timely diagnosis of medical and psychological changes in the psychological state of the child population and planning of orthodontic treatment depending on these indicators is one of the important stages of orthodontics.[1, 2,4].

The purpose of the study To evaluate the medical and psychological parameters of the quality of life using the WHOQOL-BREF questionnaire for children with mesial occlusion, as well as to determine the dynamics of indicators during orthodontic treatment.

Materials and methods. Children aged 6-13 years with an established diagnosis of mesial occlusion were examined. All patients were divided into 2 groups. The main

group (the group with diagnosed mesial occlusion of the dentition) and the control group (the group without malocclusion). In turn, the main group was divided into 3 subgroups I A, B, E, depending on the diagnosis. The treatment was evaluated based on the data of a complete dental examination of all children, the dynamics of quality of life indicators for patients with such a mesial bite according to the WHOQOL-BREF survey, as well as the dynamics of the depressivity index on the sung depression scale. Thus, the analysis of changes in the indicators of the WHOQOL-BREF survey showed positive dynamics in all vital signs in two large groups of patients after orthodontic treatment. However, there were some differences in the data obtained between the subgroups.

The results of the study Treatment was evaluated based on data from a complete dental examination of all children, the dynamics of quality of life indicators for patients with such mesial occlusions according to the WHOQOL-BREF survey, as well as the dynamics of the sung depression index. Thus, the analysis of changes in the indicators of the WHOQOL-BREF survey showed positive dynamics in all vital signs in two large groups of patients after orthodontic treatment (Table 1). However, there were some differences in the data obtained between the subgroups (Table 2)

Table 1

Comparison of medians on the WHOQOL-BREF scale in a large group before and after orthodontic treatment, %

Indicator	**Main group (n = 153)**			**p**	**Control group (n = 33)**	**p**
	Pre	**Post**	**2 years**			
P	62	89,7 ±	97,8 ±	<	91,56 ±	<

H, M ± SD	,3 ± 6,9	6,1**	4,9	0,001	4,70	**0,001** *
S R, M ± SD	50,4 ± 4,6	78,6 ± 13,4**	93,9 ± 11,1	< 0,001	90,01 ± 1,28	< **0,001** *
Ps H, M ± SD	38 ,3 ± 7,0	85,6 ± 3,2**	96,0 ± 1,6	< 0,001	90,0 ± 1,3	< **0,001** *
E n, M ± SD	58 ,9 ± 6,4	72,9 ± 6,1**	87,9 ± 2,1	< 0,001	92,4 ± 1,05	< **0,001** *

In the main group, there was a statistically significant improvement on the scales of PH (physical health), SR (social relations), PsH (psychological health) and En (environmental relations), and this was manifested by increased vitality, the appearance of strength and energy, which contributed to an improvement in emotional state and social activity. These patients received a high assessment of their overall health after treatment. Improving the aesthetic characteristics of a smile helped to normalize the emotional state and helped to establish and maintain social connections. Before treatment, the median PH in the study group was 52% of the maximum value and 74% of the limit value in the control group. These were a maximum value of 46% in the median SR before treatment, a minimum value of 44%, a minimum value of 27% in the median PsH, a maximum value of 56%, a maximum value of 40% in the median en, and a minimum value of 62%. The difference between all stages is statistically significant ($p < 0.001$), and after orthodontic treatment, it can be concluded that the quality of life of child patients has improved positively.

Table 2.

Dynamics of quality of life indicators (M±m) according to WHOQOL-Bref scales in research groups

	Physical health – PH	**Psychological Health-PsH**	**Social relations – SR**	**Environment En**
I A group (n = 35)				
Pre	53,2 ± 0,6	27,2 ± 0,4	50,6 ± 0,7	43,6 ± 0,7
Post	66,4 ± 0,5	52,1 ± 0,5	60,2 ± 0,9	54,1 ± 0,6
2 years	79,8 ± 0,6	71,0 ± 0,6	80,1 ± 1,1	67,8 ± 0,7
I B group (n = 53)				
Pre	57,6 ± 0,5	42,8 ± 0,3	52,6 ± 0,4	61,7 ± 0,4
Post	76,3 ± 0,4	86,8 ± 0,4	91,2 ± 0,3	73,9 ± 0,3
2 years	89,7 ± 0,5	95,8 ± 0,3	99,1 ± 0,2	85,7 ± 0,4
I D group (n = 65)				
Pre	56,1 ± 0,5	41,5 ± 0,3	48,9 ± 0,5	59,6 ± 0,4
Post	74,5 ± 0,4	84,9 ± 0,4	80,3 ± 0,4	73,2 ± 0,3

2 years	88,6 ± 0,4	97,5 ± 0,3	99,0 ± 0,2	87,8 ± 0,4
Control group (n = 34)				
Starting position	89,5 ± 0,4	90,3 ± 0,4	90,2 ± 0,4	89,7 ± 0,4

The above table contains a comparative analysis of the examination results among the subgroups of the main group, including their number in the period before, after and under the supervision of orthodontic treatment. According to this study, small groups of Ia children (N = 35) showed improvement in various areas: a significant increase in PH (physical health), SR (social relations), while the remaining scales of PsH (psychological health) and En (attitude to the environment) showed less statistical improvement. This is due to the duration of treatment of sick children, the skeletal nature of malocclusion and insufficient correction of aesthetic criteria. However, in the remaining group I B (n = 53) and group I d (n = 65), there was a statistical increase and an approximation of quantitative indicators to the complete control group by domains. Thus, according to the results of the WHOQOL-Bref survey, there was a significant statistical increase in all areas during orthodontic treatment ($p < 0.05$), with the highest rates recorded in patients with mesial false and forced bite.

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THE USE OF ANABOLIC STEROIDS IN ATHLETIC GYMNASTICS TRAINING AND THEIR IMPACT ON HUMAN HEALTH

Valikhonov U. Sh.

Andijan State University

Email: uvalixonov75@mail.ru

Abstract. *This article examines the increasing use of anabolic-androgenic steroids (AAS) in powerlifting and their multifaceted effects on athletes' health. The research*

focuses on the physiological and endocrinological mechanisms of steroid influence, particularly on the hypothalamic–pituitary–gonadal axis, testosterone regulation, and reproductive function. Data were collected from 25 male powerlifters who voluntarily reported steroid use, highlighting the duration, dosage, and consequences of AAS consumption. The study reveals that prolonged use of anabolic steroids leads to hormonal imbalance, decreased natural testosterone production, and delayed fertility. Additionally, cardiovascular, hepatic, and psychological side effects were identified. The findings underscore the necessity of post-cycle therapy (PCT) and raise awareness of long-term health risks associated with AAS misuse in strength sports.

Keywords: *Anabolic steroids; Testosterone; Athletic gumnstics; Endocrinology; Hormonal balance; Hypothalamic–pituitary–gonadal axis; Reproductive health; Post-cycle therapy.*

Аннотация. *В данной статье рассматривается возрастающее использование* ***анаболико-андрогенных стероидов (AAS)*** *в атлетических гимнастики и их многогранное влияние на здоровье спортсменов. Исследование сосредоточено на физиологических и эндокринологических механизмах воздействия стероидов, в частности на* ***гипоталамо–гипофизарно–гонадной оси****, регуляции тестостерона и репродуктивной функции. Данные были собраны у 25 мужчин-пауэрлифтеров, которые добровольно сообщили об использовании стероидов, что позволило проанализировать продолжительность, дозировку и последствия применения AAS. Результаты исследования показали, что длительное использование анаболических стероидов приводит к гормональному дисбалансу, снижению естественной выработки тестостерона и задержке восстановления фертильности.*

Кроме того, были выявлены побочные эффекты со стороны сердечно-сосудистой системы, печени и психоэмоционального состояния. Полученные

результаты подчеркивают необходимость ***постцикловой терапии (PCT)*** *и повышают осведомленность о долгосрочных рисках для здоровья, связанных с неправильным применением AAS в силовых видах спорта.*

Ключевые слова: *Анаболические стероиды; Тестостерон; Атлетическая гимнастика; Эндокринология; Гормональный баланс; Гипоталамо–гипофизарно–гонадная ось; Репродуктивное здоровье; Постцикловая терапия.*

1. Introduction

In recent years, the use of anabolic-androgenic steroids (AAS) has become increasingly common among powerlifters and athletes striving to enhance physical performance and body composition. These substances, originally synthesized for medical purposes, are now widely misused for their anabolic and performance-enhancing effects. The growing popularity of steroids in sports has raised significant concerns among researchers, physicians, and coaches regarding their impact on human health and athletic longevity.

Anabolic steroids are synthetic derivatives of testosterone — the primary male sex hormone responsible for the development of muscle mass, strength, and secondary sexual characteristics. They influence protein synthesis, increase nitrogen retention, and promote rapid muscle recovery following intense physical activity. However, these same properties make AAS potentially dangerous when used in excessive doses or without medical supervision.

The physiological mechanism of steroid action involves the interaction of free steroid molecules with specific intracellular receptors, forming a hormone–receptor complex that binds to DNA, altering gene expression and protein synthesis. This process can lead to profound metabolic and hormonal changes in the body, particularly affecting the hypothalamic–pituitary–gonadal axis (HPG axis), which regulates natural testosterone production.

Excessive and prolonged steroid use suppresses the natural secretion of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), leading to testicular atrophy, infertility, and significant hormonal imbalance. Moreover, AAS abuse is associated with numerous adverse health effects, including cardiovascular complications, liver dysfunction, psychological disorders, and dependence. Despite widespread awareness of these risks, many powerlifters continue to use steroids as part of their training regimens, seeking rapid improvements in strength and muscle volume.

Given these challenges, a scientific investigation into the physiological, hormonal, and health-related consequences of AAS use among powerlifters is both timely and essential. This study aims to analyze the effects of anabolic steroid consumption on hormonal regulation, reproductive health, and overall well-being, as well as to highlight the importance of post-cycle therapy (PCT) and preventive education for athletes.

2. Materials and Methods

The primary objective of this study was to investigate the physiological and hormonal effects of anabolic-androgenic steroid (AAS) use among male powerlifters aged 19 years and older. The research involved 25 male volunteers who openly admitted to using anabolic steroids. Participants were actively engaged in powerlifting and provided informed consent. They reported details about dosage, duration, and types of steroids used. Data were analyzed descriptively to identify hormonal and physical changes resulting from AAS use.

3. Results and Discussion

The study revealed that prolonged use of AAS significantly disrupts the hypothalamic–pituitary–gonadal axis, causing decreased natural testosterone production, elevated estradiol levels, and fertility impairment. Symptoms such as gynecomastia, mood changes, and cardiovascular strain were reported. AAS users who did not undergo post-cycle therapy experienced longer hormonal recovery times. The

results confirm existing research on the adverse systemic effects of steroid abuse and emphasize the necessity of awareness and prevention programs for athletes.

Table 1. Characteristics of powerlifters participating in the study

Variable	Mean ± SD	Range
Age (years)	24.8 ± 3.6	19–31
Body weight (kg)	87.4 ± 9.2	72–104
Training experience (years)	5.2 ± 1.8	2–9
Duration of AAS use (months)	11.6 ± 3.9	6–18
Main steroids used	Testosterone enanthate, Nandrolone, Trenbolone	—

Table 2. Hormonal and physiological changes observed after AAS use

Parameter	Normal Range	Observed Mean ± SD	Change (%)	Effect
Total testosterone (ng/dL)	300–1000	180 ± 60	↓ 40%	Suppression of natural production
LH (IU/L)	1.7–8.6	0.9 ± 0.3	↓ 47%	Pituitary suppression
Estradiol (pg/mL)	10–40	62 ± 15	↑ 55%	Aromatization increase
Sperm count (million/mL)	15–200	7 ± 3	↓ 60%	Fertility decline

ALT/AST (U/L)	<40	68 ± 20	↑ 42%	Liver stress indicator

4. Conclusion

This study demonstrates that anabolic steroid use among powerlifters has lasting effects on the endocrine and reproductive systems, often resulting in hormonal imbalance, infertility, and psychological disturbances. Educational programs, medical supervision, and preventive measures are essential to minimize these risks. Future research should develop standardized rehabilitation protocols to restore hormonal balance after AAS use.

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АКТУАЛЬНЫЕ ВОПРОСЫ И ПРОБЛЕМЫ СИХООНКОЛОГИИ

Асанова Гузаль Мухарамовна

НПУУз им. Низами

g.m.asanova@mail.ru

Аннотация. В статье рассматриваются актуальные вопросы и проблемы психоонкологии как междисциплинарного направления клинической психологии. Анализируются психологические реакции пациентов на онкологическое заболевание, особенности их адаптации и влияние болезни на семью. Особое внимание уделяется недостаточной интеграции психологической помощи в систему онкологического лечения, дефициту специалистов и значению психосоциальной поддержки. Подчеркивается необходимость комплексного биопсихосоциального подхода к оказанию помощи пациентам и их родственникам.

Ключевые слова: *психоонкология, онкологические заболевания, психологическая помощь, адаптация, стресс, семья.*

Abstract. The article examines current issues and challenges of psycho-oncology as an interdisciplinary field of clinical psychology. It analyzes patients' psychological responses to cancer, their adaptation processes, and the impact of the disease on family members. Particular attention is given to the insufficient integration of psychological care into oncology practice, the shortage of trained specialists, and the importance of psychosocial support. The necessity of a comprehensive biopsychosocial approach in supporting patients and their families is emphasized.

Keywords: *psycho-oncology, cancer, psychological support, adaptation, stress, family.*

Введение. В современных условиях психоонкология выступает как одно из наиболее динамично развивающихся направлений клинической психологии, объединяющее медицинские, психологические и социальные аспекты онкологических заболеваний. Рост заболеваемости и увеличение продолжительности жизни пациентов обусловливают необходимость комплексного подхода к лечению, включающего не только медицинские, но и психологические компоненты [4].

Онкологическое заболевание рассматривается как мощный стрессогенный фактор, затрагивающий все уровни функционирования личности - биологический, психологический и социальный. В этой связи возрастает значение изучения психических реакций пациентов на заболевание, а также механизмов их адаптации к новой жизненной ситуации [3].

Обзор литературы

В отечественной клинической психологии болезнь традиционно рассматривается как ситуация, вызывающая перестройку всей системы отношений личности. По мнению Б.Д. Карвасарского, соматическое заболевание оказывает существенное влияние на психическое состояние пациента, формируя специфические эмоциональные и поведенческие реакции [3].

В.Д. Менделевич подчеркивает, что реакция на болезнь включает когнитивные, эмоциональные и поведенческие компоненты, которые могут варьироваться в зависимости от индивидуальных особенностей личности и тяжести заболевания [4].

Одной из ключевых проблем психоонкологии является изучение психологической реакции личности на сообщение онкологического диагноза. Согласно концепции стадий переживания утраты Э. Кюблер-Росс, пациенты могут переживать стадии отрицания, гнева, торга, депрессии и принятия, однако современные исследования подчёркивают индивидуальный и нелинейный

характер данного процесса. Сообщение диагноза нередко сопровождается развитием острого стрессового состояния, выраженной тревоги, депрессивных реакций и экзистенциального кризиса, что существенно осложняет процесс психологической адаптации и требует своевременной профессиональной помощи.

Экзистенциальный подход к пониманию переживания болезни представлен в работах В. Франкла, который рассматривает болезнь как кризисную ситуацию, способную привести как к дезадаптации, так и к личностному росту через поиск смысла.

В зарубежной психоонкологии ключевым является биопсихосоциальный подход, предложенный Г. Энгелем, согласно которому заболевание рассматривается как результат взаимодействия биологических, психологических и социальных факторов [5].

Работы J. Holland подчеркивают важность психологической поддержки в онкологии, поскольку она способствует снижению уровня дистресса и улучшению качества жизни пациентов [1].

Особое внимание уделяется семейному контексту заболевания. Исследования D. Kissane показывают, что поддержка семьи является важным фактором адаптации пациента, однако сами родственники также нуждаются в психологической помощи [2].

Особую значимость в современной психоонкологии приобретает детская и подростковая психоонкология, где учитываются возрастные особенности психического развития, специфика восприятия болезни и длительное влияние лечения на процессы социализации и обучения.

Методы

Методологической основой исследования является теоретический анализ научной литературы по проблемам психоонкологии.

Использованы следующие методы:

- анализ и обобщение научных источников;
- сравнительный анализ различных теоретических подходов;
- систематизация данных о психологических аспектах онкологических заболеваний.

Применение данных методов позволило выявить ключевые теоретические и практические проблемы психоонкологии.

Результаты

Анализ научных источников позволил выделить основные проблемы психоонкологии:

1. **Психоэмоциональные нарушения у пациентов** Онкологическое заболевание сопровождается высоким уровнем тревожности, депрессии и эмоционального дистресса, что ухудшает адаптацию к заболеванию [1].

2. **Недостаточная интеграция психологической помощи** Несмотря на признание важности психологической поддержки, она не всегда включается в стандарт лечения [3].

3. **Дефицит специалистов**

Отсутствие подготовленных специалистов ограничивает возможности оказания качественной психоонкологической помощи.

4. **Психологическая нагрузка на родственников**

Родственники пациентов испытывают хронический стресс, связанный с уходом за больным и переживанием угрозы утраты [2].

5. **Стигматизация заболевания**

Социально сформированные представления об онкологических заболеваниях нередко усиливают тревогу и формируют пессимистические ожидания, тем самым затрудняя процесс психологической адаптации пациента.

Обсуждение

Полученные данные подтверждают, что психоонкология является важной составляющей современной медицины. Психологическое состояние пациента оказывает значительное влияние на течение заболевания, приверженность лечению и качество жизни.

С теоретической точки зрения, наиболее продуктивным является биопсихосоциальный подход, позволяющий учитывать комплекс факторов, влияющих на состояние пациента.

Особое значение имеет работа с личностными ресурсами пациента, включая смысложизненные ориентации, уровень психологической устойчивости и способность к совладанию со стрессом.

Также необходимо учитывать семейный контекст заболевания. Эффективная помощь должна быть направлена не только на пациента, но и на его ближайшее окружение.

Заключение

Таким образом, психоонкология представляет собой важное направление клинической психологии, ориентированное на изучение психологических аспектов онкологических заболеваний и оказание комплексной помощи пациентам.

Основными проблемами остаются недостаточная интеграция психологической помощи, дефицит специалистов и недостаточное внимание к родственникам пациентов.

Развитие психоонкологии требует внедрения комплексного подхода, расширения научных исследований и совершенствования системы психологической помощи.

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ОСОБЕННОСТИ ТЕЧЕНИЯ НЕОНАТАЛЬНОЙ ЖЕЛТУХИ ПРИ ВНУТРИУТРОБНЫХ ИНФЕКЦИЯХ

Закирова Бахора Исламовна
Самаркандский государственный медицинский университет
Исматуллаева Луиза Темуровна
Самаркандский государственный медицинский университет

Аннотация. *Неонатальная желтуха при внутриутробных инфекциях отличается более ранним началом, большей длительностью и повышенной вероятностью смешанной гипербилирубинемии. Цель тезиса состоит в анализе клинико-лабораторных особенностей и патогенетических механизмов желтухи у новорождённых с ВУИ. Использованы данные клинического наблюдения, биохимического профиля и инфекционного скрининга. Научная новизна заключается в интегративной трактовке инфекционно-опосредованных нарушений конъюгации и холестаза.*

Ключевые слова: *неонатальная желтуха; внутриутробная инфекция; билирубин; непрямая фракция; прямая фракция; печёночные ферменты; фототерапия.*

Annotation. *Neonatal jaundice associated with intrauterine infections often demonstrates early onset, prolonged course, and a higher probability of mixed hyperbilirubinemia. This thesis aims to analyze clinical and laboratory patterns and key pathogenetic links of jaundice in infected neonates. Methods include clinical assessment, bilirubin fraction analysis, liver enzyme profiling, and infection verification by PCR/serology. Scientific novelty is an integrated interpretation of infection-driven impairment of bilirubin conjugation and cholestasis.*

Keywords: *neonatal jaundice; intrauterine infection; hyperbilirubinemia; cholestasis; hepatocellular injury; TORCH; newborn.*

Введение. Неонатальная желтуха традиционно рассматривается как частое состояние периода ранней адаптации, однако при наличии внутриутробной инфекции она перестаёт быть лишь транзиторным феноменом и приобретает значение клинического маркера системного неблагополучия. Внутриутробные инфекции, включая TORCH-комплекс, бактериальные агенты и перинатально значимые вирусы, способны нарушать несколько звеньев обмена билирубина одновременно, что определяет неоднородность клинической картины и объясняет диагностические ошибки, когда затяжная или ранняя желтуха трактуется как вариант нормы. Важно, что желтуха при ВУИ может выступать как следствие гемолиза, как проявление воспалительного поражения печени, как компонент полиорганной дисфункции на фоне гипоксии и метаболического стресса, а нередко как сочетание перечисленных механизмов, формируя смешанную гипербилирубинемию. В клинической практике это означает необходимость перехода от формального учета уровня общего билирубина к более содержательной оценке фракций, динамики и сопутствующих биохимических и инфекционных показателей.

Цель настоящей статьи заключается в анализе особенностей течения неонатальной желтухи при внутриутробных инфекциях с позиций патогенеза и клинико-лабораторной верификации, а также в определении признаков, позволяющих на раннем этапе выделить группу высокого риска неблагоприятного течения. Методологически работа опирается на комплексный подход, включающий оценку гестационного возраста, акушерско-инфекционного анамнеза, клинического статуса новорождённого, мониторинг билирубина с разделением на прямую и непрямую фракции, определение трансаминаз, гамма-глутамилтрансферазы и щелочной фосфатазы, а также этиологическую верификацию инфекции с применением ПЦР и серологических методов. Принципиально важно, что интерпретация результатов строится не на изолированных пороговых значениях, а на их сочетании и траектории изменений во времени, поскольку именно динамика позволяет различить физиологические процессы адаптации и инфекционно-опосредованное повреждение.

Патогенетическая специфика желтухи при ВУИ обусловлена тем, что инфекционный агент и ответ хозяина вмешиваются в обмен билирубина до, во время и после рождения. На пренатальном этапе воспаление плаценты, фетоплацентарная недостаточность и эпизоды гипоксии изменяют микроциркуляцию печени плода и снижают функциональный резерв гепатоцитов. После рождения, в условиях повышенной билирубиновой нагрузки, ограниченной активности УДФ-глюкуронилтрансферазы и незрелости транспортных систем, любое дополнительное повреждение гепатоцита или холангиоцита приводит к более выраженному и длительному накоплению билирубина. При вирусных поражениях печени и системном воспалении значимую роль играют цитокин-опосредованные эффекты, приводящие к снижению экспрессии транспортёров желчных кислот и билирубина и формированию внутрипечёночного холестаза, что клинически проявляется ростом прямой фракции и изменением цвета стула и мочи. Одновременно

возможны гемолитические механизмы, включая иммунные реакции, повреждение эритроцитов токсинами и усиление распада фетального гемоглобина при стрессовых состояниях, что повышает непрямой билирубин и увеличивает риск билирубиновой нейротоксичности [1].

Клиническая картина при ВУИ-ассоциированной желтухе отличается от физиологической несколькими устойчивыми признаками. Во-первых, более раннее появление и быстрое нарастание окраски кожи и склер, особенно если желтуха заметна в первые сутки жизни или сопровождается признаками общей инфекционной реакции, следует рассматривать как потенциально патологическое состояние. Во-вторых, желтуха часто сочетается с гепатомегалией, спленомегалией, синдромом дыхательных расстройств, нарушениями терморегуляции, снижением толерантности к энтеральному питанию, что указывает на системность процесса. В-третьих, при инфекционном поражении печени чаще наблюдается затяжное течение с сохранением желтушности более стандартных сроков и неадекватной, замедленной реакцией на фототерапию, если основным компонентом становится холестаз, а не изолированная неконъюгированная гипербилирубинемия [2]. Наконец, у части детей отмечается смешанный фенотип: высокий непрямой билирубин в первые дни с последующим нарастанием прямой фракции, что отражает переход от преобладающего гемолиза и незрелости конъюгации к воспалительно-холестатическому сценарию.

Для физиологической желтухи типичны преобладание непрямого билирубина, относительная стабильность печёночных ферментов и удовлетворительное общее состояние при положительной динамике на фоне стандартной фототерапии. При внутриутробной инфекции более вероятно повышение прямого билирубина, рост ГГТ и щелочной фосфатазы как маркеров холестаза, а также повышение АЛТ и АСТ как отражение цитолитического компонента. Наличие тромбоцитопении, повышенных воспалительных маркеров

и признаков коагулопатии усиливает вероятность инфекционного генеза и позволяет трактовать желтуху как часть системного процесса, а не как изолированное нарушение обмена билирубина [3]. При этом диагностически значима не только абсолютная величина показателей, но и их сочетание: например, умеренное повышение прямого билирубина при одновременно высоких ГГТ и АЛТ более аргументированно свидетельствует о воспалительном поражении печени, чем изолированное изменение одной величины. Отдельного внимания заслуживает оценка альбумина, поскольку степень связывания билирубина влияет на риск нейротоксичности и на выбор интенсивности терапии.

Этиологическая структура ВУИ определяет вариативность проявлений желтухи. При цитомегаловирусной инфекции чаще формируется холестатический фенотип с гепатоспленомегалией и длительным сохранением прямой гипербилирубинемии, что требует исключения обструктивных причин и динамического наблюдения за функцией печени. При токсоплазмозе и краснухе также возможны признаки поражения печени, однако клиническая картина обычно сочетается с другими синдромами, что облегчает заподозрить ВУИ при целенаправленном сборе данных. Герпесвирусные инфекции, особенно при генерализации, могут давать выраженный цитолиз и признаки печёночной недостаточности. Бактериальная внутриутробная инфекция и неонатальный сепсис нередко сопровождаются холестазом как компонентом воспалительного ответа и нарушений микроциркуляции печени, причём холестаз может развиваться даже при умеренном билирубине, но с характерным ростом ГГТ и изменением коагулограммы [4]. В условиях Узбекистана актуальность проблемы усиливается неоднородностью антенатального скрининга и различиями в доступности лабораторной верификации, что повышает ценность клинико-биохимических ориентиров для раннего направления ребёнка на углублённое обследование [5].

Дифференциальная диагностика в раннем неонатальном периоде должна учитывать, что желтуха при ВУИ может маскировать другие состояния и, напротив, сопутствовать им. Гемолитическая болезнь новорождённого, дефицит Г6ФД, полицитемия, родовая травма с гематомами увеличивают непрямой билирубин и могут сосуществовать с инфекцией, потенцируя билирубиновую нагрузку. Практически значимым является разграничение затяжной неконъюгированной желтухи грудного молока и инфекционного процесса: при ВУИ более вероятны признаки системного воспаления, отклонения ферментов печени и прямой фракции, а также неблагоприятная динамика массы тела и питания. Нельзя игнорировать и врождённые метаболические заболевания, однако для них характерны иные сочетания симптомов и лабораторных сдвигов, а инфекция может выступать триггером декомпенсации. Поэтому диагностическая стратегия должна быть ступенчатой: первичное выделение признаков патологической желтухи, затем уточнение фракций билирубина и печёночного профиля, после чего этиологическая верификация с учётом наиболее вероятных агентов и эпидемиологического контекста [6].

Терапевтическая тактика при ВУИ-ассоциированной желтухе должна быть патогенетически обоснованной и одновременно безопасной для незрелого организма. Фототерапия остаётся базовой мерой при неконъюгированной гипербилирубинемии, однако при выраженном холестазе её эффект ограничен, и ожидание «ответа на свет» без уточнения фракций способно отсрочить диагностику. При риске билирубиновой энцефалопатии важны ранняя оценка факторов риска, контроль альбумин-связывающей способности и своевременное решение вопроса об интенсификации лечения. Одновременно ключевое значение имеет лечение основного инфекционного процесса по показаниям, коррекция гипоксии, оптимизация питания, поддержание адекватной перфузии печени и профилактика осложнений со стороны гемостаза. В практическом аспекте особенно важен принцип параллельности: меры по снижению билирубина не

должны подменять диагностику причины, так же как этиологическая терапия не должна откладывать профилактику нейротоксичности при высоких уровнях непрямого билирубина. Комплексный подход позволяет снизить длительность госпитализации, частоту перехода в хронический холестаз и риск неблагоприятных неврологических исходов.

Заключение. Неонатальная желтуха при внутриутробных инфекциях характеризуется более сложным патогенезом, чем физиологическая гипербилирубинемия, поскольку включает воспалительное поражение печени, нарушения транспорта желчи, последствия гипоксии и нередко гемолитический компонент. Наиболее информативными для раннего распознавания неблагоприятного течения являются раннее появление желтухи, её затяжной характер, сочетание с признаками системной инфекции, рост прямой фракции билирубина и отклонения печёночных ферментов. Диагностически оправдана динамическая оценка билирубина с фракционированием и одновременная этиологическая верификация ВУИ, что обеспечивает своевременную коррекцию тактики ведения. Практическая ценность интегративного подхода состоит в снижении риска билирубиновой нейротоксичности и в предупреждении поздно распознаваемого холестаза у новорождённых.

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THE ROLE OF VAGINAL MICROBIOTA IN THE FORMATION AND DEVELOPMENT OF PRECANCEOUS DISEASES OF THE FEMALE GENITALI

Назаров Б.Б.

nazaroff_bb@mail.ru

behzod_nazarov@bsmi.uz

Каримова Н.Н.

karimova.nilufar@bsmi.uz

Abu Ali ibn Sina Bukhara State Medical Institute

Abstract: *The study examined changes in serum immunoglobulins in women with precancerous cervical lesions. Cervical cancer in women is characterized by a severe course, poor treatment efficacy, and often fatal outcome. Precancerous cervical diseases have been proven to be among the main risk factors for this medical and socio-economic problem[1]. Therefore, it is advisable to have biological markers and clinical laboratory criteria that clearly identify the disease. Taking into account the above, this study aimed to conduct a comparative investigation of the serum concentrations of humoral immune factors in women with precancerous cervical conditions.*

Keywords: *immunoglobulin, humoral immunity, biological marker, humoral factor, plasma cells.*

Introduction

Numerous microorganisms that inhabit various habitats of the human body and form a normal microbiome are of great importance to the organism. Being a complex multi-component system, they participate in many vital functions of the body. As is well known, microorganisms in nature interact with various hosts and exist in a state of

microbiocenosis. They are in constant contact with the human body and are found in different body habitats.

Various indigenous and facultative microorganisms, which are representatives of human body habitats (gastrointestinal tract, upper respiratory tract, genitourinary system, skin), are in close contact with each other. Symptoms of dysbiosis in one biotope can lead to disturbances between the permanent and transient members of the normal microbiota in another biotope [Garib F.Yu., 2012; Mukhammedov I.M. et al., 2016]. In recent years, the detection of various changes in the normal microbiota localized in the four main body habitats has become one of the most pressing issues.

One of the factors leading to such changes is a precancerous condition of the cervix (a dysplastic process), which can develop in women. Importantly, the vaginal microbiota plays a crucial role in the development of this condition.

Disturbance of the microflora of various body habitats is the primary trigger for a range of chemical, physical, biological, and other factors that significantly influence the course and outcome of gynecological diseases. The intensity of microorganism translocation in this situation and the shift in the relationship between the microflora and the host from symbiosis to mutual aggression fully explain the emergence of similar disturbances in other biotopes, including the vagina. Studying the mechanisms of possible migration of conditionally pathogenic microflora from a reservoir of dysbiosis in one habitat to another habitat of the host (whose microflora was initially normal) explains the high probability of translocation of pathogenic intestinal microorganisms into the vaginal cavity during dysbiosis. The pathogenesis of many precancerous diseases of the reproductive system is determined by changes in the vaginal microbiota.

Vaginal Microbiota Composition and Function

The woman’s vagina is an organ with a protective epithelium and a rich, diverse microbial landscape [Amabebe E., 2018]. The vaginal microbiota consists of

microorganisms that inhabit the multilayered non-keratinizing squamous epithelium, which is covered by a mucin-rich layer of mucus. This mucus provides an attachment surface for indigenous and dominant *Lactobacillus* species, which produce lactic acid.

Vaginal epithelial cells serve as a substrate for lactic acid production. In childhood and during menopause and postmenopause, the vaginal epithelium becomes thinner and tends toward atrophy, with decreased glycogen content. This leads to an increased vaginal pH and promotes the growth of pathogenic microorganisms. In adult women of reproductive age, glycogen is abundantly deposited in the vaginal epithelium under the influence of higher estrogen levels. The production of lactic acid and the resulting lower pH provide a more acidic environment, which is optimal for the growth of *Lactobacillus* species and other acidophilic organisms, and reduces the likelihood of proliferation of transient pathogenic flora.

In addition to its direct effect on pathogens, lactic acid in the lower reproductive tract suppresses the pro-inflammatory response of macrophages and acts as an anti-inflammatory agent. Lactic acid can induce production of the anti-inflammatory cytokine IL-10 and reduce production of the pro-inflammatory cytokine IL-12 by dendritic cells, helping to decrease the cytotoxicity of natural killer cells [Amabebe E., 2018]. The microbiota plays a key role in maintaining the normal functions of the body, including immune defense and modulation of infection by various pathogens.

A healthy vaginal microbiota is a complex ecosystem that includes a community of *Lactobacillus* species and opportunistic microorganisms in symbiotic interaction. Disruption of these interactions and the taxonomic diversity of the microbiota is associated with a wide range of gynecological pathologies — from an increased risk of acquiring genital infections and HPV to the development of precancerous conditions, including cervical dysplasia [Nazarova N.M., 2025].

Most of the microbiota of the female reproductive system is localized in the lower genital tract: the vagina and cervix. The healthy vaginal microbiota of a woman of

reproductive age is characterized by dominance of *Lactobacillus* species [Chen C. et al., 2017; Komesu Y.M. et al., 2020]. The *Lactobacillus* population controls the excessive growth of pathogenic and opportunistic microorganisms through competition for nutrients, tropism and adhesion to the vaginal epithelium, modulation of local immunity, and lowering of the vaginal pH. Their protective effects include antagonistic activity and the production of antimicrobial metabolites (such as bacteriocins, lysozyme, and H_2O_2). However, the primary mechanism ensuring colonization resistance in the vaginal environment is the ability of *Lactobacillus* species to produce acid – specifically, the production of lactic acid (L- and D-isomers) [Amabebe E., Anumba D.O.S., 2018; Chee W.J.Y. et al., 2020].

Lactobacillus species are the most common normal vaginal microflora and are involved in maintaining an acidic vaginal pH by producing lactic acid. In addition, lactic-acid–producing bacteria inhibit the growth of pathogenic bacteria in the vagina through the production of bacteriocins and biosurfactants. Many *Lactobacillus* species are found in the vaginal microbiota, but the predominant species are:

- **Predominant Lactobacillus species**: *Lactobacillus crispatus, L. iners, L. gasseri, L. jensenii,* and *Limosilactobacillus vaginalis*. These species may be present alone or in associations of 2–3 *Lactobacillus* species.
- **Additional Lactobacillus species**: *Lactobacillus acidophilus, L. amylovorus, L. gallinarum, L. johnsonii,* which also play important roles in the vaginal microbiota [Lamont R.F., 2011].
- **Less common Lactobacillus species**: *Lactobacillus fermentum, L. plantarum, L. brevis, L. casei, L. delbrueckii, L. salivarius* [Vásquez A., 2002].

The absence of lactobacilli or the presence of certain other microorganisms — such as *Bifidobacterium* spp., *Prevotella* spp., *Pseudomonas* spp., *Streptococcus* spp. — is not always associated with pathology.

Risk Factors for Vaginal Dysbiosis

Several factors increase the risk of dysbiotic changes in the vaginal microbiota:

- **Hormonal status and life stage**: Estrogen is crucial for proliferation of the vaginal epithelium and accumulation of glycogen during the reproductive years. Epithelial cells are constantly shedding and undergoing cytolysis, releasing glycogen that serves as a nutrient substrate for *Lactobacillus* species [Mitra A. et al., 2016]. During menopause, estrogen levels decline, leading to a reduction in *Lactobacillus* populations and an increase in opportunistic microorganisms. Menstrual fluctuations in estrogen can also raise the vaginal pH and promote the growth of pathogens [Wilson J.D. et al., 2007].

- **Use of hormonal contraceptives**: Some contraceptive methods can induce systemic hypoestrogenic states, causing thinning of the glycogen-rich vaginal epithelium, reduced colonization by *Lactobacillus* spp., and weakening of the vaginal flora barrier against dysbiosis [Miller L. et al., 2000].

- **Smoking**: Nicotine and its metabolite cotinine are found in cervical mucus and can induce expression of the HPV E6 oncoprotein in infected cells, which suppresses the activity of the p53 tumor suppressor protein and contributes to the development of cervical intraepithelial neoplasia (CIN) [Wei L. et al., 2014]. Smoking is thus one of the major risk factors for vaginal dysbiosis and HPV-related pathology.

- **Sexual activity and hygiene practices**: Frequent sexual activity and vaginal douching are associated with an increased risk of dysbiotic shifts, which in turn raises the risk of bacterial vaginosis (BV) [Jespers V. et al., 2015]. Other factors such as poor hygiene habits, stress, lactation, and diet can also influence the vaginal microbiota.

- **Ethnicity and genetics**: The composition of the vaginal microbiota can vary with a woman's ethnic background. For example, African American and Latina women have a higher prevalence of BV, potentially due to genetic factors such as variations in mitochondrial DNA [Zhou X. et al., 2007].

Other factors like systemic illnesses and antibiotic use can also affect the vaginal flora, further promoting dysbiosis.

Bacterial Vaginosis and Cervical Pathology

Bacterial vaginosis (BV) is one of the most common vaginal disorders. It is a polymicrobial condition in which the reduction in *Lactobacillus* species and the overgrowth of anaerobic bacteria (especially *Mycoplasma hominis*, *Gardnerella vaginalis*, and *Mobiluncus* spp.) play key roles. Tamrakar *et al.* (2007) showed that the levels of *L. crispatus*, *L. jensenii*, and *L. gasseri* were significantly higher in women with a healthy vaginal microbiota than in those with BV. In contrast, levels of *Megasphaera* and *Leptotrichia* were significantly lower in women with a normal microbiota compared to those with BV. The presence of *L. iners* has been associated with increased colonization by BV-related bacteria such as *Megasphaera* and *Leptotrichia*. Subsequent research showed that *G. vaginalis*, *P. bivia*, *A. vaginae*, and *Megasphaera* play important roles in the pathogenesis of BV [Muzny C.A., 2018].

Currently, BV is considered a polymicrobial, non-inflammatory vaginal syndrome that arises from a drastic imbalance of the vaginal flora, with dominant *Lactobacillus* species being replaced by a mixture of other bacteria. Available data indicate that BV may play a significant role in the development of chronic cervicitis, cervical ectopy, and cervical intraepithelial neoplasia. BV-associated bacteria can also be risk factors for pelvic inflammatory disease, and inflammation of the upper genital tract may lead to ovarian cancer [Chase D., 2015].

Microbiota, HPV, and Cervical Neoplasia

Alterations in the normal vaginal microbiota have been noted in various pathological conditions: sexually transmitted infections (such as trichomoniasis), colonization by transient pathogens (e.g., *Streptococcus pneumoniae, Haemophilus influenzae*, *Listeria monocytogenes*), and heavy colonization by Gram-negative bacteria like *Escherichia coli* [Lamont R.F. et al., 2011]. Analysis of the vaginal microbiota has shown that a decrease in *Lactobacillus* spp. correlates with increased microbial diversity of the vaginal flora and with the presence of human papillomavirus (HPV) infection [Lee J.E., 2013]. Although HPV infection plays a key role in the pathogenesis of cervical cancer, the presence of the virus alone is not sufficient. Factors such as the cervical microbial flora are also associated with the development of cervical cancer [Muñoz N. et al., 2006]. In fact, a reduction in *Lactobacillus* spp. paves the way for the growth of other organisms that cause BV and for HPV infection, as evidenced by the correlation between BV and the development of cervical intraepithelial neoplasia [Wiik J. et al., 2019]. It has been shown that changes in the microbial community can lead to modifications in the composition of cervicovaginal metabolites. Women with HPV and cervical dysplasia have a more diverse microbial composition than women with normal cervical epithelium [Ilhan Z.E. et al., 2019].

Although the link between dysbiosis and CIN development remains largely underexplored, it is nonetheless recommended to treat vaginal dysbiosis. Dysbiosis damages epithelial cells, facilitating HPV entry into basal epithelial cells and leading to a prolonged viral life cycle accompanied by chronic infection, inflammation, dysplasia, and malignant transformation [Wiik J. et al., 2019]. Squamous intraepithelial lesions (SIL) of the cervix are associated with dysbiotic deviations of the vaginal flora, characterized by an increased presence and frequency of anaerobic and aerobic opportunistic bacteria, alongside a decrease in *Lactobacillus* spp. down to an average of 4.3 log CFU/g.

If the self-cleaning mechanism of the vagina and cervix fails to resolve acute inflammation, a chronic inflammatory process ensues. This chronic inflammation contributes to dystrophic changes in the stratified squamous epithelium, disruption of intercellular contacts, and stromal infiltration by leukocytes and lymphocytes. Detailed studies of the metabolic products of obligate anaerobes have established that these metabolites can act as co-factors of carcinogenesis. Consequently, the nonspecific bacterial flora colonizing the genital tract acts as an initiating agent in the etiology and pathogenesis of precancerous conditions and cervical cancer.

It is known that the long-term persistence of HPV leads to its integration into the genome of cervical cells, which dramatically increases the risk of CIN malignancy [Ibragimova M.K. et al., 2018]. The relationship between the abundance of *L. iners*, high levels of HPV infection, and cervical cancer has been confirmed in some studies. Currently, metabolites produced by anaerobic bacteria are being highlighted as important etiological factors in the development of cervical cancer, as they increase the risk of infection by highly carcinogenic HPV types [Lin M. et al., 2019; Brusselaers N. et al., 2019].

Disruptions in the composition of the vaginal microbiota have been shown to affect carcinogenesis mechanisms by influencing the host's immune response and its ability to clear infections. Studies by Zhou Z.W. *et al.* (2021) and Wei L.Q. *et al.* (2021) indicate that disturbances in microbial homeostasis can trigger a cascade of immune reactions. Chronic inflammation, a byproduct of such disturbances, is a well-known carcinogenic factor. Vaginal dysbiosis is one of the main risk factors for HPV infection, sexually transmitted infections, and HIV [Van de Wijgert J.H.H.M., Jespers V., 2017]. Vaginal dysbiosis may contribute to HPV persistence, increased expression of the viral oncoproteins E6 and E7, genomic instability, and activation of telomerase, all of which can lead to transformation of cervical epithelial cells [Mitra A. et al., 2016]. In contrast, the presence of *Lactobacillus* spp. reduces expression of HPV oncogenes and increases expression of the tumor suppressor p21, thereby regulating

the cell cycle [Łaniewski P. et al., 2019]. Normally, the vaginal microbiota is dominated by *Lactobacillus* spp., whereas in dysbiosis *Streptococcus* spp., *Prevotella* spp., *Atopobium* spp. and other anaerobes predominate. It has been shown that a microbiota with a deficiency of *Lactobacillus* spp. and a predominance of anaerobes is associated with HPV persistence.

Pathogenic bacteria can modulate the carcinogenesis process by producing specific toxins (such as cytolethal distending toxin and colibactin) that are capable of damaging DNA [Nguyen Thi Nga et al., 2016].

Mechanisms by which the microbiota affects the risk of dysplasia and cervical cancer include reducing the integrity of the epithelial barrier and modulating the local immune response. Research has shown that a deficiency of *Lactobacillus* spp. and a predominance of *Gardnerella vaginalis* in the microbiota facilitate HPV infection and persistence, provoking inflammation and damage to the cervical epithelium. Disruption of the *Lactobacillus* balance in the microbiota decreases amino acid and glycogen turnover, accelerates metabolism of glycochenodeoxycholate and carnitine, increases lipid production, and raises vaginal pH, stimulating cytokine-induced inflammation in the mucosa [Nazarova N.M., 2025].

Results of studies confirm that a deficiency of *Lactobacillus* spp. and a predominance of anaerobes in the vaginal microbiota are risk factors for persistence of HPV infection, development of CIN, and cervical cancer [Di Paola M. et al., 2017]. Moreover, the microbiota of patients with dysplasia and cervical cancer contains microorganisms associated with BV — *Gardnerella*, *Megasphaera*, *Prevotella*, *Peptostreptococcus*, *Streptococcus*, *Sneathia sanguinegens*, *Atopobium* — which were more often present in HPV-positive patients [Łaniewski P., 2020].

Microbiota and Ovarian Cancer

Research by Banerjee *et al.* (2017) revealed significant differences in microbial composition between ovarian cancer tissues and healthy ovarian tissues. Specifically,

in ovarian cancer tissues researchers found oncogenic viruses and bacteria: *Brucella* (76%), *Mycoplasma* (74%), and *Chlamydia* (60%) [Banerjee S. et al., 2017]. Similar findings were reported by Zhou B. *et al.* (2019), who identified changes in the tissue microbiota of ovarian cancer, including an increased ratio of Proteobacteria to Firmicutes compared to controls. In ovarian cancer tissues there was an increased colonization by *Acinetobacter* and a deficiency of *Lactobacillus* spp.

Numerous studies confirming the key role of the microbiota in the development and progression of tumors have led to the inclusion of the microbiota as a hallmark of cancer [Hanahan D., 2022].

The microbiota comprises all communities of commensal, symbiotic, and pathogenic microorganisms — including bacteria, fungi, archaea, and viruses — that colonize the gastrointestinal tract and other organs and tissues. Once the mechanisms of interaction along the "tumor – immune system – microbiota – probiotics" axis are elucidated, it will become possible to manage the microbiota in two ways: by enhancing the antitumor properties of components of the microbiota, and by influencing them with probiotics. For example, genetic engineering approaches are being applied to enhance the antitumor properties of microbiota components [Nazarova N.M., 2025].

Furthermore, there is evidence that lactate concentrations are higher in metastatic cervical tumors compared to non-metastatic tumors, making tumor lactate content a proposed prognostic factor and marker for the risk of metastasis and disease recurrence [Walenta S. et al., 2000].

Probiotics and Immune Interactions

A key question in developing specific probiotic formulations is the interaction of probiotics with local immune components, primarily tumor-associated macrophages (TAMs). TAMs perform tolerogenic phagocytosis and degradation of bacteria, and their response to bacterial components can elicit varying degrees of inflammatory

reaction depending on the activation state of the TAMs and the involvement of pattern recognition receptors (TLRs, scavenger receptors, etc.). Considering that TAMs can both support tumor growth and preserve antitumor properties, the influence of probiotics on TAMs must be carefully studied for each cancer type in preclinical in vivo and in vitro systems [Belyavskaya V.A. et al., 2022].

In the case of viral infections, it is also important to note that macrophages can not only degrade viral particles, but can also serve as long-term reservoirs for viral survival, allowing the virus to replicate years after the primary infection [Belyavskaya V.A. et al., 2022].

Understanding the "microbiota – immunity – cancer – probiotics" axis will enable microbiome management in two directions: strengthening the antitumor properties of microbiota components and using probiotics to modify the tumor microenvironment.

Conclusion

Thus, the vaginal microbiota is a key factor in women's reproductive health and influences the development of various gynecological diseases. Dominance of *Lactobacillus* species, especially *Lactobacillus crispatus* and *L. gasseri*, provides protection of the epithelial barrier, suppresses the growth of pathogenic microorganisms, and reduces the risk of HPV persistence. In contrast, vaginal dysbiosis — characterized by a deficiency of *Lactobacillus* spp. and a predominance of *Gardnerella vaginalis* and strict anaerobes (such as *Prevotella* spp. and *A. vaginae*) — is associated with an increased risk of inflammatory processes, HPV infection and persistence, neoplastic transformation of cervical epithelium, and carcinogenesis. Early diagnosis of precursor lesions of the cervix and adequate treatment of detected pathology are effective measures for the prevention of precancerous conditions and cervical cancer.

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АЁЛЛАР ЖИНСИЙ АЪЗОЛАРИ ЎСМАСИ ВА ЎСМА ОЛДИ ҲОЛАТЛАРИНИНГ ПОПУЛЯЦИЯДА УЧРАШИ, ХАВФ ОМИЛЛАРИ, ТАШХИСИ ВА МОРФОЛОГИК ЎЗИГА ХОС ХУСУСИЯТЛАРИ: АДАБИЁТЛАР ШАРҲИ

Назаров Бегзод Баҳтиёрович

Тешаев Шуҳрат Жумайевич

nazaroff_bb@mail.ru

behzod_nazarov@bsmi.uz

Бухоро давлат тиббиёт институти

Аннотация: *Мазкур мақолада аёллар жинсий аъзолари ўсмалари ва ўсма олди ҳолатларининг популяцияда учраши, асосий хавф омиллари, ташхислаш усуллари ҳамда морфологик хусусиятлари адабиётлар таҳлили асосида ўрганилган. Тадқиқотда турли илмий манбаларга таянилган ҳолда ўсмаларнинг этиологияси ва патогенези, уларнинг тарқалиш даражаси ва клиник кечиши таҳлил қилинган. Шунингдек, эрта ташхислашнинг аҳамияти, замонавий диагностика усуллари ва профилактик чора-тадбирларнинг роли ёритилган. Морфологик жиҳатдан ўсмаларнинг турлари ва уларнинг ўзига хос белгиларини аниқлаш, касалликни самарали даволаш ва олдини олишда муҳим аҳамиятга эга эканлиги асослаб берилган.*

Калит сўзлар: *аёллар жинсий аъзолари ўсмалари, ўсма олди ҳолатлари, популяция, хавф омиллари, ташхис, морфология, гинекологик ўсмалар, неоплазия, эрта ташхислаш, профилактика, клиник кечиш, этиология, патогенез, онкология*

Abstract: *This article presents a comprehensive review of the prevalence of tumors and precancerous conditions of the female reproductive system in the population, as well as their major risk factors, diagnostic approaches, and morphological characteristics. Based on the analysis of various scientific sources, the etiology, pathogenesis, distribution patterns, and clinical course of these conditions are examined. Special attention is given to the importance of early diagnosis, modern diagnostic methods, and preventive measures. The study also highlights the significance of identifying morphological features of different tumor types for effective treatment and prevention strategies.*

Keywords:*female reproductive system tumors, precancerous conditions, population prevalence, risk factors, diagnosis, morphology, gynecological tumors, neoplasia, early detection, prevention, clinical course, etiology, pathogenesis, oncology*

Маълумки, бачадон бўйни ўсмаси (ББЎ) аёллар орасида кенг тарқалган ёмон сифатли ўсмалардан бири бўлиб қолмоқда. Бу ривожланаётган мамлакатларда аёллар онкологик касалланиши ва ўлими таркибида етакчи ўсма ҳисобланади ва барча иқтисодий ривожланган мамлакатларда муҳим тиббий ва ижтимоий муаммодир. Ҳар йили дунёда ББЎ билан боғлиқ қарийиб 604 мингта янги ҳолат аниқланади ва ундан 342 мингтагача ўлим қайд этилади. Сўнгги йилларда репродуктив ёшдаги аёлларнинг ББЎ билан касалланиш тенденцияси прасаймаётгани диққатга сазовор. Аниқланишича, 30-34 ёшдаги онкологик касалликлардан вафот этган ёш аёллар орасида деярли ҳар тўртинчиси ББЎ дан вафот этган [26].

Маълумки, ББЎ эпидемиологияси бўйича биринчи тадқиқотлар XIX асрда бошланган. 1842 йилда Rigoni-Stern 1760 йилдан 1830 йилгача Веронада ўлимлар реестрини ўрганиш асосида маълумотларни нашр этган. У ББЎ кўпинча турмуш қурган ва бева аёлларнинг ўлимига сабаб бўлгани, бокира ва роҳибаларда бўлмаганлигини пайқаган. Бу олимга ББЎ нинг инфекцион табиати ҳақида фараз қилиш имконини берган. Gagnon F. (1950) томонидан чоп этилган маълумотлар, Монреал ва Квебек роҳибаларининг 13 мингта тиббий ёзувларини ўрганиш жараёнида, ББЎ ҳеч қачон аниқланмаганлиги сабабли, катта қизиқиш уйғотади. Ушбу натижалар роҳибаларда бачадон бўйни яллиғланиш касалликларининг кам учрайдиган ҳолати билан боғлиқ, деб ҳисобланган [3, 15].

Дунё бўйича тан олинган AIRS, GLOB-OCAN халқаро ташкилотлари (2008) статистик маълумотларини таҳлил қилиш шуни кўрсатганки, ҳар йили дунёда 529 800 дан 530 232 гача янги аниқланган бачадон бўйни ўсмаси ҳолатлари қайд этилади ва 190 минг аёл вафот этади. Барселонадаги Одам

папиллома вируси ва ўсма бўйича ахборот маркази (ICO) ишчи гуруҳининг 2016 йилги йиллик ҳисоботида Осиё-Тинч океани минтақаси бўйича умумлаштирилган маълумотлар келтирилган. Унга кўра, ББЎ Осиёда аёллар жинсий аъзолари ўзсмаси орасида 3-ўринни эгаллаб, касалланиш даражаси 100 минг аёлга 12,7 тани ва ўлим кўрсаткичи 6,4 тани ташкил этган. Халқаро экспертлар гуруҳининг 2015 йилдаги Қозоғистон бўйича йиллик ҳисоботида айтилишича, ББЎ аёллар орасида 2-ўриндаги энг кўп тарқалган касаллик бўлиб, 15-44 ёшдагилар орасида 1-ўринни эгаллаган. Касалланиш даражаси 32,8 ни ташкил этган, бу эса Европа мамлакатларидаги шу каби кўрсаткичлардан сезиларли юқоридир [1, 15].

Муаллифлар томонидан кўрсатиб берилишича, ББЎ кўпинча (78%) ривожланаётган давлатларда кузатилади. Ушбу давлатларда у аёлларда аниқланган барча хавфли ўсмаларнинг 15% ини ташкил этиб, саратон касаллигидан ўлим ҳолатларининг сони бўйича 2-ўринда туради. Иқтисодий жиҳатдан ривожланган давлатларда эса, ББЎ барча янги ташхис қўйилган саратон касалликларининг фақат 4,4% ини ташкил этади [27].

Сыдыкова А.Б. ва ҳаммуал. [15] маълумотларига кўра, ББЎ нинг энг юқори тарқалиши Лотин Америкаси ва Кариб ҳавзаси мамлакатлари, Шарқий ва Жанубий Африка, Жанубий ва Жанубий-Шарқий Осиёда кузатилади, бу ерда у аёллардаги барча ўсма касалликларининг 9-15% ини ташкил этади ва ўсмадан ўлимнинг иккинчи сабаби бўлган. Шимолий Америка ва Европа мамлакатларида ББЎ ривожланиш тезлиги сезиларли паст бўлган (ҳар 100 минг аёлга 14 дан кам). Хитой ва Ғарбий Осиё мамлакатларида ББЎ тарқалиш даражаси пастлиги қайд этилган (2,3-4,4%). Юқори кўрсаткичлар қуйидаги мамлакатларда кузатилган: РФ (касалланиш даражаси 15,3%, ўлим даражаси 6,1%), Украина (мос равишда 16,6% ва 6,4%), Литва (мос равишда 26,1% ва 7,5%), Латвия (мос равишда 17,3% ва 6,3%), шунингдек, Қозоғистонда.

МДҲ давлатлари аҳолиси орасида юзага келган хавфли ўсмалар касалланиши таркибида ББЎ улуши Беларус, РФ ва Украинада 4-6% дан, Ўзбекистон, Қирғизистон ва Қозоғистонда эса 9-16% гача ўзгариб турган. Ушбу ҳудудларда янги аниқланган беморларнинг ўртача ёши 49-53 ёш бўлган [3, 15].

Чиссов В.И. ва ҳаммуал. [17] маълумотларига кўра, беморларнинг ўртача ёши 52,6 ни ташкил этган, шундан 50% дан ортиғи 49 ёшдан кичик аёллар бўлган. Сўнгги 15 йил ичида беморларнинг ўртача ёши 4 йилга камайган, 29 ёшдан кичик аёлларда эса касалланиш 2,5 баробар ошган. ББЎ ва ўлим кўрсаткичлари нафақат мамлакатлар ўртасида, балки бир мамлакатнинг турли вилоятларида ҳам сезиларли даражада фарқланган. Муаллифнинг фикрича бу кўплаб омиллар билан боғлиқ: ижтимоий-иқтисодий шароит, миллий анъаналар, аҳолининг тиббий маданияти даражаси, соғлиқни сақлаш тизимининг ривожланиш даражаси, скрининг дастурларининг амалга оширилиши ва бошқалар.

Текширув ўтказишнинг мавжудлигига қарамай, Беларусда ББЎ аёлларда репродуктив тизимнинг хавфли ўсмалари орасида 3-ўринни эгаллаган (кўкрак бези ва бачадон саратонидан кейин). Аниқланишича, ББЎ бирданига пайдо бўлмайди. Жаҳон соғлиқни сақлаш ташкилоти (ЖССТ) маълумотларига кўра, in situ дисплазиясининг ўртача ўтиш даври 3-8 йилни ташкил этади. Микроинвазив ўсма ривожланишигача яна 10-15 йил ўтади. Аниқланишича, бачадон бўйни касалликларининг 80% дан ортиғи фон касалликлари ва 20% саратон олди касалликларига тўғри келади [2, 18].

Семикоз Н.Г. ва ҳаммуал. [13] фикрича ҳозирги вақтда ББЎ ва дисплазиянинг ривожланиш хавф омиллари қуйидагилар ҳисобланади: жинсий фаоллик; нафақат аёл ўзининг, балки унинг эркак ҳамроҳларининг ҳам жинсий ҳамроҳларини тез-тез ўзгартириши; жинсий гигиенага риоя қилмаслик; эрозияга олиб келадиган бачадон бўйни тез-тез жароҳатланиши; абортлар; гормонал препаратларни узоқ муддат қабул қилиш; жинсий аъзолар юқумли касалликлари; генетик мойиллик; тананинг заифлашган ҳимоя функцияси; жинсий йўл билан

юқадиган касалликлар; етарли даражада малакали бўлмаган акушерлар ёрдамида тез-тез туғиш; етарлича хилма-хил овқатланиш йўқлиги, витаминлар, хусусан А ва С витаминлари етишмаслиги; вирусли инфекциялар, улар орасида одам папиллома вируси (ОПВ) инфекцияси; чекиш; иккиламчи иммунтанқислик; орал контрацептивлардан фойдаланиш, гормонал бузилишлар. ББЎ ривожланишига олиб келувчи кўплаб хавф омиллари орасида, жинсий ҳаётнинг эрта бошланишига алоҳида эътибор қаратилади, чунки 14-18 ёшда биологик жиҳатдан етилмаган бачадон бўйни эпителийси канцероген ва ко-канцероген агентлар таъсирига кўпроқ мойил бўлади. Ёшлар жинсий фаоллиги ошиши генитал ВПЧ инфекциясининг кенг тарқалишига олиб келган.

Аслонова М.Ж. ва ҳаммуал. [3] келтирган маълумотларга кўра, охирги йилларда дунёнинг кўплаб давлатларида ОПВ сабаб бўлган папилломавирус инфекцияси (ПВИ) билан касалланиш даражасининг ошиши кузатилмоқда. Бачадон бўйни ясси ҳужайрали интраэпителиал зарарланиши (ЯҲИЗ) репродуктив ёшдаги аёллар орасида гинекологик патологиялар структурасида асосий ўринни эгаллайди.

Шунга ўхшаш маъхлумотлар Ашурова Н.Г., Наврузова Н.О. [5] ишларида ҳам келтирилган. Улар фикрича, бачадон бўйни ЯҲИЗ ривожланишида ОПВ нинг асосий роли бор. ОПВ билан юқишнинг энг юқори чўққиси 15 ёшдан 30 ёшгача бўлган даврга тўғри келади ва 18,6% ни ташкил қилади, 30 ёшдан кейин эса ОПВ юқиш даражаси камаяди (9,9%), шу билан бирга бачадон бўйни ЯҲИЗ ва саратони аниқланиш частотаси ортади.

Ўзбекистонда ҳар йили ўртача 2844 та янги онкогинекологик патология ҳолатлари ташхис қилинади, бу эса умумий ўсмалар сонининг 13,5% ини ташкил қилади. 2016 йилда онкогинекологик патологиялар орасида энг кўп беморлар ББЎ (1465 та), генетик патология билан касалланиш (4,6 та), систематик патология (9,2 та) билан рўйхатга олинган. Шунингдек, 2016 йилда республикада ўлим даражаси генетик патология бўйича 43,8, систематик патология 100 дан

бўлган. Энг юқори кўрсаткичлар Андижон вилоятида бўлган - 10,2, Хоразм вилоятида 6,9, Наманган вилоятида 6,7, Тошкент шаҳрида 6,8 ва ҚҚР да 5,9 ни ташкил этган. Касалланиш/ўлим кўрсаткичи 1,8 бўлган. Энг паст кўрсаткичлар Сирдарё (2,5), Сурхондарё (2,9), Қашқадарё (3,0) вилоятларида кузатилган. Ёш бўйича энг юқори кўрсаткич 45-59 ёшга тўғри келган. Ўсмаларнинг III- ва IV-босқичлари аниқланган бемор аёллар фоизи юқори бўлган, бу эса аниқланган ҳудудга қараб онкоэпидемиологик вазиятни ўрганишни талаб қилади [2, 22].

Ихтиярова Г.А. ва ҳаммуал. [8] ҳам ББЎ бевосита ОПВ инфекцияси билан боғлиқлигини ўз тадқиқотлари натижасида исботлаб берганлар ва касалланишнинг ўсиш тенденцияси сақланиб қолаётганини таъкидлаганлар.

Юқори онкоген хавфли ОПВ ДНК си (асосан 16- ва 18-типлари) бачадон бўйни кўп қаватли ясси эпителийсининг ўртача ва оғир дисплазияси намуналарининг 30-80% ида ва бачадон бўйни инвазив саратонининг 90% ида аниқланганлиги кўрсатилган. ПВИ 2 та шакли мавжудлиги исботланган: продуктив ва интегратив [16, 25].

Бошқа муаллиф ББЎ барча ўсма касалликларининг 5% дан кўпроғини ташкил этишини кўрсатган. РФ да охирги 10 йилда ББЎ билан касалланиш янги ҳолатлари кўпайган: 2010 йилда 14 719 та бўлган бўлса, 2020 йилда бу кўрсаткич 15 500 тага етган. Муаллифнинг таъкидлашича, Донецк Халқ Республикасида ББЎ касалланиши охирги 2 йил давомида пасайиш тенденциясини кўрсатган ва 100 минг аҳолига нисбатан кўрсаткич РФ даги шу кўрсаткичдан 9,65% га паст, аммо Украинадаги параметрлардан 9,87% га юқори бўлган. Энг кенг тарқалган инвазив ББЎ ясси шаклли ҳужайрали ўсма бўлиб, у клиник ҳолатларнинг 70-80% ини ташкил қилган, 10-20% ҳолларда аденокарцинома, 10% ҳолларда эса паст дифференциаллашган ўсма аниқланган, бошқа гистологик шакллар эса 1% дан кам ҳолларда учраган [4, 13, 28].

Европа мамлакатлари саратон регистрлари маълумотларига кўра, XX асрнинг 90-йилларида ББЎ билан касалланган беморларнинг йиллик омон қолиш

даражаси 84%, 3 йиллик омон қолиш даражаси 66%, 5 йиллик омон қолиш даражаси эса 62% ни ташкил этган. Энг паст 5 йиллик омон қолиш даражаси Полшада (51%), энг юқори кўрсаткич эса Исландияда (84,7%) қайд этилган [15, 32].

Маълумки, ББЎ ривожланишида этиологик жиҳатдан муҳим роль ОПВ га тегишли. Бу эса ушбу касалликни комплекс даволашда интерферон ишлаб чиқаришни рағбатлантирувчи иммуномодуляторларни қўллашга асос бўлади. Комплекс даволашда иммунотерапия ва иммунокоррекциянинг ўрни ва аҳамиятини баҳолаш клиник иммунология ва онкологиянинг долзарб муаммоларидан биридир. Тавсия этилган иммуномодуляторлардан бири - аллокин-алфа (аллоферон) ББЎ билан оғриган беморларни комплекс даволашда, неоадъювант поликимётерапия олган беморларда, детоксикация ва ҳужайраларнинг цитостатикларга сезгирлигини оширишга ёрдам берадиган плазмаферез билан биргаликда қўлланилган. Цитокин даражаларининг динамикаси шуни кўрсатганки, плазмаферезни аллокин-алфа билан бирга қўллаш яллиғланиш компонентини минималлаштирган [12, 30].

Сушинская Т.В. ва ҳаммуал. [14] маълумотларига кўра, амбулатор босқичда ўсма олди касалликлари ва ББЎ ни ташхислаш аниқлиги 42,2% ни ташкил этган. Бунда ўсма жараёнини кам ташхислаш ҳолатлари кўпроқ учраган. Бунга сабаб диагностик муолажаларни бажаришдаги камчиликлар, CIN морфогенези хусусиятлари билан боғлиқ объектив қийинчиликлардир.

Короленкова Л.И. [10] 71,8% беморларда турли даражадаги CIN бирга келишини аниқлаганини маълум қилган. 36% беморларда микроинвазив ББЎ ва CINI даражасининг бирга келиши аниқланган. Бу ОПВ таъсири остида бўлган бачадон бўйни эпителий ҳужайраларининг генетик беқарорлиги фонида ўсманинг гетерогенлиги билан боғлиқ бўлган.

Каюкова Э.В. ва ҳаммуал. [9] тадқиқотининг мақсади айрим молекуляр параметрларнинг нейрон тармоқлар таҳлили асосида CIN ва ББЎ ни ташхислаш

технологиясини яратиш бўлган. Тадқиқ қилинган гуруҳлар орасида юқори ёғ кислоталари спектри, sCD27 нинг маҳаллий қиймати бўйича сезиларли фарқлар аниқланган. Кўп қаватли перцептронга C18:2ω6, OPN, ICAM-1, sCD25, sCD27 киритилган. Олинган молекуляр маълумотларнинг нейрон тармоғи таҳлили CINIII даражасини юқори аниқлик билан ташхислаш имконини берган. Муаллифлар хулоса қилишларича, яратилган модель CINIII даражаси ва ББЎ ни юқори аниқлик билан ташхислаш имконини берган. Кўп қатламли перцептрон конфигурацияси молекуляр кўрсаткичлар ўртасидаги патофизиологик ўзаро боғлиқликларни тасдиқлаш ва асослаш имконини берган, бу эса бачадон бўйни канцерогенези механизмлари ҳақидаги тушунчаларни кенгайтирган.

Доброхотова Ю.Е. ва ҳаммуал. [7] тадқиқотининг мақсади ҳомиладор аёлларда туғма иммунитет омиллари экспрессиясини тўғрилаш орқали бачадон бўйни дисплазиясини даволашнинг янги ёндашувларини ишлаб чиқиш бўлган. Цитокинотерапия фонида вирус юки 1,2-1,8 баробар камайганлиги аниқланган, цервикал каналда TNFa экспрессияси 2 баробар, HBD-1, TLR-9 ва TLR-2 эса 10 баробар ошганлиги қайд этилган. Вагина эпителийсида TLR-9 даражаси 5,3 баробар кўпайган. Муаллифлар Суперлимф препарати фонида вирус юкламасининг ўзгариши цервикал канал шиллиқ қавати ва вагинада ҳам TLR2 ва TLR9 генлари ҳамда TNFa ва HBD-1 эффектор молекулалари экспрессиясининг фаоллашуви ҳисобига туғма иммунитет кўрсаткичларининг фаоллашуви билан боғлиқлигини хулоса қилган.

Дунёда ББЎ ҳолатларининг 70% и иккита ОПВ (16- ва 18-тип) типлари томонидан чақирилиши аниқланган. Аксарият мамлакатларда ОПВ га қарши иккита вакцина қўллаш учун тасдиқланган, иккаласи ҳам 16- ва 18-типли ОПВ томонидан чақириладиган инфекцияларнинг 95% дан ортиғини олдини олиши ва ББЎ ни чақирувчи бошқа кам тарқалган ОПВ типларига қарши маълум даражада иммунитет ҳосил қилиши кўрсатилган. Вакциналардан бири ўткир кондиломаларни келтириб чиқарадиган ОПВ нинг 6- ва 11-типларидан ҳимоя

қилиши айтилган. Ҳар иккала вакцина ҳам ОПВ билан алоқада бўлишдан олдин қўлланилганда самарали бўлган. ЖССТ тавсияларига кўра, ОПВ га қарши эмлашнинг мақсадли гуруҳи 9-13 ёшдаги ва жинсий ҳаёт тарзи билан шуғулланмайдиган қизлардир. Муаллиф таъкидлашича, ҳар иккала вакцина ҳам 6 ой давомида уч дозада юборишни талаб қилади, уларнинг хавфсизлиги қатъий назорат қилинади ва ишончли [11, 24].

Иммуноонкология илмий йўналиши ўсмалар билан касалланган беморларни даволаш натижаларини яхшилаш учун потенциал янги стратегия сифатида пайдо бўлган. Цитокинлар организмнинг ўсмага қарши ҳимоясида алоҳида муҳим роль ўйнагани сабабли, ўсмалар иммунотерапияси учун IL-2, TNF ва IFNγ дан фойдаланиш имкониятига катта эътибор қаратилмоқда. TNFα асосидаги янги гибрид молекулаларни фаол излаш туфайли, онкологларнинг замонавий амалиётига махсус ишлаб чиқилган маҳаллий рекомбинант ген-муҳандисликка асосланган ўсмага қарши препаратлар, хусусан, “Refnot” (TNFα-timozin-α1) ва “Ingaron” (IFNγ) препаратлари кириб келмоқда. Ушбу препаратлар билан даволаш 2 йилдан ортиқ вақт давомида такрорий ББЎ ни самарали назорат қилишга имкон берувчи, бемор ҳаёт сифатини яхшиловчи ижобий даволаш самарасига эга бўлган хавфсиз қўшимча даволаш усули ҳисобланади. Ушбу турдаги даволаш клиник онкологияда қўллаш учун тавсия этилган [21, 29].

Афанасьев М.С. ва ҳаммуал. [4] тадқиқотларидан мақсад ОПВ-инфекциясининг клиник шаклларини юқори карциноген хавфли ОПВ типлари хусусиятларига боғлиқлигини аниқлаш бўлган. Тадқиқотга фаол ПВИ ва унинг клиник шакллари аниқланган 16 ёшдан 71 ёшгача бўлган 1063 нафар бемор жалб этилган. Беморлар фаол ОПВ инфексияси фонида касалликнинг клиник шаклларига қараб гуруҳларга бўлинган: вирус ташувчилар, CIN енгил даражаси, ўрта даражаси, оғир даражаси, карцинома in situ ва инвазив ББЎ. Полимераза занжир реакцияси (ПЗР) усули ёрдамида ОПВ (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68 типлари) аниқланган. Натижалар бачадон бўйни ПВИ ни ташхислаш

ва даволашда ОПВ типини ҳисобга олиш зарурлигини кўрсатган. Бу касалликнинг ривожланишини ва ББЎ пайдо бўлишини олдини олишга қаратилган прогноз аниқлиги ва терапевтик тадбирлар самарасини оширишга имкон берган.

ОПВ келтириб чиқарадиган касалликлар кенг тарқалиши ва ОПВ билан боғлиқ жараёнлар патогенетик хусусиятлари, “ОПВ-макроорганизм” тизимидаги ўзаро таъсири эволюцион жиҳатлари билан боғлиқ бўлиб, Toll-симон рецепторлар 4- ва 9-типлари фаоллиги, туғма иммунитет ҳужайралари – нейтрофиллар ва макрофаглар, дендрит ҳужайралар, Т-, В-лимфоцитлар, NK- ва стромал ҳужайралар билан боғлиқдир. *Candida spp* нинг сийдик-таносил тизими шиллиқ қаватларини шикастлаши, вирус-замбуруғ ассоциациялари мавжудлиги, уларнинг сурункали яллиғланиш, оксидатив стресс, иммун назоратни амалга оширувчи ҳужайралар функционал-метаболик салоҳияти бузилишини ривожлантиришдаги роли, организмнинг иммун салоҳиятини меъёрлаштириш учун тизимли ва маҳаллий таъсирга эга иммуномодулятор препаратларни қўллаш зарурлигини асослаган [19, 31].

Гизингер О.А. [6] маълумотларига кўра, Immunomax® препарати – бу организмдаги иммун назоратни амалга оширувчи ҳужайраларнинг Toll-симон рецепторлари томонидан тан олинадиган кислотали пептидогликан ҳисобланади. Муаллиф таъкидлашича, Immunomax® ОПВ-инфекциясида иммун жавобнинг вирусга қарши механизмларини фаоллаштиришга олиб келади; Гепон® препарати организмнинг вирус, бактерия, *Candida spp* келтириб чиқарган инфекцияларга қарши чидамлилигини оширади, *Candida spp* чақирган шиллиқ қаватлар ва тери инфекцияларини комплекс даволашда самарали, антибиотиклар билан даволаш фонида шиллиқ қаватлар ва тери кандидозининг олдини олишда ёрдам беради, шиллиқ қаватлар ва терининг яллиғланиш даражасини пасайтиради, шиллиқ қаватларнинг қуруқлигини камайтиради.

Тадқиқотда 210 нафар аёлда ПЗР ёрдамида ПВИ аниқланган. Иммуномодулятор билан даволаш самарадорлиги юқори бўлган. Кузатув давомида 6 ой ичида маҳаллий яллиғланиш кўрсаткичи 54,2-83,3% гача пасайган. Бачадон бўйни яллиғланиш жараёнининг клиник кўринишлари фақат CIN қайталанганда кузатилган. Комбинацияланган терапия натижасида 6 ой ичида ОПВ ини йўқ қилиш ва деструктив даволашдан сўнг бачадон бўйни эпителизацияси тезлашиши қайд этилган [1].

Бошқа тадқиқотда ушбу даволаш натижасида ОПВ 85-90% ҳолларда спонтан равишда регрессия бўлган, аммо юқори онкоген типли ОПВ сабабчи бўлган ПВИ нинг давом этиши бачадон бўйни CIN ва инвазив ББЎ ривожланиш хавфини оширган. Кўпчилик ҳолларда CIN ва ББЎ ОПВ-мусбат беморларда учраган, аммо организмдаги вируснинг мавжудлиги патологик жараённинг ўзига хос ривожланиши ёки регрессиясининг белгиси сифатида қаралмаслиги керак, деган фикр билдирилган. Вирус интерферон ҳолатининг ўзгариши, NK-ҳужайралар цитотоксик фаоллиги, метилланиш жараёнларида намоён бўладиган ҳужайрали иммун жавобни келтириб чиқарган. Даволашда яхлит ёндашув, анъанавий терапия, эмлаш, иммуномодуляция имкониятларига эга бўлган препаратларни қўллаш юқори онкоген хавфли ОПВ персистенсияси ва саратон олди касалликлари, шунингдек ББЎ бўлган беморлар учун долзарб. Вирус билан боғлиқ касалликларни даволашда кислотали пептидогликан қўлланилиши клиник аломатларни бартараф этишга ёрдам берган [8].

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ТЕРРИТОРИ НЕКОТОРЫХ РАЙАНОВ НАВОИЙСКОЙ ОБЛАСТИ

Хашимов Б.С.

Государственный центр диагностики болезни животных и продовольственной безопасности Навоийской области Республики Узбекистан, г. Навои.

Даминов А.С.

Самаркандский государственный университет

Еспанов Ж.У.

Казахский национальный аграрный исследовательский университет

Аннотация. *Разработано серологический метод прижизненный диагностики цефалопиноза верблюдов направленный на выявления в сыворотке крови верблюдов экскреторно-секторного антигена личинок верблюжьего овода Cephalopina titillator и антител к ним, которые являются пригодными для прижизненной диагностики цефалопиноза верблюдов, а также для изучения иммунного ответа на цефалопинозную инвазию и выяснения паразито-хозяйнных взаимоотношений при данной инвазий.*

Ключевы слова: *цефалопиноз, экзогенные экскреторно-секреторные антигены личинок, иммуноферментный анализ, иммуноферментный цефалопинозный коньюгат.*

Annotation. *A serological method for the diagnosis of camel cephalopinosis has been developed aimed at detecting the excretory-sector antigen of camel gadfly larvae Cephalopina titillator and antibodies to them in the blood serum of camels, which are suitable for the lifetime diagnosis of camel cephalopinosis, as well as for studying the*

immune response to cephalopinosis invasion and clarifying parasitic-economic relationships in this invasion.

Keywords: *cephalopinosis, exogenous excretory-secretory antigenic larva, immunofermenty analysis, immunofermenty cephalopinosis conjugate.*

Введение. Верблюдоводство в Казахстане и Узбекистане является традиционной отраслью животноводства и важным резервом производства мяса, молока и шерсти в пустынной и полупустынной зонах. Неприхотливые животные обеспечивают население высококалорийными и целебными продуктами питания - молоком, шубатом, мясом, а промышленность - ценным сельскохозяйственным сырьем - шерстью и кожей.

Однако развитие отрасли сдерживается различными заболеваниями инвазионного и инфекционного характера. Одними из них, наносящие значительный экономический ущерб, является цефалопиноз (Cephalopinosis). Высокая интенсивность оводовых инвазий и большой процент заражения (до 100%) пораженности верблюдов в региональных условиях Казахстана и Узбекистана приводят к значительному экономическому ущербу[1].

Основными причинами этого является недостаточная изученность паразито-хозяинных взаимоотношений и иммунитета, знания которых является необходимой предпосылкой для разработки высокочувствительных и объективных методов прижизненной диагностики и профилактики цефалопиноза верблюдов.

Существующие методы диагностики паразитарных болезней включает разнообразные подходы, основанные как на обнаружения непосредственно возбудителя болезней в различных стадиях его развития (прямые методы), так и на регистрации ряда изменений в пораженном организме в той или иной мере специфических для какого-либо возбудителя (косвенные методы). Из косвенных методов широкое распространения получили серологические тесты, основанные

на использовании специфических реакции выявления в сыворотке крови антител и антигенов паразитов [2].

Новизна исследования связана с определением возможности применения иммуноферментного анализа для выявления в сыворотке крови лошадей экзогенных (экскреторно-секреторных) антигенов верблюжьего овода Cephalopina titillator и антител к ним.

Материалы и методы. Работа выполнена в период 2021 по 2025 года, на базе Казахского национального аграрного исследовательского университета на кафедре «Биологическая безопасность» и на кафедре «Паразитологии и организация ветеринарного дела» Самаркандского государственного университета ветеринарной медицины, животноводства и биотехнологии.

Личинки овода получали путем вскрытия носовой полости, лобной пазухи решетчатой кости забитых верблюдов в убойном пункте Навоийской области.

Экзогенные (зкскреторно-секреторные) антигены личинок верблюжьего овода Cephalopina titillator получали методом культивирования личинок. Для чего, личинки тщательно промывали водопроводной водой комнатной температуры, ополаскивали дисстилированной водой и подсушивали фильтровалной бумагой. Затем личинок помещали в различные культуральные жидкости: среду Игла199, солевой раствор Хенкса и забуференный физиологический раствор 7, 2 -7,4). В качестве антисептиков добавляли антибиотики пенициллин и стрептомицин в дозе 100 ЕД на 1 мл. раствора. В культуральных жидкостях после удаления личинок содержание белка определяли на спектофотометре СФ-26, при длине волны 280 нм. Затем жидкость центрифугировали при 15 тыс об/мин в течение 30 минут. Полученный супернатант диализовали против дисстилированной воды 24 часа при 4^0С. Диализат концентрировали в 30%-ном растворе полиэтиленгликоля (ПЭГ-600).

Гипериммунные сыворотки получали методом иммунизации кроликов зкскреторно-секреторными антигенами по методу Fey et al.(1976) с полным

адъювантом Фрейнда, в нашей модификации. Эмульнирование адьюванта с цефалопинозным антигеном, введение, взятие крови у кроликов проводили по методу М. Горвица и М. Шарфа (1972).

Содержание антител а сыворотке крови иммунизированных кроликов определяли реакцией количественной преципитацией (M. Heidelberger, 1938). Изполученных антисывороток методом высаливания сульфатом аммония выделяли гамма-глобулиновую фракцию, а затем ионообменной хромотографии на диэтиламинометан (ДЭАЭ)-целлюзе выделили иммуноглобулин G (IgG).

Иммуноферментный анализ проводили в двух направлениях: 1) в сыворотке крови лошадей определяли антитела к экзогенным (зкскреторно-секреторные) антигенам личинок верблюжьего овода Cephalopina titillator. 2) в сыворотке крови лошадей определяли экзогенные (зкскреторно-секреторные) антигены личинок верблюжьего овода Cephalopina titillator.

Для определения циркулирующих антител в сыворотке крови верблюдов иммуноферментный анализ (ИФА) проводили по методу A. Voller et al. (1976), где в качестве первого сорбируемого компонента на полистироловых иммунологических планшетах использовали экскреты - секреты личинок, разведенные в 0.1 М карбонатно-солевом буферном растворе (РН 9,6). В качестве коньюгата использовали антитела против иммуноглобулинов верблюдов (Анти Ig G), меченые пероксидазой из хрена. В качестве субстратно-индикаторной смеси применяли субстрат предложенный D.Ellens et al. (I960) и субстрат, предложенный A.Abraham (I984) [3,4].

Для иммуноферментного определения в сыворотке крови экзогенных экскреторно-секреторных антигенов личинок верблюжьего овода Cephalopina titillator приготовили иммуноферментные коньюгаты. Приготовления иммунофehментных коньюгатов начали с получения антисывороток и экскреторно-секреторным антигенам личинок вышеупомянутым методом.

Из полученных антисывороток выделяли гамма-глобулиновую фракцию путем высаливания 33%-ным раствором аммония сульфата, выделенную гамма-глобулиновую фракцию диализовали против 0,01 М фосфатного буферного раствора (РН 7,2-7,4) в течение 48 часов при 4 °С при пятикратной смене буферного раствора. После чего, путем ионообменной хромотографии на диэтиламиноэтан (ДЭАЭ) целлюлозе выделили иммуноглобулин Ig G. Коньюгацию кроличьей анти Ig G с пероксидазой из хрена, с показателем чистоты Rz - 2,7-2,3 проводили по методу P. K. Nacane (I974).

Полученный коньюгат концентрировали с помощью полиэтилен-глюколя-600 до концентрации белков не ниже 1 мг/мл, после чего к нему добавляли бычий сывороточный альбулин до концентрации 10 мг/мл и иммунологическую активность полученного коньюгата проверяли в ИФА. Во всех вариантах ИФА учет результатов проводили с помощью автоматического ИФА анализатора и визуально (по интенсивности окрашивания субстрата в опыте и контроле). Контролем служили сыворотки крови верблюжата текущего года рождения свободные от личинок оводов.

Результаты исследования и обсуждения. При постановке ИФА на выявления антител к экскреторно-секреторным антигенам установлено, что максимально регистрируемые титры антител 1:5120 достигали при оптимальной концентрации экскреторно-секреторных антигенов личинок верблюжьего овода Cephalopina titillator 20 мкг/мл р, что свидетельствует о перспективности применения данного теста для диагностики цефалопиноза верблюдов.

Постановку ИФА направленного на обнаружение в сыворотке крови лошадей экскреторно-секреторных антигенов личинок личинок верблюжьего овода Cephalopina titillator начали с приготовления иммуноферментного коньюгата.

Иммуноферментный цефапинозный коньюгат приготовили периодатным методом по P.K.Nakane et al (I974). В качестве первого компонента, сорбируемого

на полистироловых планщетах, использовали гамма-глобулиновые фракции, выделенные из антисывороток кроликов к цефалопинозному экзогенному антигену, на которую затем сорбировали исследуемые сыворотки крови верблюдов. Затем в лунки полистироловых планшетов вносили цефалопинозный иммуноферментный коньюгат и субстратно-индикаторную смесь.

Для оптимизации процесса определения образующихся на полистироловых планшетах комплексов антиген-антитело экспериментально подобрали оптимальные концентрации гамма-глобулиновых фракции к цефалопинозному антигену, цефалопинозный иммуноферментный коньюгат, при которых обеспечивались максимально регистрируемые титры антигенов.

Максимальные регистрируемые антигенов титры получили при разведений гамма-глобулиновой фракции к цефалопинозному антигену 1:5000 (2 мкг белка на лунку-рабочее разведения) и имуноферментного цефалопинозного коньюгата 1:1200.

Как известно, степень влияния различных факторов на чувствительность анализа зависит от уровня оптимизации физико-химических параметров, таких как pH сорбционного и комплексирующего буферного раствора, время инкубации и температуры. Оптимизация теста, где максимальные регистрируемые титры цефалопинозного антигена 1:1200, достигались при сорбции первого компонента в течение 16-18 часов при температуре 4 ^{0}C и 3 часа при T 37 ^{0}C, при pH сорбционного буферного раствора от 9,0-до 10,0.

Заключение. Результаты проведенных нами исследований показывает, что отработанная нами тест-система являются пригодными для прижизненной диагностики цефалопиноза верблюдов, а также для изучения иммунного ответа на цефалопинозную инвазию и выяснения паразито-хозяйнных взаимоотношений при данной заболеваний.

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ВЕРТЕБРАБАЗИЛАР ЕТИШМОВЧИЛИКНИ ТАШҲИСЛАШДА БИОМАРКЕРЛАРНИНГ АҲАМИЯТИ

Ҳафизова М.

Тилавова Ҳ.О.

Тошкент давлат тиббиёт университети

Аннотация. Долзарблиги. *Вертебробазиляр этишмовчилиги (ВБЙ) мия томирлари патологиянинг энг кенг тарқалган турларидан биридир. Полиморф клиник кўринишлари орасида вестибуляр ва координациянинг бузилиши, эшитиш ва кўриш ўткирлигининг бузилишлари устунлик қилади, беморларнинг меҳнат қобилиятини кескин пасайтиради ва ҳаёт сифатини ёмонлаштиради. ВБЙ барча неврологик касалликларнинг тахминан 38% ташкил қилади. ВБЙ ишемик инсултларнинг 25-30% ни ташкил қилади. Вақтинчалик мия қон айланишининг бузилишининг 70% ВБЙ билан боғлиқ.* ***Ишнинг мақсади:*** *вертебробазиляр етишмовчилиги бўлган беморларда нейромедиаторланинг қондаги ўзгаришларини ўрганиш.* ***Материал ва усуллар****. Тадқиқот иши учун 2024-2025 йил давомида Миллий тиббиёт маркази «Неврология» бўлимига ВБЙ ташҳиси билан ётқизилган 58 нафар бемор олинди. Беморлар касалликнинг турига кўра 2 та асосий гуруҳга ажратилди. Назорат гуруҳига 20 нафар амалий соғлом инсонлар олинди.* ***Натижалар ва хулосалар.*** *Асосий гуруҳ беморларда биокимёвий қон таҳлили ўткир ВБИ билан оғриган барча беморларнинг қон зардобида GFAP ва MBP мавжудлигини аниқлади.*

Калит сўзлар: *ўткир ва сурункали вертебрабазиляр етишмовчилик, MBP -мембрана асосий оқсили, GFAP - глиал фибриллар кислотали оқсил, дофамин, серотонин.*

Аннотация. Актуальность. *Вертебрально-базилярная недостаточность (ВБН) является одной из наиболее частых форм цереброваскулярной патологии. Многочисленные полиморфные клинические проявления, среди которых доминируют вестибулярные и координаторные нарушения, расстройства функции слуха и зрения, резко снижают трудоспособность пациентов, ухудшают качество жизни. ВБН затрагивает около 38% всех неврологических болезней. На ВБН приходится 25-30% случаев ишемических инсультов. 70% преходящих нарушений мозгового кровообращения связано с ВБН.* ***Цель исследования****. Исследование изменений нейромедиаторов в крови у больных с вертебробазилярной недостаточностью.* ***Материалы и методы****. Для решения поставленных задач, нами были обследованы 58 пациентов, поступивших в неврологическое отделение Национального медицинского центра с диагнозом ВБН в 2024-2025 годах. В зависимости от виды ВБН, больными были определены следующие репрезентативные группы: 1-я, 2-я последние две составили основную группу обследованных пациентов. В контрольную группу вошли 20 практически здоровых человек.* ***Результаты и заключение.*** *В основной группе пациентов, включенных в исследование, биохимический анализ крови выявил наличие GFAP и MBP в сыворотке крови у всех пациентов с острой ВБН.*

Ключевые слова: *острая и хроническая вертебробазилярная недостаточность, MBP - основной мембранный белок, GFAP - глиальный фибриллярный кислый белок, дофамин, серотонин.*

Abstract. Relevance*. Vertebrobasilar insufficiency (VBI) is one of the most common forms of cerebrovascular pathology. Numerous polymorphic clinical manifestations, among which vestibular and coordination disorders, hearing and vision disorders predominate, sharply reduce the ability of patients to work, worsen the*

quality of life. VBI affects about 38% of all neurological diseases. VBI accounts for 25-30% of ischemic strokes. 70% of transient cerebral circulatory disorders are associated with VBI. ***Purpose of the study.*** *Study of changes in neurotransmitters in the blood of patients with vertebrobasilar insufficiency.* ***Materials and methods.*** *To solve the tasks, we examined 58 patients admitted to the neurological department of the National Medical Center with a diagnosis of VBI in 2024-2025. Depending on the type of VBI, the patients were divided into the following representative groups: 1st, 2nd, the last two formed the main group of examined patients. The control group included 20 practically healthy people.* ***Results and conclusion.*** *In the main group of patients included in the study, biochemical blood analysis revealed the presence of GFAP and MBP in the blood serum of all patients with acute VBI.*

Keywords: *acute and chronic vertebrobasilar insufficiency, MBP - basic membrane protein, GFAP - glial fibrillary acidic protein, dopamine, serotonin.*

Долзарблиги. Вертебробазиляр этишмовчилиги (ВБЙ) мия томирлари патологиянинг энг кенг тарқалган турларидан биридир [4,10]. Полиморф клиник кўринишлари орасида вестибуляр ва координациянинг бузилиши, эшитиш ва кўришнинг бузилишлари устунлик қилади, беморларнинг меҳнат қобилиятини кескин пасайтиради ва ҳаёт сифатини ёмонлаштиради. Жараённинг ривожланиши, айниқса нотўғри даво терапияси шароитида дициркуляцион энцефалопатия ёки вертебробазилар тизимда олдинги мия ишемияси оқибатда доимий неврологик бузилишларнинг ривожланишига олиб келади.

Касаллик клиник белгиларининг Меньера касаллиги, бўйин умуртқалари чурраси фонида келиб чиқган бош айланишлари оқибатида кеч ташхисланади. Бу эса тўлик клиник лабалатор ва инструментал текширувлардан фойдаланиш сарф харажатларини оширади. Буларни инобатга олиб ВБЙ характерли клиник кўринишини аниқлаш қиммат ташҳислаш усулларидан фойдаланиш эҳтимоллигини камайтиради.

Кўпгина тадқиқотларда ВБЙнинг юзага келишида гипертония касаллиги фонида мия асосий ва вертебрал артерияларнинг стенози ёки экстровазал қисилиши асосий сабаб қилиб кўрсатилган [7,10].

Цереброваскуляр патологиянинг синдромларидан бири доирасида ВБЙни ҳисобга олсак, касалликнинг ривожланиш хавфини ҳисобга олган ҳолда бундай беморларни даволаш тактикаси мия томирларининг шикастланишини даволаш ва уларни иккиламчи олдини олиш тамойилларига мос келиши кераклигини есга олиш керак. [10]. ВБЙ билан касалланиш цереброваскуляр патологиянинг барча ҳолатларнинг 20% га етади [1,12].

Ишемик инсулт патогенезида қоннинг физик-кимёвий хусусиятларининг бузилишининг аҳамияти адабиётларда кенг муҳокама қилинади [10]. ВБЙ барча неврологик касалликларнинг тахминан 38% таъсир қилади. ВБЙ ишемик инсултларнинг 25-30% ни ташкил қилади. Транзитор бош мия қон айланиши бузилишининг 70% ВБЙ билан боғлиқ [5,9]. Вертебробазиляр тизимда транзитор ишемик атака ва ишемик инсултнинг пайдо бўлишида қон ивиш тизимининг фаоллашуви, фибринолитик фаолликни камайиши ва қон қовушқоқлигинг ошиш синдромини шакллантиришининг роли ҳақида ишончли далиллар мавжуд [6,3]. Ҳозирги кунда ВБЙ барча турларида қон таркибида нейромедиаторларнинг ўзгариши ҳақида маълумотлар берилмаган.

GFAP - глиал фибрилляр кислотали оқсил марказий асаб тизимининг (мия ва орқа мия) астроситлари (астроглия)нинг асосий таркибий оқсилидир, шунингдек, у периферик асаб тизимининг мийелинсиз Шванн ҳужайраларида ҳам учрайди. У ҳужайра шаклини сақлайди ва ҳужайра пролиферацияси, синаптик пластика ва қон-мия тўсиғи функцияси билан боғлиқ жараёнларни тартибга солишда иштирок етади. GFAP оралиқ филамент оқсиллари гуруҳига киради. Бугунги кунгача унга яқин GFAP изоформалари тасвирланган. Бироқ, фақат устун бўлган изоформ (изоформ 1 ёки GFAP-а) клиник аҳамиятга эга [2,11].

MBP - мембрана протеолипидлари бўлган мийелин асосий оқсили. Бу шван ҳужайралаи томонидан ишлаб чиқарилади. Қоннинг қуйидаги биокимёвий анализзлари бош мия нерв системасинг шикастланганлигидан хабар берувчи маркерлар деб қаралади, яъни булар марказий асаб тизимига жуда хос бўлиб, астроцитдан марказий нерв системаси шикаслангандан кейин кейин ҳужайрадан ташқарига чиқарилади, ушбу нейронал ситосклетал ва айниқса глиал оқсилларнинг аксарияти фақат марказий асаб тизимида ва унинг отоантикорлари периферик қонда топилади [8]. Нормада бу оқсиллар периферик қонда аниқланмайди ва уларнинг қондаги миқдори пг/мл да ўлчанади.

Ишнинг мақсади: вертебробазиляр етишмовчилиги бўлган беморларда нейромедиаторланинг қондаги ўзгаришларини ўрганиш.

Текширув усуллари: Тадқиқот иши учун 2024-2025 йил давомида “Миллий тиббиёт маркази” неврология бўлимига ВБЙ ташҳиси билан ётқизилган 58 нафар бемор олинди. Беморлар касалликнинг турига кўра 2 гуруҳга ажратилди. Биринчи гуруҳ – ўткир ВБЙ билан касалланган 28 нафар беморлар, иккинчиси – сурункали ВБЙ билан касалланган 30 нафар беморлар киритилди. Назорат гуруҳига 20 нафар амалий соғлом инсонлар олинди. Нейромедиаторлар дофамин ва серотонин рецепторларига сезгир ҳисобланган GFAP, MBP оқсил даражаси спецификациясини аниқлаш «Саломат ҳаёт» хусусий клиникаси лабалаториясида бажарилди. Ушбу таҳлилни ўтказиш учун беморлар венасидан 5 мл миқдорида қон олиниб ундан сентрифугалаш орқали плазмаси ажратиб олинди ва текширилди.

Натижалар ва муҳокама. Назорат гуруҳига киритилган амалий соғлом инсонлар периферик қон зардобида GFAP - глиал фибрилляр кислотали оқсил ва MBP - мембрана асосий оқсиллари аниқланмади. ВБЙ касаллигининг ҳар иккала турида бу оқсилларнинг периферик қонда аниқланиши бош мияда қон айланишининг ўткир бузилиш касаллигини ва турғун неврологик етишмовчилик хавфини олдини олишимиз учун муҳим ҳисобланади. Шунингдек периферик

қондаги бу оқсилларнинг миқдор кўрсаткичи бизга ВБЙ оғирлик даражасини баҳолашимиз учун ҳам муҳим белгилардан биридир.

1-гуруҳ беморларининг барчасида (100%) периферик қонда GFAP ва МБП лар аниқланди. Ўткир ВБЙ билан касалланган беморларнинг перифеик қонидаги МВР миқдоринг энг паст кўрсаткичи 4,1 пг/мл дан, энг юқори кўрсаткич эса 7,8 пг/мл гача аниқланди. МБП оқсилинг энг паст кўрсаткичи эса 3,8 пг/мл дан, энг юқори кўрсаткич эса 4,4 пг/мл гача аниқланди (1-жадвал). Бу таҳлил натижалари эса ўткир ВБЙ билан касалланган беморларнинг барчасида марказий нерв системаси кучли зарарланишдан дарак беради. 2-гурух беморларида эса бу зарарланиш 80% ни ташкил қилади ва ўткир ВБЙ билан касалланган беморларга қараганда марказий нерв системасининг зарарланиш даражаси пастроқ бўлади (2-жадвал).

1 ва 2-гуруҳ беморларида периферик қонда аниқланадиган дофамин ва серотонин рецепторларига GFAP ва MBP оқсиллар спецификация натижалари қуйидаги 1- жадвалда келтирилган.

1- жадвал

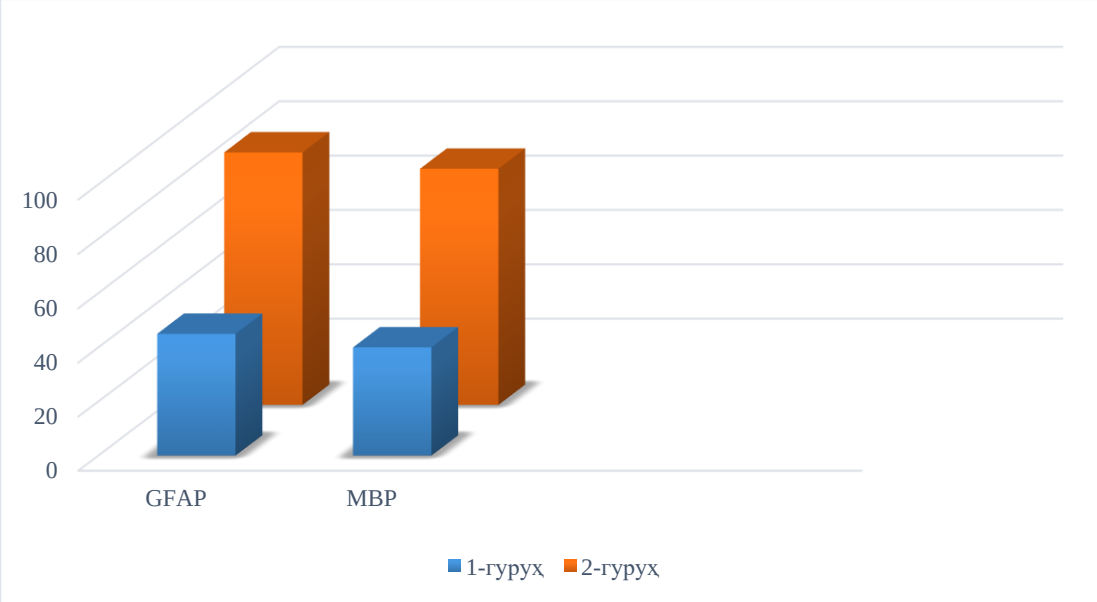
	GFAP	MBP
Назорат гуруҳи	-	-
1-гуруҳ	2,8-3,4 pg/ml	2,2-3,1 pg/ml
2-гуруҳ	4,1-7,8 pg/ml	3,8- 4,4 pg/ml

Ўткир ва сурункали ВБЙ билан касалланган беморлар периферик қонида аниқланадиган дофамин ва серотонин рецепторларига ГФАП ва МБП оқсиллар спецификация натижаларининг қиёсий таҳлили фоизларда қуйидаги 2-жадвалда келтирилган.

2-жадвал

	GFAP	MBP
Назорат гуруҳи	-	-
1-гуруҳ	82%	80%
2-гуруҳ	100%	100%

Текширув гуруҳларида қон биокимёвий таҳлилини ўрганимизда ўткир ВБЙ билан касалланган беморларнинг барчасида (100%) GFAP ва MBP периферик қонда аниқланди. Сурункали ВБЙ билан касалланган жами беморларнинг 82%да GFAP ва 80%да MBP периферик қонда паст миқдорда аниқланди (1-расм).



1-расм. Текширув гуруҳларида қондаги GFAP ва MBP оқсиллар учраши

Хулоса. Амалий соғлом инсонлар периферик қон зардобида GFAP ва MBP аниқланмайди. 1- ва 2-гуруҳ беморлари қон биокимёвий хусусиятларининг кўрсаткичлари бир-биридан фарқ қилади. Бундай клиниканинг намоён бўлиши эса ВБЙ нинг ҳар бири турида ўзига хос даво муолажа зарурлигини тақозо қилади. Периферик қонда GFAP ва MBPнинг аниқланиши бу бош мияда ўткир қон айланишининг бузилиши келиб чиқиш хафини олдини олиш учун муҳимдир.

Чунки бу кўрсатгичлар марказий нерв тизими нейронлари шикасланишининг маркери бўлиб ҳисобланади. Бундан келиб чиқадики ўткир ва сурункали вертебро базиллар етишмовчиликда ўзига хос даво чорасини қўллашни талаб қилади.

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ПРОФЕССИОНАЛЬНЫЕ ВРЕДНОСТИ В ОПЕРАЦИОННОЙ: ХРОНИЧЕСКОЕ ВОЗДЕЙСТВИЕ ИНГАЛЯЦИОННЫХ АНЕСТЕТИКОВ И

ХИРУРГИЧЕСКОГО ДЫМА (ПРИ КОАГУЛЯЦИИ) НА ЗДОРОВЬЕ ПЕРСОНАЛА (ЛИТЕРАТУРНЫЙ ОБЗОР)

Эргашев М.Ш.

Нуруллаев Ё.Э.

Ташкентский государственный медицинский университет

info@tma.uz

Аннотация. *Обзор направлен на санитарно-гигиеническую оценку воздействия хирургического дыма и отработанных газов на здоровье медицинских работников. Анализ литературы выявил, что около 77% твердых частиц дыма имеют размер менее 1,1 мкм и способны проходить сквозь стандартные хирургические маски, которые неэффективны для частиц меньше 5 мкм. Дополнительные сложности связаны с токсичностью компонентов и отсутствием установленных предельно допустимых концентраций для современных анестетиков, включая севофлуран. Длительное воздействие способствует развитию окислительного стресса и заболеваний дыхательных путей, таких как хронический фарингит (в 77,2% случаев) и ринит (45,6%). Для минимизации рисков рекомендуется введение систематического мониторинга, применение респираторов N95 и обязательное использование местных вытяжных вентиляционных систем.*

Ключевые слова. *Гигиена труда, воздух рабочей зоны, профессиональные вредности, хирургический дым, ингаляционные анестетики, локальная вытяжная вентиляция, предельно допустимая концентрация.*

Abstract. *This review assesses the cumulative health impact of surgical smoke and waste gases on medical personnel. Literature shows 77% of smoke particles are ultrafine (<1.1 μm), easily penetrating standard surgical masks, which are ineffective*

for particles <5 μm. The risk is compounded by toxic compounds and a lack of permissible exposure limits for modern anesthetics like sevoflurane. Chronic exposure triggers oxidative stress and occupational respiratory diseases, namely chronic pharyngitis (77.2%) and rhinitis (45.6%). Protecting personnel requires strict environmental monitoring, N95 respirators, and mandatory local exhaust ventilation systems.

Keywords: *Occupational hygiene, workplace air, occupational hazards, surgical smoke, inhalation anesthetics, local exhaust ventilation, permissible exposure limit.*

Введение. В операционных возникают смеси из ультратонких частиц хирургического дыма и микроутечек ингаляционных анестетиков [6, 10]. Соприкосновение с ними ежегодно испытывают сотни тысяч медработников, что связано с ростом заболеваемости верхних дыхательных путей, включая хронические фарингиты и риниты [6, 8]. Проблема усугубляется ложным чувством безопасности: обычные хирургические маски пропускают до 98% ультратонких частиц [7], а локальные системы удаления дыма практически не применяются в клинике [4, 8]. Также возникновение эффективных мер осложняет отсутствие установленных нормативов и предельных концентраций современных анестетиков [1, 10]. Принимая во внимание фрагментарность исследований и дефицит комплексного анализа кумулятивного воздействия [3, 6], обзор обобщает доступные данные о патофизиологии совместного влияния этих факторов. Такой подход необходим для обоснования внедрения систем эвакуации хирургического дыма и применения респираторов класса N95 с высоким уровнем фильтрации [7].

Материалы и методы. Для проведения обзора был выполнен систематический поиск литературы в период с 2016 по 2026 год в базах данных PubMed/MEDLINE, Google Scholar, eLibrary.ru и CyberLeninka. В анализ были включены полнотекстовые исследования различных типов (in vivo, in vitro, клинические), которые рассматривали патофизиологические эффекты

хирургического дыма и микроутечек анестетиков, с акцентом на оценку маркеров окислительного стресса, цитотоксичности и гистологических изменений в респираторном эпителии.

Результаты. Физико-химические характеристики материала: хирургический дым включает более 150 токсичных газообразных компонентов, таких как бензол и формальдегид, а также твердые микрочастицы, около 77 % которых менее 1,1 мкм, что способствует их проникновению в альвеолы [6, 9]. В дополнение, воздух в операционных зонах загрязнен микроутечками ингаляционных анестетиков, обнаруженными в составе дыма [2, 10]. Мутагенный потенциал аэрозоля, образующегося при разрушении 1 г ткани, сопоставим с воздействием шести нефильтрованных сигарет, при этом ежедневное воздействие на хирурга может достигать эквивалента 27–30 сигарет [1, 3, 9]. Свойства аэрозоля зависят от используемой энергетической технологии. Монополярная коагуляция приводит к формированию наночастиц размером около 0,07 мкм с высокой канцерогенностью [6]. При применении лазеров и ультразвуковых скальпелей возникает биологически активный «низкотемпературный аэрозоль» с частицами от 0,31 до 6,5 мкм, включающий жизнеспособные вирусы (например, ВПЧ и ВИЧ) и фрагменты опухолевых клеток, что повышает риск заражения персонала в радиусе до 40 см от источника [1, 3, 6].

Патогенез и гистология. Хирургический дым приводит к сосудистому стазу и некрозу эпителия носа, сопровождаясь снижением мукоцилиарного клиренса, что особенно выражено у анестезиологов с длительным временем воздействия [3, 6, 10]. Эксперименты показывают, что ингаляция аэрозоля может быть связана с развитием бронхиолита, застойной пневмонии и эмфиземы легких [1, 6]. Исследования in vitro выявляют высокую цитотоксичность дыма, выражающуюся в разрушении мембран и гибели макрофагов и респираторных эпителиальных клеток [3, 6]. Постоянное воздействие анестетиков сопряжено с

апоптозом лимфоцитов, нарушениями эпителия и репродуктивной токсичностью, включая повреждение ДНК сперматозоидов [2, 10]. Продолжительная ингаляция этих веществ способствует развитию окислительного стресса у медицинского персонала, проявляющегося снижением деятельности каталазы и супероксиддисмутазы, а также усилением перекисного окисления липидов [2, 10]. Воспалительная реакция сопровождается повышением уровней провоспалительных цитокинов (интерферона-γ, интерлейкинов-2, -4 и -8) при нормальных значениях классических маркеров острой фазы, таких как С-реактивный белок [2, 3, 10].

Клинические проявления. Вдыхание наночастиц и токсичных газов, которые не задерживаются масками, способствует развитию хронических воспалений верхних дыхательных путей — ринитов, фарингитов, бронхитов, а при более тяжелых состояниях — пневмонии, эмфиземы и бронхоспазмов [1, 3, 6]. Дополнительную опасность представляют аэрозоли, образующиеся при использовании лазеров и ультразвуковых скальпелей, поскольку они способствуют распространению интактных вирусов (таких как ВПЧ и ВИЧ), а также жизнеспособных опухолевых клеток, которые при оседании на респираторном эпителии могут вызывать инфекционные и неопластические процессы [1, 6]. Также, длительное воздействие ингаляционных анестетиков связано с выраженной репродуктивной токсичностью [2, 10]. Их генотоксический эффект приводит к нарушению синтеза эстрогенов у женщин и повреждению ДНК сперматозоидов, что может снижать фертильность и увеличивать вероятность спонтанных абортов, врожденных аномалий и когнитивных нарушений у потомства [2, 10].

Гигиенические нормативы и профилактика. Стандартные хирургические маски демонстрируют ограниченную эффективность в защите от хирургического дыма, пропуская до 98% ультрамелких частиц и вирусных агентов [7]. Более надежную защиту, превышающую 95% очистки аэрозолей,

обеспечивают только респираторы класса N95, плотно прилегающие к лицу [7]. В качестве наиболее эффективного способа управления качеством воздуха в операционной рассматриваются локальные системы эвакуации дыма (SES) с применением тройной фильтрации посредством ULPA-фильтров, которые способны задерживать до 99,9% наночастиц, что почти в сто раз превосходит эффективность традиционных HEPA-фильтров [4, 9]. Однако, данные системы на практике используются сравнительно редко — только 1–3% персонала применяют их, чему способствует высокий уровень шума, неудобства в эксплуатации, несовместимость с устаревшими вентиляционными системами и недостаточная информированность о рисках среди специалистов [4, 5, 8].

Вывод. Хирургический дым и микроутечки анестетиков формируют в операционных помещениях среду, насыщенную наночастицами размером около 0,07 мкм, а также канцерогенными и патогенными веществами. Длительное воздействие этих факторов способствует развитию системного окислительного стресса, повреждению клеток дыхательных путей, а также вызывает мутационные и репродуктивные нарушения. Поскольку стандартные маски оказываются недостаточно эффективными, а системы эвакуации (SES) применяются редко, сохраняется высокий уровень профессиональных рисков для здоровья медицинского персонала. Полученные результаты подчеркивают необходимость усиления требований в области охраны труда, включая обязательное осуществление эколого-гигиенического мониторинга, использование респираторов типа N95 и законодательное закрепление обязательного внедрения локальной вытяжной вентиляции.

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ENGINEERING SCIENCES AND MODERN ENGINEERING SOLUTIONS

ARRALI JINDA JINLASH SAMARADORLIGINI OSHIRISH USULLARINI TAHLIL QILISH

Asranov Xabibullo Kamoldin o‘g‘li
Kokand unversiteti Andijon filiali
Email: habib19920827@gmail.com
Abduvaxidov M. M.
Namangan davlat texnika unversiteti
Asranova Umidaxon Xamidjon qizi
Andijon mashinasozlik instituti

Annotatsiya. *Arrali jinda paxta xomashyosining titkilanish jarayonini yaxshilash va jinlash samaradorligini oshirish uchun takomillashtirilgan konstruktsiyasi tola va chigitning jarohatlanishining kamayishiga olib keladi. Bunkerdan buferli barabanga kelib tushgan paxta xomashyosining titkilanganlik darajasi plastinaning bikrligiga bog'liq.*

Kalit so‘zlar: *paxta xomashyosi, arrali jin, jinlash, xomashyo valigi, buferli baraban, podshipnik, bikrlik, tola, chigit, jarohatlanish.*

Abstract. *In order to improve the process of loosening raw cotton and increase the ginning process in the improved design of the saw gin leads to a decrease in damage to the fiber and seeds. The degree of loosening of raw cotton coming from the bin to the buffer drum depends on the rigidity of the plate.*

Keywords: *raw cotton, saw gin, ginning, feed roller, buffer drum, bearing, stiffness, fiber, seed, damage.*

Kirish. Paxta xomashyosining tolasini chigitdan ajratish jinlash jarayoni hisoblanadi. Paxta xomashyosining tolasini ajratishdan maqsad – talab etilgan unumdorlikda maqbul sifatli va eng ko‘p tola chiqarishga erishishdir. Arrali jinlar PD

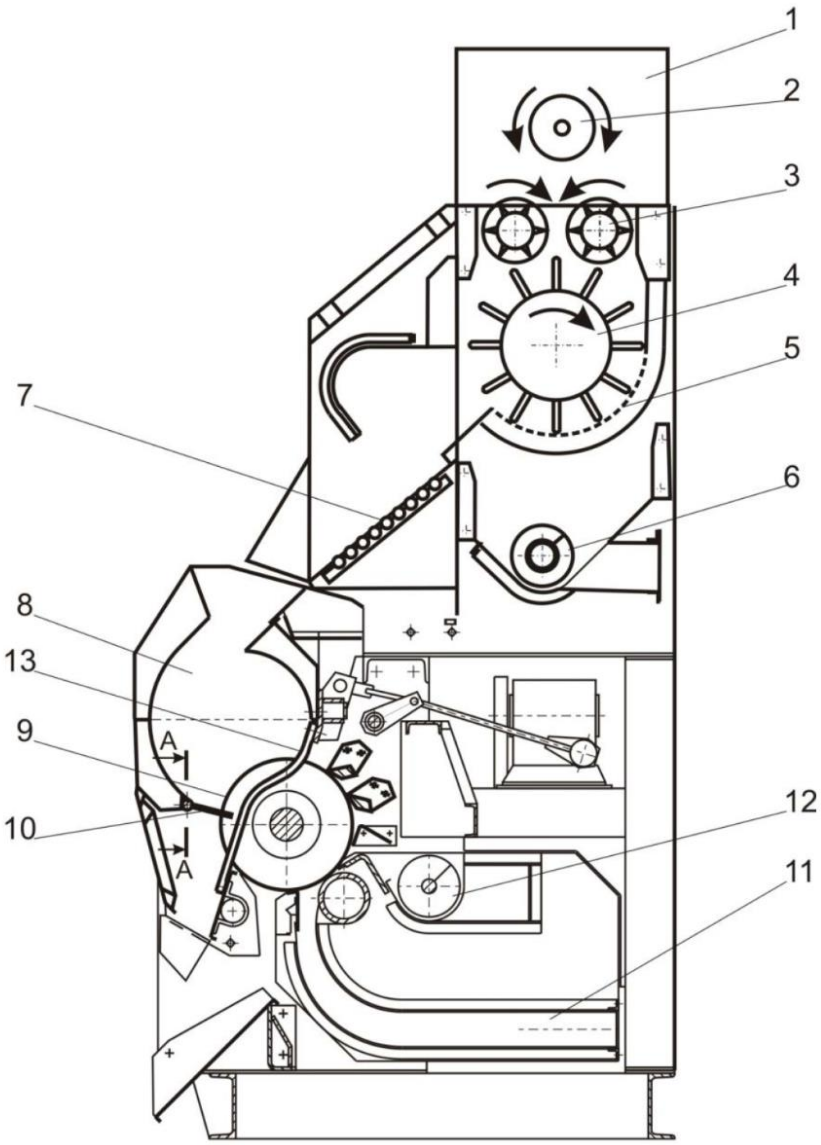
ta’minlagichlari bilan jihozlangan bo‘lib, ular paxta xomashyosini jinlash jarayoni bir maromda va muvofiiqlashgan holda uzatishdag iborat bo‘lib, shuning undan mayda iflosliklardan ajratishda ham muxim axamiyatga ega [1,2]. Jaxon amaliyotida paxta xomashyosi tarkibidagi chigitdpn tolani ajratish arrali jinlarda amalga oshirilib, uning tarkibi korpusga o‘rnatilgan kolosnikli panjarali arrali silindrdan, chigit tarog‘i va xavo yordamida arra tishlaridan tolani yechib olish qurilmasi, shuningdek, tolani olib chiqib ketuvchi quvurdan iborat. Usullar. Ko‘rib chiqilayotgan konstruksiyada paxta xomashyosining ta‘minlash valiklariga doimiy yuklanishlarda bo‘lishi uning asosiy kamchiliklaridan biridir. Jinga o‘rnatilagan magnit doskasi faqat metall bo‘lakchalarini tutib qoladi va chigitning me‘yordagi tukdorlikda chiqishi uchun doimiy ravishda chigit tarog‘ini rostlashni talab etadi. Mazkur muammoni xal etish uchun ta‘minlash valiklariga tushadigan yuklanishni kamaytirish va jin chigit tarog‘ini rostlashdan iborat.

Arra silindri tishlari hom ashyo valigidagi paxta tolalarini ilib, kolosniklar orasiga olib kiradi va chigit sirtidan yulib oladi. Arra tishlaridagi tolalar soplodan 55-65 m/daqiqa tezlikda chiqayotgan havo oqimi bilan ajratilib, umumiy tola quvuri orqali tola tozalash dastgohiga uzatiladi. Kolosniklarning ishchi qismida tirqishlar kengligi 3,2 mm.dan katta bo’magani uchun chigit o’tib keta olmaydi, aylanib turgan chigitpaxta valigiga qo’shilib ketadi va hamma tolalari ajralmaguncha aylanishda davom etadi. Jami tolalardan ajratilgan chigitlar o’zining ishlash qobiliyatini yo’qotadi, chigitli tola valigidan ajralib, kolosnik sirtiga va u orqali pastga tushadi. Jindan chiqayotgan chiqayotgan chigitlarning tuklilik darajasi taroq bilan o’zgartirilib turiladi. Arra tishlari ishchi kamerasidan kolosniklar orqali chiqqandan keyin, tolani tishlardan ajratish bilan birga o’lik va mayda iflosliklardan tozalash jarayoni bajariladi. O’lik va mayda iflosliklar tolalar arra tishidan ajralmasdan oldin markazdan qochma kuch ta’sirida toladan ajraladi va o’lik koziryogi orqasiga o’tib ketadi. Ajratilgan iflosliklar va o’lik mashinadan vintli konveyer yordamida chiqariladi. Jinning ta’minlagichi ostidagi iflosliklar mexanik uzatgichlar yordamida ishlab chiqarish chiqindilarini pnevmatik usulda yig’ish tizimiga uzatilib, sexdan tashqariga chiqariladi. Jindan ajratilgan

iflosliklar va o’lik pnevmatik uzatish sistemasi yordamida jinlash sexi chiqindilarini regeneratsiyalash mashinasiga uzatiladi. Arrali jinlar batereyasining ishlash samaradorligi mashinalarning texnik holati va qayta ishlayotgan paxtaning sifatiga bog’liqdir.

Arrali jinlash mashinasi. Arrali jin mashinaning asosiy ish qismlari, ish kamerasi va arrali silindr 2 dan iborat. Arrali silindr 80—130 dona arrali disklardan yig‘iladi. Chigitli paxta ish kamerasi ga tushadi. Aylanib turgan silindr arralariga ilingan tolalarning bir qismi chigitdan ajralib, panjara 3 orasiga o‘tadi, soplo 4 va mashina bo‘g‘zi 5 orqali batareya kondensoriga yig‘iladi. Chigitli paxta silindr bilan bir necha marta uchrashgach, chigit tolalardan deyarli tozalanadi va sirpanib, taroq 8 bilan panjara orasidan o‘tib, chigit konveyeriga tushadi. “Ulik” tola ajratish moslamasi 6 toladan “ulik” tola va ifloslarni ajratib, shnekli “ulik” tola konveyeri 7 ga yo‘naltiradi. Valikli jin mashinaning ish qismlari hayvon terisidan, sun’iy rezinalashtirilgan materiallar va tabiiy po‘kaklardan yasalgan valik, qo‘zg‘almas pichoq 2 va urish valigi 3 dan iborat. Ta’minlash kamerasi ga tushgan chigitli paxtani qarama-qarshi tomonga aylanib turadigan valiklar 2 qoziqchali titkilash barabani 3 ga bir me’yorda uzatadi, baraban qoziqchalari uni ilashtirib, to‘r 4 sirtidan sudrab utadi. Paxtadan ajralgan xas-cho‘plar to‘r ko‘zlaridan o‘tib tashqariga chiqadi, titilgan paxta esa qiya 5 dan sirpanib, ignali baraban 6 ga yo‘naladi. Tekislovchi valik 8 chigitli paxta qatlamini tekislab turadi. Tezlatish barabani 9 ignali baraban 6 dan chigitli paxtani ajratib olib, bir-biriga teskari aylanayotgan ish valigi va urish valigi 10 orasiga keltiradi. Chigit pichoq ostidan o‘ta olmaydi, tolalar chigitdan ajraladi va ish valigiga yopishib, pichoq ostidan o‘tib ketadi. Chigit tolalardan to‘liq ajralmaguncha bu jarayon takrorlanadi. Chigitdan ajralgan tola nov 15 ga tushib, undan tola quvuriga, chigitlar esa to‘r 7 ning ko‘zlaridan o‘tib, nov 14 orqali yig‘ish shnegiga yo‘naladi. Paxta tozalash korxonalarida bir necha jin mashina batareya tarzida (arralisi har qatorda 2—5 tadan, valiklisi 8—10 tadan) o‘rnatiladi. O‘zbekiston paxta korxonalarida avtomatlashtirilgan jin mashina lari ishlatiladi.

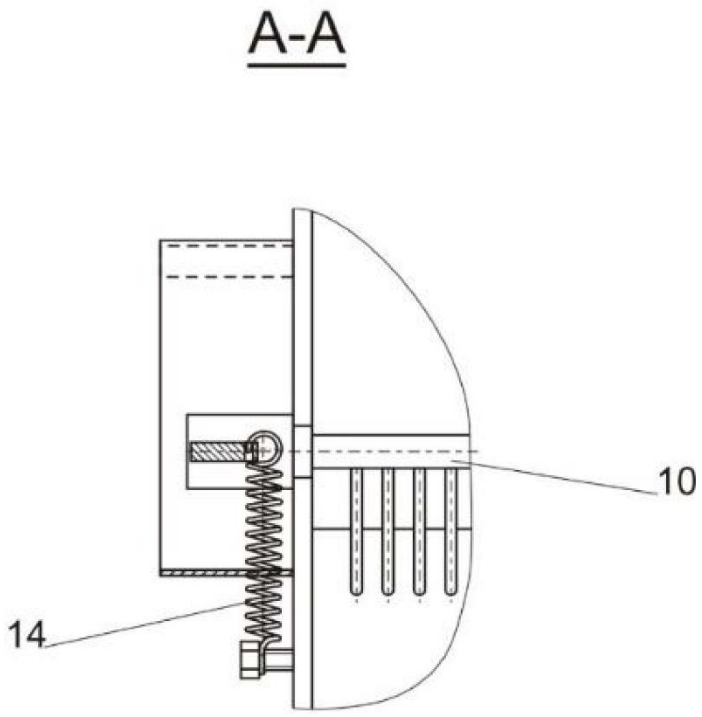
Qo‘yilgan masalani xal qilish uchun shaxta-to‘plagichda ta‘minlash valiklari ustiga buferli baraban o‘rnatilgan bo‘lib, u yuritmasiz podshipniklarga o‘rnatiladi. Bunda buferli baraban 2 g‘ovak (truba shaklida) tayyorlangan bo‘lib, uning o‘qining xar ikki tomonida metall chiqib turgan joylar 16 bilan bikr birlashtirilgan, barabanning 2 o‘qida 18 bikr qotirilgan prujina plastinalar 15 bilan kontaktda bo‘ladi. Barabanning ikki yon tomonidan podshipnik o‘qi bilan birlashtirilgan disklar o‘rnatilgan. Taklif etilayotgan konstruksiyaning 1-rasmda arrali jinning umumiy ko‘rinishi, 2-rasmda - chigit tarog‘i, 3-rasmda buferli barabanning qirqimi keltirilgan. Arrali jin quyidagi qismlardan tashkil topgan: shaxta 1, buferli baraban 2, ta‘minlash valiklari 3, qoziqli baraban 4, to‘rli yuza 5, ifloslikni olib chiquvchi shnek 6, doska 7, ishchi kamera 8, arrali silindr 9, chigit tarog‘i 10, havo kamerasi 11, o‘lik kamerasi 12, kolosniklar 13. Chigit tarog‘i 10 korpusga sharnir 17 yordamida va korpus bilan qo‘shimcha prujina 14 yordamida bog‘langan. Prujina 14 konussimon shaklda bajarilishi mumkin.



1-rasm. Arrali jinning umumiy ko‘rinishi.

Malum bo’lgan bu konstruktsiyaning kamchiligi undagi magnit doskasi faqat qisman metall chiqindilarni ushlab qoladi. Bu esa paxta xomashyosi tarkibiga metall chiqindilardan tashqari, yuqorida o’rnatilgan taminlagichning to’rli sirtidan o’tmay qolgan kichik o’lchamdagi metall va undan farqli chiqindilarni xomashyo tarkibiga qo’shilishini keltirib chiqaradi. Natijada ushbu chiqindi va metall jismlar arrali jinning ishchi organlariga salbiy tasir ko’rsatadi. Taklif etilayotgan tadqiqot ishining maqsadi, magnitli doskasini metall jismlardan tashqari paxta xom ashyosidan alohida chiqindilarni ham tutib qolishdan iborat.

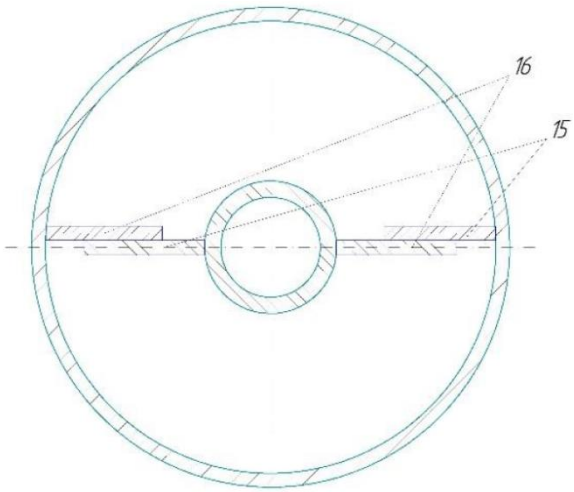
Natija. Arrali jin quyidagicha ishlaydi: paxta tozalash korxonasi bosh binosiga uzatilayotgan paxta xomashyosi separator orqali taqsimlovchi shnekka 1 kelib tushadi, so‘ngra xar bir jin ustida o‘rantilgan ta‘minlagichlarni 3 to‘ldiradi. Ta‘minlash valiklari 3 ustiga podshipnikda buferli baraban 2 o‘rnatilgan bo‘lib, ta‘minlash valiklarga 3 tushadigan bosimni bartaraf etadi. Bunda buferli barabanning 2 ikki tomoniga paxta xomashyosining kelib tushishiga bog‘liq xolda metall chiqib turgan joylar 16 prujinali plastinaga 14 ta‘sir qiladi, natijada paxta xomashyosining massasiga bog‘liq xolda deformatsiyalanadi, buferli baraban 2 buraluvchi tebranishlarni hosil qiladi, so‘ngra ta‘minlash valiklariga 3 paxta xom ashyosini bir maromda uzatiladi. Ta‘minlash valiklari 3 paxta xomashyosini qoziqli barabanlarga 4 bir maromda uzatadi. So‘ngra qoziqli baraban 4 to‘rli yuza 5 bilan birgalikda paxta xomashyosini titkilash va iflosliklardan tozalab, maginitli valik 7 orqali jinning xomashyo kamerasiga 8 uzatadi. Ajratilgan iflosliklar ifloslik shneki 6 yordamida olib chiqiladi. Xomashyo kamerasiga 8 kelib tushgan paxta xomashyosi arrali silindrning 9 aylanuvchi arra disklari yordamida ilashtirilib, chigit tarog‘idan 10 kolosniklarning ishchi qismiga tomon siljiydi. Arra tishlari bilan ilashtirilgan paxta bo‘lakchalari, paxta bo‘lakchalari va



boshqa bo‘lakchalar bilan ilashtirilgan paxta xomashyosi ularga arra tishlari parakti xaqida xabar beradi: natijada paxta xomashyosining xamma massasi xomashyo kamerasida arrali disklarning 9 teskari yo‘nalishdagi harakati hisobiga xomashyo valigi hosil bo‘ladi. Xomashyo valigining aylanishini arra tishlari bilan paxta xomashyosini to‘xtovsiz uzatish bilan ta‘minlanadi, shuning uchun jinning to‘xtovsiz ish unumdorligini ta‘minlaydi. Toladan ajralgan chigitlar xomashyo valigi massasidan aloqani yo‘qotadi va kolosnik 13 bo‘yicha pastga qarab harakatlanadi. Jindan chiqayotgan chigitlarning tukliligini chigit tarog‘ining 10 holatini prujina 14 yordamida o‘zgartirish bilan rostlanadi. Chigit tarog‘i 10 xomashyo valigining zichligiga qarab holatini o‘zgartiradi. Bunda prujinaning 14 deformatsiyasi hisobiga chigit tarog‘i 10 kichik burchak tebranishni tuksiz chigitlarning yuklanishini chigitlarning tukligiga bog‘liq holda keltirib chiqaradi. Chigit tarog‘ining 10 avtomatik rostlash holati amalga oshiriladi. Arrali jinlash jarayonini to‘xtovsiz ta‘minlash jin ishchi kamerasidagi aylanuvchi xomashyo valigi bilan arrali silindar arralarining tishlari, kolosniklar 13, havo bilan tolani yechib olish qurilmasi 11 bilan o‘zaro ta‘siri bilan amalga oshiriladi.

2-rasm. Chigit tarog‘i

Chigit tarog‘i uskunaga kelayotgan paxta tolasidagi chigitni ajratib olgandan



so‘ng unda qolib ketgan tolani yana ham yaxshiroq tozalsh uchun xizmat qiladi.

3-rasm. Buferli baraban

Buferli baraban chigitni quritish hamda tozalsh uchun xizmat qiladi. Shu texnologiyalardan samarali foydalanish esa paxta tolasini yaxshi va sifatli ishlab chiqarishga xizmat qiladi. Bu esa ishlab chiqarish sanoatida birinchi o‘rinda turadi.

Xulosa. Taklif etilayotgan konstruksiya paxta xomashyosining titkilanish darajasini sezilarli darajada oshirish hisobiga jinning ish unumdorligini oshishiga va tola hamda chigitning sinishini kamayishiga olib keladi. Bu esa sanoat iqtisodi uchun unumli ishlash xolatiga sabab bo‘ladi.

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ARRALI JINLASH QURILMASINING ISH JARAYONIGA TAYYORLASHDA TEXNOLOGIK VA KONSTRUKTIV TA'SIRINI TAHLIL QILISH

Asranov Xabibullo Kamoldin o'g'li
Namangan davlat texnika unversiteti
Email: habib19920827@gmail.com
Abduvaxidov M. M.
Namangan davlat texnika unversiteti
Asranova Umidaxon Xamidjon qizi
Andijon davlat texnika instituti

Annatatsiya: *Maqoalada paxtani qayta ishlash, chigitdan tolani ajratish, jinlash qurilmalarni taxlil qilish bo'yicha ishlar olib borilgan. Paxta sanoati rivoji uchun tanlanishi kerak bo'lgan jinlash qurilmasining xolati keltirilgan.*

Kalit so'zlari: *Chigitdan paxta tolasini ajratish, ulyuk, ifloslik, valikli jinlash, arrali jinlash, 3XDDM – UMPD rusumli jin, barqaror jinlash jarayoni.*

Annotation: *The article presents research on cotton processing, including the separation of fiber from seed and the analysis of ginning machines. The condition and*

selection criteria of ginning equipment required for the development of the cotton industry are discussed.

Keywords: *Separation of cotton fiber from seeds, trash, impurities, roller ginning, saw ginning, 3XDDM–UMPD type gin, stable ginning process.*

Xozirgi kunda paxtani chigitdan ajratish hamda unga qayta ishlov berish juda ham yaxshi rivojlanib bormoqda. Paxtadan olinadigan maxsulotlar soni ortib eksport uchun ham maxsulotlar chiqarilishi bu soxada ishlar jadal rivojlanib borayotganligidan dalolat beradi. Paxta xosildorligi ham sezilarli darajada oshdi. Paxtaning yetishtirish karayoni qanchalik qiyin bo’lsa unga ishlov berish ham shunchalik muxim sanaladi. Yetishtirilgan xosildorliklarni yaxshi saqlab qolish ulardan sof toz maxsuklotlatlarni yaratish uchun paxta qayta ishlash zavodlari zamonaviylashib bormoqda. To‘g‘ri xamma sanoat korxonlarida ham yangi texnologiyalarni joriy qilish oson emas. Shunday bo’lsa ham Paxta sonoati xozirgi kunning juda rivojlanib borayotgan sohasi xisoblanadi. Tayyor xoldagi paxtani qayta ishlash jarayonida uning tolasini hamda chigit maxsulotini ajratish eng muxim jarayonalardan biridir.

Chigitli paxta quritish-tozalash va tozalash sexlarida konditsion namlikkacha quritilib, xas-cho’plardan tozalangandan keyin zavodning bosh korpusiga jinlash uchun yuboriladi [1]. CHigitli paxtani jinlashda quyidagi texnologik talablar bajarilishi lozim:

— chigitlardan yigirishga yaroqli tolalarning hammasini ajratish, jin ish organlarining tolaga ta’siri natijasida tola yoki chigitda nuqsonlarning paydo bo’lmasligi;

— chigitli paxta bo’lakchalarining jindan chiqayotgan tola yoki chigitga qo’shilib ketmasligi;

— ulyuk va iflos aralashmalardan tozalash samaradorligi yuqori bo’lishi kerak.

Paxtani qayta ishlash jarayoni uchun yuqorida keltirilgan talablar to’liq bajarilganda jinlash to’g’ri amalga oshirilgan xisoblanadi.

Paxtaning tolasini va chigitini ajratish uchun 2 xil turdagi jinlash qurilmasidan foydalaniladi.

Jinlash jarayonining turlari:

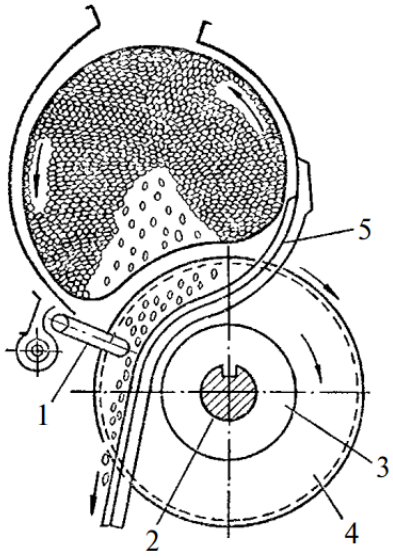
- Valikli jinlash
- Arrali jinlash

Valikli jinlash korxonasida paxta navining uzun tolalilari, ularning I, II, va III navlariga ishlov beriladi. Ingichka tolali paxtaning tolasini chigitdan ajratish uchun va likli jinlar ishlatiladi. Bu usulda jinlash ingichka tolalarga zarar yetkazmaydi va ularning tabiiy yuqori sifatlari saqlanadi. Valikli jinlash jarayoni chigitli paxtaning tolalarini aylanuvchi valikning sirti bilan unga qattiq bosib qo'yilgan qo'zg'almas pichoq orasiga kiritib kesish va chigitni urib tolalardan ajratishdan iboratdir.

Arrali jinlar ishlatiladigan korxonalarda o'rta tolali paxta navlarining hammasi va uzun tolali paxtaning IV, V naviga ishlov beriladi. Arrali jinlash qurilmasi asosiy texnologik mashinalardan biri sanaladi. Ushbu qurilmalar yuqori aylanish tezligida ishlashi sababli chigitdan paxta tolasini ajratib olishda juda ham qo'l keladi [1].

Jinlash jarayoniga qarab paxta xom ashyosidan chiqadigan tola va chigit miqdori ularning sifati bajolanadi. Tola uzilishi noziklashib qolishi ham aynan jinlash qurilmasiga bo'g'liq. CHigitning sinishi, chigitda tolani qolib ketishi ham jinlash jarayoniga bo'g'liq bo'lganligi sababli bu jarayon paxta sanoatida juda ham muxim texnologik jarayon xisoblanadi.

Arrali jinlar (1-rasm) vazifasiga ko’ra laboratoriyada va ishlab chiqarishda foydalaniladigan jinlarga bo’linadi. Arrali valdagi arralar soniga qarab 10, 80, 90, 100 va undan ko’p arrali, arralarning tishlaridan tolalarni ajratib olish apparatining



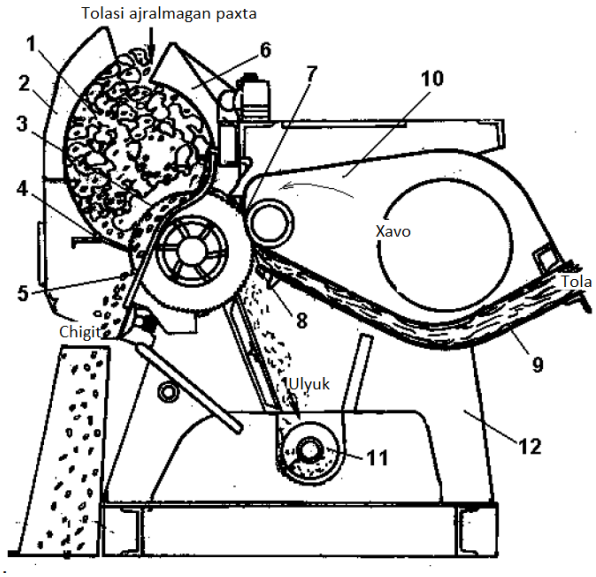
konstruksiyasiga qarab, cho’tkali va havo oqimi bilan ishlaydigan, havo oqimi soplosining o’rnatilish joyiga qarab, yuqoridan tola ajratadigan jinlarga bo’linadi.

1-rasm. Arraning chigitli paxta valigiga ta’siri sxemasi.

1-taroq; 2-val; 3-disk; 4-arra; 5-kolosnik.

Paxta tozalash zavodlarida havo oqimi bilan ishlaydigan va arra tishlaridan tolani pastdan ajratadigan XDD rusumli 80 arrali jinlar ham o’rnatiladi. XDD-2M rusumli jinlar XDD rusumli jinlardan ish kamerasining shakli va konstruksiyasi, ko’tarish mexanizmi hamda kolosniklarning takomillashtirilganligi bilan farqlanadi. (1-2 rasm) [2].

3XDDM – UMPD rusumli jin (1-rasm) va 4DP-130 rusumli jin (2-rasm) o’rta tolali chigitli paxtaning tolasini chigitidan ajratish uchun ishlatiladi. Unda namligi 7-9 % bo’lgan o’rta tolali paxtaning xamma navlari va uzun tolali paxtaning IV, V navlariga ishlov beriladi. Paxta tozalash korxonasining bosh binosiga keltirilgan chigitli paxta



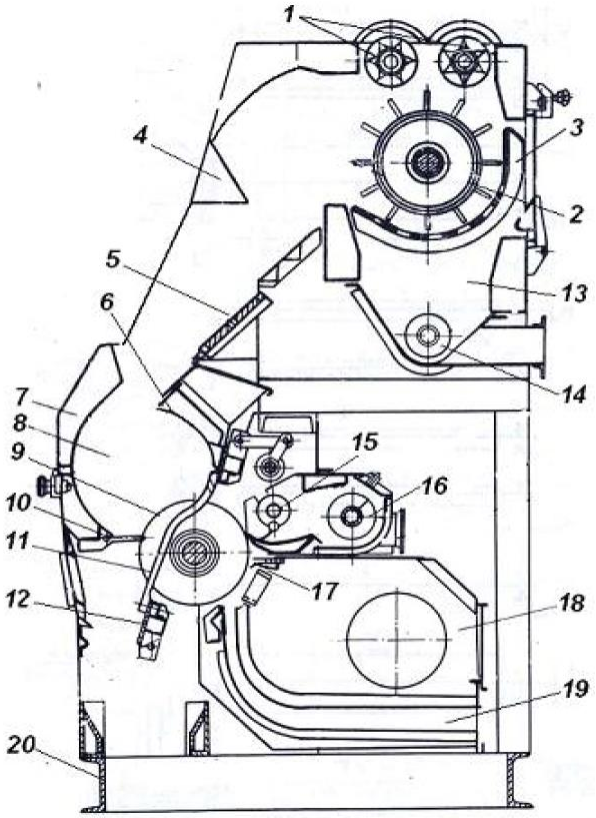
seperator va taqsimlovchi shnek yordamida xar bir jinga yetkazib beriladi.

2-rasm. 3XDDM-UMPD rusumli arrali jinning texnologik jarayon sxemasi

1-ishchi kamera; 2-oldingi fartuk; 3- arrali silindr; 4-chigit tarog’i;3-havo kamerasi; 5- kolosnik kolosnik); 6-peshtoq brusi; 7-soplo; 8-ulyuk dastagi; 9-tola uzatish quvuri; 10-havo kamerasi;

11- ulyuk yig’ishtirish konveyeri;

Kamchililari: 3XDDM-UMPD rusumli arrali jinning ishlash xolatida nuqsonli chigitlarning ortishi bilan birgalikda jin qurilmasining me’yordan ortiq vibratsiya berishi tola sifatiga ham sezilar ta’sir ko’rsatgan. Ishchi kamerasi ham jin qurilmasing ishlash xolati bilan mos kelmasligi ya’ni kattaligi sababli kameraga yig’ilgan paxta chigitdan tolasini ajratish jarayoni qiyin kechgan. Mana shu kamchiliklarni inobatga olgan xolda paxta qayta ishlash korxonlari 3XDDM-UMPD rusumli arrali jinlash qurilmasining yangilashga to‘g‘ri kelgan.



3-rasm. 4DP-130 rusumli arrali jinning ko'ngdalang kesim

1- ta'minlovchi valiklar; 2-qoziqchali baraban; 3-to'rli yuza; 4- yunaltiruvchi to'siq; 5-magnit; 6-peshtoq brusi; 7-oldingi fartuk; 8- ishchi kamera; 9- arrali silindr (disk); 10- chigit tarog'i; 11- kolosnik; 12-pastki brus; 13- ifloslik bunkeri; 14- iflosliklarni yig'ishtirish va uzatish shnegi; 15- chiqindi olib ketuvchi moslama; 16- chiqindini uzatish shnegi; 17- saplo; 18- havo kamerasi; 19- tola uzatish quvuri.

Yuqorida keltirilgan 4DP-130 rusumli jinlash qurilmasi ishlash xolati o'sha davr uchun mos kelgan. Keyinchalik rivojlanish natijasida jinlash qurilmasining uzunligi

uning kamchiligi ekanligini olimlar tomonidan aniqlandi. Valning uzunligi ish jarayoni kuchli tebranishga sabab bo‘lgan natijada esa jinlash jarayonida chigitdan tola ajratsih vaqtida chigitning sinishi tola yaxshi ajramasligi kuzatilgan. Arraning xolati xam tebranish sabab xususiyatini tez yoqatib borgan.

Arrali jin ishchi kamerasining tuzilishi, uning ayniqsa ish unumdorligiga, sarf bo’ladigan elektr energiyasiga va chiqariladigan mahsulotlarning sifatiga katta ta’sir qiladi. Ishchi kamerasiga quyidagi texnologik talablar qo’yiladi: uning qismlari tolada nuqsonlar paydo qilmasligi va chigitlarni shikastlantirmasligi, kameraning tuzilishi xom ashyo valigining aylanishiga mumkin qadar to’sqinlik qilmasligi kerak. Ishchi kameraga paxtaning kirib kelishiga, tola va chigitlarning chiqishiga to’siqlar mumkin qadar kam bo’lishi kerak.

Paxtaning namligi, iflosligi me’yorda bo’lsa jinlash jarayoni ham jadal olib boriladi. Qurilma shuna biz kutgan natijani beradi. Paxta xom ashyosini qayta ishlash jarayonida qanchalik yaxshi tozalansa keying jarayonla ya’ni undan olinadigan maxsulot turi sifatli bo’lib boradi. Agarda paxta tola ,yaxshi ajralmagan chigitlarni qayta ishlash yuborilsa ishlash jarayonida tenika texnologiyalarga ham salbiy ta’sir ko‘rsatadi.

XDD, XDD – 2M, 3 XDD va DP-130 rusumli arrali jinlarning texnik tavsifi [2].

1-jadval.

Ko’rsatkichi	**XDD**	**XDD-2M**	**3XDD**	**DP-130**
Bir arraning ish unumi kg/soat.	10 gacha	10-12	12,5	10-16
Arrali silindrning aylanish chastotasi, min^{-1}	730	730	730	730
Valdagi arralar soni	80	100	80-90	130
Arra diametr, mm	320	320	320	320

Arradagi tishlar soni	280	280	280	280
Oraliq qistirmalar qalinligi. mm	18,45	16,35	18,45	18,45
Tozalash samaradorligi, %	25-30	25-30	25-30	10-15
Havo sarfi, m^3/sek	0,5-0,6	0,5-0,6	0,5-0,6	0,5-0,8
Havo bosimi, Pa	1570-1960	1570-1960	1570-1960	3795
Quvvati, kVt	40	45	55	79,5

Barqaror jinlash jarayoni ishchi kamerasining ish unumdorligini aniqlash uchun quyidagi tenglamani yozish mumkin:

$$П = \frac{Q}{t_{o`r}} * A \qquad \text{kg/soat}$$

bu erda:

Q-ishchi kamerasidagi xom ashyo valigining miqdori, kg;

A-jinlash jarayonining o’zgarmas ko’rsatkichi;

$t_{o`r}$-ishchi kamerasida tola va chigitning o’rtacha bo’lish vaqti, soat.

Bu tenglamaga ko’ra, ishchi kamerasining unumdorligini undagi xom ashyo valigi massasini oshirish, yoki tola bilan chigitning kamerada bo’ladigan o’rtacha vaqtini kamaytirish yo’li bilan oshirish mumkin.

XULOSA: Yuqoridagi formuladan ko’rinib turibdiki ishlab chiqarish jarayonida ishchi kamerasida paxta qanchalik kam tursa ish unimdorligi oshadi. Bundan korinib turibdiki ishchi kameradagi tolasi ajralmagan chigitni, kamera ichida qo’zg’atish, yoki kamera ichida g’alayon sodir qilish yo’li bilan bu unumdorlikka erish mumkin bo’ladi. Bunday xolatlarni keltirib chiqarish uchun ishchi kameradagi xolatni tebrantirish ya’ni

vibratsiya berish yoki mexanik xarakatdan, arraning xarakatidan foydalanib tolasi ajralmagan paxtani aylantirishga erish mumkin xisoblanadi.

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BARQAROR URBANIZATSIYA SHAROITIDA BIOIQLIMIY ARXITEKTURA VA ENERGIYA TEJAMKOR SHAHARSOZLIKNI RIVOJLANTIRISH (JIZZAX SHAHRI MISOLIDA)

Janizaqov Abduvaxob Esirgapovich

Jizzax politexnika instituti

Nurullayeva Marjona Zayniddin qizi

Jizzax politexnika instituti

e-mail: abduvaxobjanizaqov@gmail.com

Annotatsiya. *Mazkur maqolada zamonaviy urbanizatsiya sharoitida barqaror rivojlanish, bioiqlimiy arxitektura va energiya tejamkor shaharsozlik masalalari tahlil*

qilinadi. Shaharlar va hududlarni rejalashtirishda ekologik muvozanatni ta’minlash, resurslardan oqilona foydalanish hamda inson uchun qulay muhit yaratish zaruriyati asoslab beriladi. Jizzax shahri misolida amaliy tahlillar keltirilgan.

Kalit so‘zlar. *barqaror rivojlanish, bioiqlimiy arxitektura, yashil shahar, energiya samaradorligi, urbanizatsiya.*

Аннотация. *В статье рассматриваются вопросы устойчивого развития, био-климатической архитектуры и энергоэффективного градостроительства в условиях современной урбанизации. Обоснована необходимость создания комфортной среды проживания с учетом экологического баланса и рационального использования ресурсов. Приведен анализ на примере города Джизак.*

Ключевые слова: *устойчивое развитие, биоархитектура, зеленый город, энергоэффективность, урбанизация.*

Annotation:*This article examines sustainable development, bioclimatic architecture, and energy-efficient urban planning in the context of modern urbanization. It highlights the importance of ecological balance, rational resource use, and the creation of a comfortable living environment. A case study of Jizzakh city is presented.*

Keywords: *sustainable development, bioclimatic architecture, green city, energy efficiency, urbanization*

Kirish. O‘zbekiston Respublikasida shaharlar va hududlarni zamonaviy talablar asosida rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Mamlakatimiz rahbari Shavkat Mirziyoyev tomonidan shaharsozlik sohasini tubdan isloh qilish, aholiga qulay yashash sharoitlarini yaratish va ekologik muvozanatni ta’minlash masalalariga alohida e’tibor qaratilmoqda.

O‘zbekiston Respublikasida quyidagi normativ-huquqiy hujjatlar - “Yangi O‘zbekiston taraqqiyot strategiyasi”, PQ-98 — qurilish sohasini modernizatsiya qilish, Shaharsozlik kodeksi, Energiya samaradorligi bo‘yicha davlat dasturlari ushbu

yo‘nalishni qo‘llab-quvvatlaydi. Ushbu hujjatlar asosida yashil qurilish standartlari joriy etilmoqda, energiya tejovchi texnologiyalar kengaymoqda va ekologik monitoring tizimi takomillashtirilmoqda

Xususan, “Yangi O‘zbekistonning taraqqiyot strategiyasi”, shuningdek, shaharsozlikni rivojlantirishga oid qator Prezident farmon va qarorlarida hududlarni kompleks rejalashtirish, yashil hududlarni kengaytirish hamda energiya tejamkor texnologiyalarni joriy etish ustuvor vazifa sifatida belgilangan.

Shaharlarning tarixiy rivojlanishiga nazar tashlasak, ular inson ehtiyojlari va ijtimoiy munosabatlar asosida shakllanib, har bir davr o‘zidan oldingi tajribani takomillashtirib borgan. Bu borada buyuk alloma Abu Ali ibn Sino o‘zining “Tib qonunlari” asarida turar joylarni joylashtirishda mikroiqlim, shamollatish va insolyatsiya masalalariga katta e’tibor qaratgan.

Asosiy qism. Bugungi kunda global miqyosda urbanizatsiya jarayonlari jadallashib, ekologik muammolar, resurslar tanqisligi va ijtimoiy nomutanosiblik kabi muammolarni yuzaga keltirmoqda. Shu sababli “barqaror rivojlanish” konsepsiyasi muhim ilmiy-amaliy yo‘nalish sifatida shakllandi.

1987-yilda Gro Harlem Brundtland boshchiligidagi komissiya tomonidan ilgari surilgan konsepsiyaga ko‘ra, barqaror rivojlanish — bu kelajak avlod ehtiyojlariga zarar yetkazmagan holda bugungi ehtiyojlarni qondirishdir.

Mazkur yondashuv shaharsozlikda quyidagi yo‘nalishlarni rivojlantirishni taqozo etadi:

- kompakt shahar modeli;
- yashil infratuzilma;
- energiya samarador binolar;
- transport tizimini optimallashtirish.

Bioiqlimiy arxitektura tabiiy omillarni hisobga olgan holda inson uchun qulay va ekologik muhit yaratishga qaratilgan yondashuv hisoblanadi. Bu yo‘nalish XX asrning

60-yillarida shakllanib, bugungi kunda eng istiqbolli arxitektura yo‘nalishlaridan biri hisoblanadi.

Mazkur yo‘nalish rivojiga malayziyalik arxitektor Ken Yeang va britaniyalik me’mor Norman Foster katta hissa qo‘shgan.

Bioiqlimiy arxitekturaning asosiy omillariga quyidagilarni kiritishimiz mumkin:

- iqlim va landshaft;
- ekologik muhit;
- ijtimoiy-iqtisodiy sharoit;
- energiya resurslari;
- shaharsozlik talablari.

Energiya tejamkor arxitektura esa - binolarda energiya sarfini kamaytirish va qayta tiklanuvchi energiya manbalaridan foydalanishga qaratilgan tizimdir.

Asosiy tamoyillar:

- quyosh energiyasidan foydalanish;
- tabiiy shamollatish;
- issiqlik izolyatsiyasi;
- yashil tomlar va vertikal bog‘lar.

Bu texnologiyalar shahar ekologiyasini yaxshilash, CO_2 chiqindilarini kamaytirish va aholining yashash sifatini oshirishga xizmat qiladi.

Jizzakh shahri so‘nggi yillarda faol urbanizatsiya jarayonlarini boshdan kechirmoqda. Shahar bosh rejasida quyidagi ustuvor yo‘nalishlar belgilangan:

- yangi turar-joy massivlarini barpo etish;
- yashil hududlarni kengaytirish;
- transport infratuzilmasini rivojlantirish;
- sanoat zonalarini optimallashtirish.

Shu bilan birga, quyidagi muammolar mavjud:

- yashil hududlar yetishmasligi;
- ekologik yuklamaning ortishi;

- energiya resurslaridan samarasiz foydalanish.

Tahlil shuni ko‘rsatadiki, bioiqlimiy arxitektura va energiya tejamkor texnologiyalarni joriy etish Jizzax shahrining barqaror rivojlanishida muhim ahamiyat kasb etadi.

Xulosa. Zamonaviy urbanizatsiya sharoitida barqaror rivojlanish, bioiqlimiy arxitektura va energiya tejamkor texnologiyalarni joriy etish muhim ahamiyat kasb etadi. Shaharlarni ilmiy asosda rejalashtirish orqali ekologik muammolarni kamaytirish, resurslardan oqilona foydalanish va aholining yashash sifatini oshirish mumkin.

Jizzax shahri misolida olib borilgan tahlillar shuni ko‘rsatadiki, yashil infratuzilma va energiya samarador texnologiyalarni keng joriy etish orqali hududning barqaror rivojlanishiga erishish mumkin.

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KOMPOZITSIYALARNI QO'LLASHNING MUHANDISLIK LOYIHAVIY YECHIMLARI

Noraliyeva Yulduzxon Yusufali qizi

Jizzax Politexnika instituti

yulduzxonnoraliyeva@gmail.com

Annotatsiya: *Ushbu maqolada zamonaviy jamoat binolarining interyerida vertical bog' va fito kompozitsiyalarni qo'llashning muhandislik loyihaviy yechimlari tahlili qilinadi. Tadqiqot davomida binolarning ichki muhitini ekologik sog'lomlashtirishda o'simliklarning o'rni aqlli sug'orish va sun'iy yoritish tizimlarining texnik xususiyatlari, shu bilan birga fito tizimlarning binolardagi mikroiqlimini barqarorlashtirish va energiya samaradorligini oshirishga ta'siri bo'yicha xulosa va amaliy takliflar keltirilgan. Ushbu maqola natijasi "yashil arxitektura" tamoyillarini jamoat binolarida joriy etish uchun amaliy tavsiya bo'lib xizmat qiladi.*

Kalit so'zlar: *Jamoat binolari, vertical bog'dorchilik, vertical bog'dorchilik, fito kompozitsiya, muhandislik yechimlar, gidroponika, mikroiqlim, biofilik dizayn, yashil arxitektura.*

Аннотация: *В данной статье анализируются инженерно-проектные решения по применению вертикальных садов и фитокомпозиций в интерьере современных общественных зданий. В ходе исследования рассмотрена роль растений в экологическом оздоровлении внутренней среды зданий, технические характеристики систем умного полива и искусственного освещения, а также влияние фитосистем на стабилизацию микроклимата и повышение энергоэффективности зданий. По результатам представлены выводы и практические рекомендации. Данная статья служит практическим*

руководством по внедрению принципов «зелёной архитектуры» в общественные здания.

Ключевые слова: *общественные здания, вертикальное озеленение, фитокомпозиция, инженерные решения, гидропоника, микроклимат, биофильный дизайн, зелёная архитектура.*

Abstract: *This article analyzes engineering design solutions for the use of vertical gardens and phytocompositions in the interiors of modern public buildings. During the study, the role of plants in the ecological improvement of the internal environment of buildings, the technical characteristics of smart irrigation and artificial lighting systems, as well as the impact of phytosystems on stabilizing the microclimate in buildings and increasing energy efficiency are presented. The results of this article serve as practical recommendations for the implementation of the principles of "green architecture" in public buildings.*

Keywords: *Public buildings, vertical gardening, vertical gardening, phyto composition, engineering solutions, hydroponics, microclimate, biophilic design, green architecture.*

Kirish

Bugungi kunda global urbanizatsiya jarayonining jadallashuvi natijasida statistikaga qaydigan bo’lsak insonlar vaqtining asosiy qismi yani kunining 80% (sakson foiz) yopiq muhitlarda, ya’ni bino interyerida o’tmoqda o’tmoqda. Bu holat me’morchilik va muhandislik oldiga nafaqat funksionalllik va mustahkamlik, balki insonlar salomatligi uchun ekologik xavfsizlik va psixologik jihatdan qulay muhit yaratish vazifasini qo’ymoqda. Zamonaviy urbanizatsiyalashgan jamiyatda inson va tabiat o’rtasidagi mavjud aloqaning uzulishi kabi muammolarni keltirib chiqarmoqda. Ushbu muammolarning eng samarali va innovatsion yechimlaridan biri – jamoat binolari interyeriga fito kompozitsiyalarni va vertical bog’dorchilik tizimlarini integratsiya qilish hisoblanadi.

Jamoat binolari - Ta’lim va tarbiya binolari (Maktabgacha ta’lim muassasalari (Umumta’lim va ixtisoslashgan maktablar), Sog’liqni saqlash va dam olish (Kasalxonalar, sanatoriyalar), Madaniyat - ma’rifiy va tomosha binolari (Kansert zallari, teatr, kinoteatr, sirk, ko’rgazma zallari, kutubxona, muzey), Savdo, umumiy ovqatlanish va maishiy xizmat binolari (Gipermarketlar, do’konlar, yopiq bozorlar, restaran, kafe, oshxona, mehmonxona, bank, pochta), Ma’muriy va boshqaruv binolari (hokiiyat, vazirlik, soliq idoralari, ofis, biznes markazlari), o’zining katta hajmi va inson oqimining yuqoriligi bilan ajralib turadi. Bunday obyektlarda vertical bog’dorchilik tizimlarini qo’llash nafaqat estetik dizayn elementi, balki murakkab muhandislik – texnik yechim hisoblanadi. Zero o’simliklarning yopiq makonda barqaror rivojlanishini ta’minlash uchun avtomatlashgan sug’orish tizimlari, sun’iy yoritish texnologiyalari va drenaj kanstruksiyalarini bino muhandislik tarmoqlari bilan uyg’unlashtirish talab etiladi.

Tadqiqotning dolzarbligi shundan iboratki, an’anaviy yashil hududlardan farqli tarzda zamonaviy fito kompoziysiyalar binoning energiya samaradorligini oshirishda mikroiqlimni tabiiy namlantirishda va shovqin darajasini ya’ni okustikani kamaytirishda faol ishtirok etadi. “yashil arxitektura” va “Biofillik dizayn” tamoyillariga asoslangan ushbu yondashuv jamoat binolari uchun barqaror rivojlanish standardlariga muvofiq loyihalashda yangi bosqichni boshlab beradi.

Ushbu maqolada jamoat binolari interyerida vertikal bog’dorchilik tizimlarini loyihalashning texnik jihatlari va ularning konstruktiv elementlari bilan bog’lash usullari va zamonaviy muhandislik yechimlarining samaradorligi tahlil qilinadi.

Giroponika tizimi – o’simliklarni tuproqsiz, maxsus ozuqaviy eritmada suv orqali yetishtirish usuli. Bunda o’simlik ildizlari bevosita suv va minerallar bilan oziqlanadi.

Fitolampalar – o’simliklar o’sishi uchun kerakli bo’lgan quyosh nurini beruvchi maxsus sun’iy chiroqlar. Fitolampalar asosan yopiq joylarda o’simlik yetishtirishda ishlatiladi.

Modulli konstruksiyalar – alohida tayyor qismlardan yig'ilib kerakligicha kengaytiriladigan va o'zgartiriladigan qurilish tizimi.

Asosiy qism

Jamoat binolarining interyerlarida vertikal bog'dorchilikni tashkil etish shunchaki estetik bezak emas balki bir qator muhandislik tizimlarining uzviy bog'liqligini talab etuvchi marakkab texnik jarayondir. Tadqiqotlar natijasida zamonaviy fito tizimlarni loyihalashda quyidagi 3 ta (uch ta) asosiy muhandislik yo'nalishi muhim hisoblanadi.

1 Konstruktiv yechimlar va modulli tizimlar. Vertikal bog'lar asosan 2 (ikki) xil konstruktiv usulda loyihalanadi:

a) Tekstil tizimlar; bunda o'simliklar maxsus polimer cho'ntaklarga joylashtiriladi. Bu usul yengilligi bilan ajralib turadi. Bino devorlariga qo'shimcha og'irlik yuklamaydi.

b) Modulli tizimlar: maxsus plastic yoki metal bloklaridan iborat bo'lib, har bir modul alohida sug'orish nuqtasiga ega. Bu tizim jamoat binolarida xizmat ko'rsatish qulayligi uchun ko'proq tavsiya qilinadi.

2 Avtomatlashtirilgan gidroponika va sug'orish tizimi. Yopiq muhitda o'simliklar tuproqsiz gidroponika usulida o'stiriladi. Bu tizim 2 (ikki) muhandislik usullarini o'z ichiga oladi.

a) Tomchilab sug'orish; Suv va ozuqaviy eritmalar yuqori qismdan pastga qarab maxsus quvurlar orqali har bir o'simlik ildiziga yetkaziladi.

b) Resirkulyatsiya tizimi; Ortiqcha suv pastki rezervuarda yig'ilib filtrlanadi va qayta ishlanadi. Bu esa suv sarfini 80% (sakson foizgacha tejaydi.

3 Sun'iy yoritish va mikroiqlim nazorati. Jamoat binolarining markaziy qismlarida ko'incha tabiiy yorug'lik yetishmaydi. Shu sababdan fitotizimlar maxsus fitolampalar bilan jihozlanadi.

a) Fitolampalar tahlili; O'simliklarning fotosintez jarayoni uchun 440 – 460 nm va 640 – 660 nm to'lqin uzunligida yorug'lik manbalari o'rnatiladi.

b) Datchiklar integratsiyasi; Namlik va harorat datchiklari binoning markaziy boshqaruv tizimiga ulanadi va o'simliklar harorati real vaqt rejimida nazorat qiladi.

c) Ushbu tizimlarni qo'llash orqali havo sifatining yaxshilanishiga, akustik qulaylik va energiya tegashga erishish mumkin.

Xulosa va amaliy tavsiyalar

Jamoat binolarining interyerida vertikal bog'dorchilik va fito kompozitsiyalarni qo'llash bo'yicha o'tkazilgan tadqiqotlar quyidagi xulosalarga kelish imkonini beradi.

- Biologik samaradorlik. Fito tizimlar yopiq makonlardagi mikroiqlimni tabiiy ravishda namlantirish va havoni zarardan tozalaydi. Bu esa o'z navbatida binoning ekologik darajasini va insonlarning ish qobiliyatini yaxshilaydi.
- Texnologik integratsiya. Zamonaviy fito kompozitsiyalar shunchaki dekorativ element emas balki aqlli muhandislik tizimlarining murakkab birikmasidir. Ularni loyihalashda bino muhandislik tarmoqlari bilan sinxromizatsiya qilish shart.
- Iqtisodiy asos. Vertikal bog'larni o'rnatish dastlabki bosqichda qo'shimcha harajatlarni talab qilsa ham uzoq muddatda binoning energiya samaradorligini oshirish va ichki haroratni barqaror saqlash hisobiga o'zini oqlaydi.

Amaliy tavsiyalar

Jamoat binolarini loyihalash jarayonida fito kompozitsiyalarni dastlabki loyihaviy bosqichga kiritish. Suv drenaj tizimi va sun'iy yoritish quvvatlarini oldindan hisoblash tavsiya etiladi. Bu tizimlar kelajakda "yashil shahar" konsepsiyasining ajralmas qismiga aylanadi.

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SUN’IY INTELLEKT KIBERXAVFSIZLIKNI TA’MINLASH VOSITASI SIFATIDA

Shukurov Orziqul Pardayevich

Muhammad al-Xorazmiy nomidagi TATU

myheartumi@gmail.com

Annotatsiya. *Mazkur ilmiy maqolada kiberxavfsizlikni ta’minlash jarayonida sun’iy intellekt (SI) texnologiyalarining roli, ahamiyati va amaliy imkoniyatlari tahlil*

qilingan. So‘nggi yillarda raqamli transformatsiyaning jadallashuvi, axborot tizimlari va tarmoqlarining murakkablashuvi kiberxavflar soni va ko‘lamining keskin ortishiga olib kelmoqda. Shu bois an’anaviy xavfsizlik mexanizmlari zamonaviy tahdidlarga qarshi yetarli bo‘lmay qolmoqda. Maqolada chop etilgan ilmiy tadqiqotlar asosida sun’iy intellekt va mashinali o‘qitish algoritmlarining kiberxavfsizlikdagi o‘rni, afzalliklari, cheklovlari hamda istiqbollari ilmiy-nazariy jihatdan yoritilgan. Tadqiqot natijalari SI texnologiyalaridan foydalanish kiberhujumlarni oldindan aniqlash, tahlil qilish va tezkor javob choralarini ko‘rishda muhim ahamiyatga ega ekanini ko‘rsatadi.

Kalit so‘zlar: *kiberxavfsizlik, sun’iy intellekt, mashinali o‘qitish, kiberhujum, tahdidlarni aniqlash, axborot xavfsizligi.*

Abstract. *This scientific article analyzes the role, importance and practical possibilities of artificial intelligence (AI) technologies in the process of ensuring cybersecurity. In recent years, the acceleration of digital transformation, the complexity of information systems and networks has led to a sharp increase in the number and scope of cyber threats. Therefore, traditional security mechanisms are no longer sufficient against modern threats. Based on the scientific research published in the article, the role, advantages, limitations and prospects of artificial intelligence and machine learning algorithms in cybersecurity are scientifically and theoretically covered. The results of the study show that the use of AI technologies is important in the early detection, analysis and rapid response to cyberattacks.*

Keywords: *cybersecurity, artificial intelligence, machine learning, cyberattack, threat detection, information security.*

Bugungi kunda jamiyatning deyarli barcha sohalari raqamli texnologiyalar bilan chambarchas bog‘liq holda rivojlanmoqda. Davlat boshqaruvi, bank-moliya tizimi, sanoat, ta’lim va sog‘liqni saqlash kabi muhim sohalarda axborot tizimlarining keng joriy etilishi kiberxavfsizlik masalasini strategik darajaga olib chiqdi. Kiberhujumlar tobora murakkablashib, avtomatlashtirilgan va intellektual xususiyat kasb etmoqda.

An’anaviy kiberxavfsizlik vositalari (signatura asosidagi antiviruslar, statik filtrlash mexanizmlari) yangi va noma’lum tahdidlarni aniqlashda ko‘pincha samarasiz bo‘lib qolmoqda. Shu nuqtai nazardan, sun’iy intellekt va mashinali o‘qitish texnologiyalarini kiberxavfsizlik sohasiga joriy etish dolzarb ilmiy-amaliy masalaga aylandi. SI tizimlari katta hajmdagi ma’lumotlarni real vaqt rejimida tahlil qilish, anomaliyalarni aniqlash va xavfsizlik hodisalariga moslashuvchan javob berish imkonini yaratadi.

So‘nggi yillarda kiberxavfsizlikni ta’minlashda sun’iy intellekt texnologiyalaridan foydalanish masalasi jahon miqyosida faol ilmiy tadqiqotlar obyektiga aylangan. Raqamli infratuzilmalarning murakkablashuvi, ma’lumotlar hajmining keskin ortishi va kiberhujumlarning intellektual tus olishi an’anaviy xavfsizlik yondashuvlarining samaradorligini pasaytirmoqda. Shu sababli, ko‘plab tadqiqotchilar kiberxavfsizlik sohasida mashinali o‘rganish va chuqur o‘rganish algoritmlarini joriy etishni muhim ilmiy muammo sifatida ko‘rib chiqmoqdalar.

Xususan, Smith va Brown (2025) tomonidan olib borilgan tadqiqotlarda sun’iy intellektga asoslangan tizimlar tarmoq trafikini tahlil qilishda yuqori aniqlik va moslashuvchanlikka ega ekanligi isbotlangan. Mualliflar nazoratli va nazoratsiz o‘rganish algoritmlaridan foydalanish orqali noma’lum (zero-day) kiberhujumlarni aniqlash imkoniyati an’anaviy signatura asosidagi tizimlarga nisbatan sezilarli darajada yuqori ekanligini ta’kidlaydilar [1].

Kumar (2025) o‘z tadqiqotida generativ sun’iy intellekt modellarining (xususan, katta til modellari) kiberxavfsizlikdagi o‘rnini tahlil qilib, ularning tahdid razvedkasi (threat intelligence) jarayonlarida muhim rol o‘ynashini asoslab bergan. Ushbu ishda SI yordamida kiberjinoyatchilar tomonidan qo‘llanilishi mumkin bo‘lgan yangi hujum ssenariylarini oldindan bashorat qilish imkoniyati mavjudligi ko‘rsatib berilgan [2].

Shuningdek, IEEE va Springer bazalarida chop etilgan tadqiqotlarda sun’iy intellektning zararli dasturlarni aniqlash, fishing hujumlarini filtrlash hamda

foydalanuvchi xatti-harakatlariga asoslangan autentifikatsiya tizimlarini yaratishdagi samaradorligi keng yoritilgan[3]. Ushbu tadqiqotlar SI texnologiyalarining kiberxavfsizlikni avtomatlashtirish va inson omiliga bog‘liqlikni kamaytirishdagi ahamiyatini ochib beradi.

Mahalliy ilmiy adabiyotlarda ham kiberxavfsizlikda sun’iy intellektdan foydalanish masalalariga bag‘ishlangan ishlar mavjud. Xususan, Abdullayev (2025) va Karimova (2025) tomonidan olib borilgan tadqiqotlarda axborot tizimlarini himoyalashda SI algoritmlarini qo‘llashning nazariy asoslari va amaliy jihatlari yoritilgan [4,5]. Biroq ushbu ishlarning aksariyatida empirik tajribalar va real tizimlar asosidagi sinov natijalari yetarlicha keltirilmagan.

Sun’iy intellekt texnologiyalarining kiberxavfsizlik tizimlariga integratsiyasi axborot resurslarini himoyalash samaradorligini sezilarli darajada oshiradi. Xususan, mashinali o‘qitish algoritmlariga asoslangan tizimlar katta hajmdagi ma’lumotlarni real vaqt rejimida tahlil qilish orqali kiberhujumlarning dastlabki belgilarini aniqlash imkonini beradi. Bu esa xavfsizlik hodisalariga tezkor va moslashuvchan javob berishni ta’minlaydi.

Shu bilan birga, tadqiqot natijalari sun’iy intellektdan foydalanish bilan bog‘liq muayyan muammolar mavjudligini ham ko‘rsatdi. Jumladan, SI modellarining noto‘g‘ri yoki yetarlicha sifatli bo‘lmagan ma’lumotlar asosida o‘qitilishi noto‘g‘ri xulosalar chiqarilishiga olib kelishi mumkin. Bundan tashqari, sun’iy intellektga asoslangan tizimlarning o‘zi ham kiberhujumlar nishoniga aylanish ehtimoli mavjud (Nguyen, 2025) [6].

Mahalliy tadqiqotlar natijalari esa SI texnologiyalarini milliy axborot infratuzilmalariga moslashtirish zarurligini ko‘rsatadi. Xususan, mahalliy tarmoq trafiklari, til va foydalanuvchi xatti-harakatlari xususiyatlarini inobatga olgan holda ishlab chiqilgan modellar yuqori samaradorlik beradi [4,5].

Umuman olganda, muhokama natijalari shuni ko‘rsatadiki, sun’iy intellekt kiberxavfsizlikni ta’minlashda kuchli va istiqbolli vosita bo‘lib, uni joriy etishda texnik, tashkiliy va huquqiy jihatlarning uyg‘unligi muhim ahamiyat kasb etadi.

Xulosa qilib aytganda, sun’iy intellekt kiberxavfsizlikni ta’minlashda muhim strategik vosita sifatida namoyon bo‘lmoqda. SI texnologiyalari yordamida kiberhujumlarni aniqlash, tahlil qilish va ularga qarshi samarali choralar ko‘rish imkoniyatlari kengaymoqda.

Kelgusida quyidagi takliflarni amalga oshirish maqsadga muvofiq:

- Kiberxavfsizlik tizimlariga sun’iy intellektni bosqichma-bosqich integratsiya qilish;
- Mahalliy ma’lumotlar asosida SI modellarini o‘qitish va moslashtirish;
- SI asosidagi xavfsizlik tizimlari uchun normativ-huquqiy bazani takomillashtirish;
- Ilmiy-tadqiqot va amaliy ishlanmalar o‘rtasidagi hamkorlikni kuchaytirish.

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РОБОТИЗАЦИЯ МАШИНОСТРОЕНИЯ В УЗБЕКИСТАНЕ: ГОТОВНОСТЬ К ПЕРЕХОДУ И ИНЖЕНЕРНАЯ СТРАТЕГИЯ В КОНТЕКСТЕ МИРОВОГО ОПЫТА

Ziuatdinov Islambek Sharapatdinovich

Kdirbaev Asan Allambergen uli

University of innovation technologies

ziuatdinov.1@gmail.com, asankdirbaev@gmail.com

Аннотация: *Статья задаёт вопрос, редко обсуждаемый в узбекской инженерной литературе напрямую: готова ли промышленность Узбекистана к роботизации — и если нет, что именно мешает? На основе данных Международной федерации робототехники, Госкомстата Республики Узбекистан и материалов международных соглашений автор анализирует позиции страны на глобальной карте промышленной автоматизации. Объём промышленного производства $89 млрд и доля обрабатывающей промышленности в 86% (2025) создают объективные предпосылки перехода. Соглашения с ROBOTIS (110 000 кв. м, производство гуманоидных роботов) и NUWA Robotics задают институциональную основу. Предложена поэтапная*

инженерная стратегия роботизации, адаптированная к ресурсным возможностям отечественных предприятий.

Ключевые слова: *роботизация, машиностроение Узбекистана, коботы, ROBOTIS, промышленная автоматизация, Индустрия 4.0, IFR, RaaS*

Abstract: *The article poses a question rarely addressed directly in Uzbek engineering literature: is Uzbekistan's industry ready for robotization — and what stands in the way? Based on IFR data, the State Statistics Committee of Uzbekistan, and international agreements, the author analyzes the country's position on the global automation map. Industrial output of $89 billion and a manufacturing share of 86% in 2025 create objective preconditions. Agreements with ROBOTIS (110,000 sq.m., humanoid robot production) and NUWA Robotics provide institutional foundations. A phased engineering robotization strategy adapted to domestic enterprises is proposed.*

Keywords: *robotization, Uzbekistan manufacturing, cobots, ROBOTIS, industrial automation, Industry 4.0, IFR, RaaS*

ВВЕДЕНИЕ

В глобальных дискуссиях об Индустрии 4.0 Узбекистан почти не упоминается. Это само по себе показательно. Между тем страна с населением 38 млн человек, промышленным производством в $89 млрд и ростом 6,8% в год (Госкомстат РУз, 2026) — не периферия мировой экономики. Это набирающий силу промышленный игрок. У него есть выбор: войти в эпоху роботизации стратегически — или оказаться перед её последствиями без подготовки.

По данным IFR World Robotics 2025, в 2024 году в мире установлено 542 000 промышленных роботов — вдвое больше, чем десятью годами ранее. Совокупный парк действующих роботов достиг 4 664 000 единиц (IFR, 2025). Не менее важна география: роботизация давно вышла за пределы традиционных лидеров. Индия в 2023 году увеличила число установленных роботов на 59%.

«Низкая стоимость труда снижает стимулы к роботизации» — этот тезис, часто применяемый к Узбекистану, больше не работает. Мировой опыт его опровергает.

Настоящая работа ставит три конкретных вопроса: где Узбекистан находится сегодня на карте мировой промышленной автоматизации? Какие реальные инициативы уже запущены? Какая инженерная стратегия оптимальна с учётом ресурсных ограничений?

ОСНОВНАЯ ЧАСТЬ

1. Глобальная динамика и позиция Узбекистана

Ежегодная динамика установок промышленных роботов в мире за 2015–2024 годы представлена на рисунке 1.



Рис. 1. Ежегодные установки промышленных роботов в мире, 2015–2024 гг. (тыс. единиц)

Рисунок 1 демонстрирует долгосрочный восходящий тренд с кратковременной коррекцией в 2019–2020 годах на фоне пандемии COVID-19 и торговых войн. Восстановление оказалось быстрым: начиная с 2021 года отрасль

вернулась к докризисным темпам роста. По прогнозу Renub Research, рынок промышленных роботов вырастет с $28,11 млрд в 2024 году до $55,19 млрд к 2033-му при CAGR 7,79% (Renub Research, 2024).

Плотность роботизации по ключевым странам — критический индикатор для понимания позиции Узбекистана — представлена на рисунке 2.

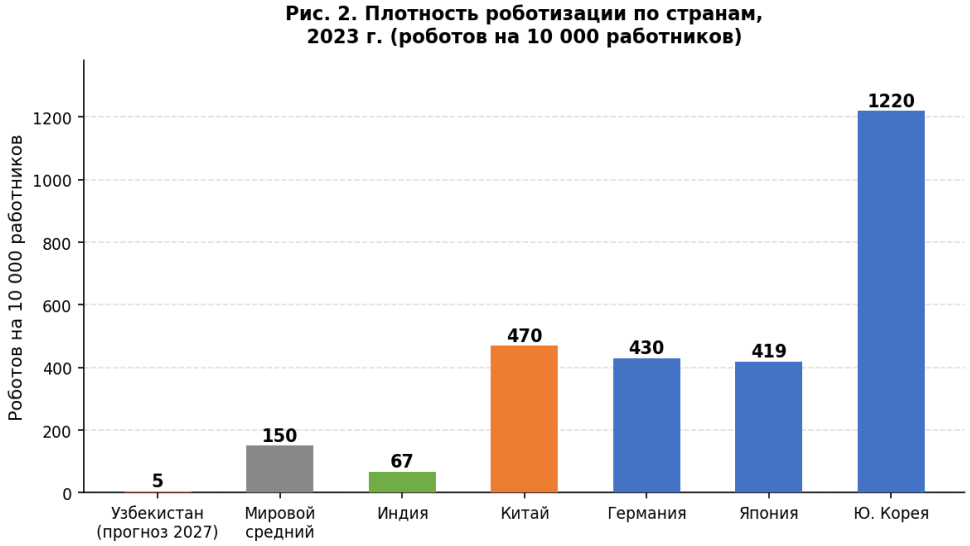

Рис. 2. Плотность роботизации по странам, 2023 г. (роботов на 10 000 работников)

Рисунок 2 фиксирует разрыв в несколько порядков между лидерами и странами, только начинающими роботизацию. Страны Центральной Азии в статистике IFR не представлены как самостоятельные рынки — это означает уровень, близкий к нулевому. Однако история показывает: нулевая точка — не приговор. Китай в 2013 году имел показатель ниже мирового среднего. Ключевая переменная — динамика зарплат. В Узбекистане средняя промышленная зарплата составляет около $494 в месяц (Госкомстат РУз, 2025). При стоимости коботов $15 000–20 000 и ROI за 12 месяцев — арифметика уже работает в пользу автоматизации.

Сравнительная характеристика Узбекистана и других развивающихся экономик по ключевым параметрам роботизации представлена в таблице 1.

Таблица 1.

Сравнение готовности к промышленной роботизации: развивающиеся экономики

Показатель	Узбекистан	Индия	Вьетнам	Казахстан
Промышл. производство, млрд долл.	89	500+	390	~120
Рост пром. производства, %	6,8	~7,5	~8,0	~4,5
Средняя зарплата в пром., долл./мес.	494	~300	~400	~650
Установки роботов в год (2024)	~100*	9 100	~4 500	~300*
Ключевые роботические соглашения	ROBOTIS, NUWA	Fanuc, ABB	Fanuc, Yaskawa	—

** — оценка автора. Составлено по данным: IFR (2025); Госкомстат РУз (2025, 2026); Renub Research (2024).*

2. Три конкретные инициативы, которые уже происходят

Декабрь 2025 года. Узбекско-корейский бизнес-диалог в Сеуле. Ассоциация Uzeltexsanoat подписывает меморандум с ROBOTIS. Тема — создание производства гуманоидных роботов в Узбекистане. Площадка расширена до 110 000 кв. м, значительная часть — под «фабрику данных» для обучения ИИ-систем (KoreaTechDesk, 2025). Стратегический расчёт ROBOTIS прозрачен: компании нужны обучающие данные. Узбекистан предоставляет оптимальное сочетание стоимости труда и государственной поддержки. Здесь Узбекистан — не просто рынок сбыта, а производственный партнёр.

IT Park Uzbekistan подписывает соглашение с тайваньской NUWA Robotics — компанией с более чем 20 000 развёрнутых роботов в десяти странах (IT Park Uzbekistan, 2024). Наконец — пример Санжара: уроженец Самарканда, выпускник KAIST и Georgia Tech, основатель Humanola, привлёкшей $2,5 млн в Кремниевой долине для разработки инфраструктуры физического ИИ с планами нанимать операторов в Узбекистане (Pivot.uz, 2025). Три разных инициативы — одна тенденция. Международные игроки видят в Узбекистане реальную площадку.

3. Инженерная стратегия: поэтапный подход

Исследование в Frontiers in Robotics and AI с участием 31 эксперта из девяти европейских стран показало: успешная интеграция коботов начинается с хорошо структурированных, повторяющихся операций (Frontiers in Robotics and AI, 2024). Для узбекского машиностроения это означает чёткую очерёдность, представленную в таблице 2.

Таблица 2.

Поэтапная стратегия роботизации машиностроительных предприятий Узбекистана

Этап	Вид операции	Ожидаемый эффект	Рекомендуемое решение	ROI
1	Сварка, окраска	Производительность +30–50%; брак до 0,1%	Сварочные роботы (ABB, Fanuc)	12–18 мес.
2	Сборка (повторяемые)	Стабильность качества; снижение зависимости от HR	Коботы (UR, ROBOTIS)	12–24 мес.
3	Контроль качества	Соответствие экспортным стандартам	Машинное зрение + ИИ	18–30 мес.
4	Логистика, склад	Сокращение ошибок; скорость	AMR, мобильные роботы	24–36 мес.

Составлено автором по данным: IFR (2025); Frontiers in Robotics and AI (2024); TechRadar (2024).

Ключевое, о чём предприятия не думают заранее: кадры. На каждого промышленного робота — в среднем 1,5–2 новых места инженерно-технического профиля (IFR, 2025). Дефицит операторов и интеграторов — самый частый тормоз успешных проектов. Подготовка кадров — не сопутствующая задача, а предварительное условие.

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Проведённый анализ позволяет сформулировать следующие результаты. Во-первых, Узбекистан обладает объективными предпосылками для роботизации: промышленное производство $89 млрд, рост 6,8%, растущие зарплаты. Во-вторых, международные инициативы — ROBOTIS (110 000 кв. м), NUWA Robotics, Humanola ($2,5 млн) — свидетельствуют о том, что роботизация уже началась. В-третьих, коботы стоимостью $15 000–20 000 с ROI за 12 месяцев — оптимальный входной инструмент для МСБ в машиностроении.

Полученные результаты согласуются с выводами Al-Amin et al. (2024): гибридные решения, сочетающие коботов с облачной аналитикой, обеспечивают наилучшие результаты по трём параметрам — экономическая эффективность, операционная надёжность и конкурентное преимущество. Главный практический вывод: поэтапность важнее масштаба. Один правильно внедрённый кобот приносит больше пользы, чем непродуманная программа комплексной автоматизации.

ЗАКЛЮЧЕНИЕ

Роботизация узбекского машиностроения — не предмет отдалённого будущего. Она уже началась. ROBOTIS подписывает соглашение на 110 000 кв. м. NUWA открывает офис. Санжар из Самарканда строит в Кремниевой долине компанию, которая будет нанимать операторов в Узбекистане. Вопрос не «будет ли» — вопрос «будет ли управляемым».

Оптимальная стратегия — три шага. Начать с коботов на сварке и окраске: результат виден за 12 месяцев. Интегрировать с облачной аналитикой для мониторинга и предиктивного обслуживания. Инвестировать в подготовку инженеров-интеграторов через партнёрства с ROBOTIS и техническими университетами. Государственная поддержка первых пилотных проектов

способна кратно ускорить этот процесс. Именно так делали Китай, Индия и Вьетнам. Узбекистану незачем изобретать велосипед.

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РАСЧЁТНОЕ ОБОСНОВАНИЕ СИСТЕМЫ МЕЛИОРАЦИИ ПОДВИЖНЫХ ПЕСКОВ В ПОЛОСЕ ОТВОДА ЖЕЛЕЗНЫХ ДОРОГ

Лесов Кувандык Сагинович

Юсупова Хуршида Абдимуминовна

Аннотация. *В статье рассмотрен расчётный подход к обоснованию системы мелиорации подвижных песков в полосе отвода железных дорог. Показано, что разработка мелиоративных мероприятий должна основываться*

на анализе природно-климатических и ветровых условий, оценке интенсивности пескопереноса, зонировании полосы отвода по степени дефляционной опасности и определении параметров защитных лесных полос. Установлено, что такой подход позволяет количественно оценить дефляционную нагрузку на железнодорожную инфраструктуру и повысить обоснованность проектных решений в аридных условиях.

Ключевые слова: *подвижные пески, мелиорация песков, полоса отвода, железные дороги, дефляционная нагрузка, пескоперенос, защитные лесные полосы, аридные территории.*

Abstract. *The article discusses a computational approach to substantiating the land reclamation system for mobile sands within railway rights-of-way. It is demonstrated that the development of reclamation measures must be based on the analysis of natural-climatic and wind conditions, the assessment of sand transport intensity, the zoning of the right-of-way according to the degree of deflationary hazard, and the determination of protective forest belt parameters. It has been established that this approach allows for a quantitative assessment of the deflationary load on railway infrastructure and enhances the validity of design solutions in arid conditions.*

Keywords: *mobile sands, sand reclamation, right-of-way, railways, deflationary load, sand transport, protective forest belts, arid territories.*

Введение

В аридных районах устойчивость железнодорожной инфраструктуры в значительной степени определяется интенсивностью эоловых процессов, вызывающих перенос песчаных частиц, формирование заносов и ухудшение состояния земляного полотна. Для железных дорог, проходящих по территории пустыни Кызылкум, включая направление Бухара–Мискин–Ургенч–Хива, подвижные пески являются одним из основных природных факторов,

снижающих эксплуатационную надёжность пути и объектов полосы отвода [1, 2].

Современные мировые исследования показывают, что защита железных дорог от песчаных заносов должна основываться на комплексном подходе, включающем анализ источников пескопереноса, условий его развития и параметров защитных мероприятий. В работах [1, 3–10] обоснована необходимость сочетания инженерных, организационных и биологических решений, включая применение защитных лесных полос как эффективного средства снижения скорости ветра и уменьшения пескопереноса.

Вместе с тем в опубликованных исследованиях недостаточно раскрыты вопросы расчётного обоснования системы мелиорации подвижных песков именно в полосе отвода железных дорог. На практике выбор защитных мероприятий нередко опирается на общие рекомендации, тогда как эффективность системы защиты определяется количественной оценкой дефляционной нагрузки, зонированием полосы отвода по степени опасности и обоснованием параметров защитных лесных полос. По материалам исследований, выполненных для линии Бухара–Мискин и смежных участков, система подготовки мелиорации включает анализ природно-климатических и ветровых условий, расчёт интенсивности пескопереноса, зонирование полосы отвода и формирование исходных параметров проектирования защитных мероприятий [11–14].

Необходимость такого подхода подтверждается тем, что для неблагоприятных участков железных дорог потенциальный годовой объём пескопереноса может достигать 55–60 м³/км·год, что существенно превышает допустимые эксплуатационные значения и требует предварительного расчётного обоснования системы защиты. На этой основе определяются параметры мелиоративных мероприятий, включая требуемое снижение скорости ветра, ширину защитной зоны и характеристики защитных лесных полос [11–13].

Актуальность исследования определяется необходимостью количественного обоснования системы мелиорации подвижных песков в полосе отвода железных дорог и совершенствования подходов к защите железнодорожной инфраструктуры в условиях активных эоловых процессов.

Предмет исследования – расчётные и организационно-технологические основы формирования системы мелиорации подвижных песков в полосе отвода железных дорог.

Цель исследования – расчётно обосновать систему мелиорации подвижных песков в полосе отвода железных дорог.

Задачи исследования: проанализировать природно-климатические и ветровые условия района работ; выполнить расчёт интенсивности пескопереноса и зонирование полосы отвода по степени дефляционной опасности; обосновать параметры системы защитных мероприятий и защитных лесных полос.

Материалы и методы (Materials and Methods)

Исследование выполнено на основе комплексного расчётно-аналитического подхода, в рамках которого система мелиорации подвижных песков в полосе отвода железных дорог рассматривалась как единый объект инженерно-экологического анализа. Подготовка мелиоративных мероприятий трактовалась как методически организованный процесс инженерного обоснования системы защиты железнодорожного пути, основанный на использовании физико-математических моделей эоловых процессов, анализе природно-климатических условий района работ и количественной оценке потенциальной дефляционной нагрузки на железнодорожную инфраструктуру [11–15]. При выполнении расчётов также учитывались действующие нормативные требования к объектам железнодорожной инфраструктуры колеи 1520 мм [16].

Последовательность расчётного обоснования системы защиты железной дороги от заносов подвижными песками представлена на рис. 1. Методическая схема отражает последовательный переход от климатического анализа к расчёту дефляционных процессов, проектированию защитной системы и оценке её эффективности. На основе расчётных значений выполняется оценка потенциальной дефляционной нагрузки на железнодорожное полотно, далее осуществляется зонирование полосы отвода по степени дефляционной опасности, после чего формируются параметры защитной системы, включая ширину и структуру защитных лесных полос, а также допустимый уровень дефляционной нагрузки.

Для связи скорости ветра на стандартной высоте 10 м с динамической скоростью трения использован логарифмический профиль ветра:

$$u_* = \frac{kU_{10}}{\ln(z/z_0)}$$

где u_* – динамическая скорость трения ветрового потока, м/с;

U_{10} – скорость ветра на высоте 10 м, м/с;

k – постоянная Кармана (≈0,4);

z – высота измерения скорости ветра (10 м);

z_0 – параметр шероховатости поверхности.

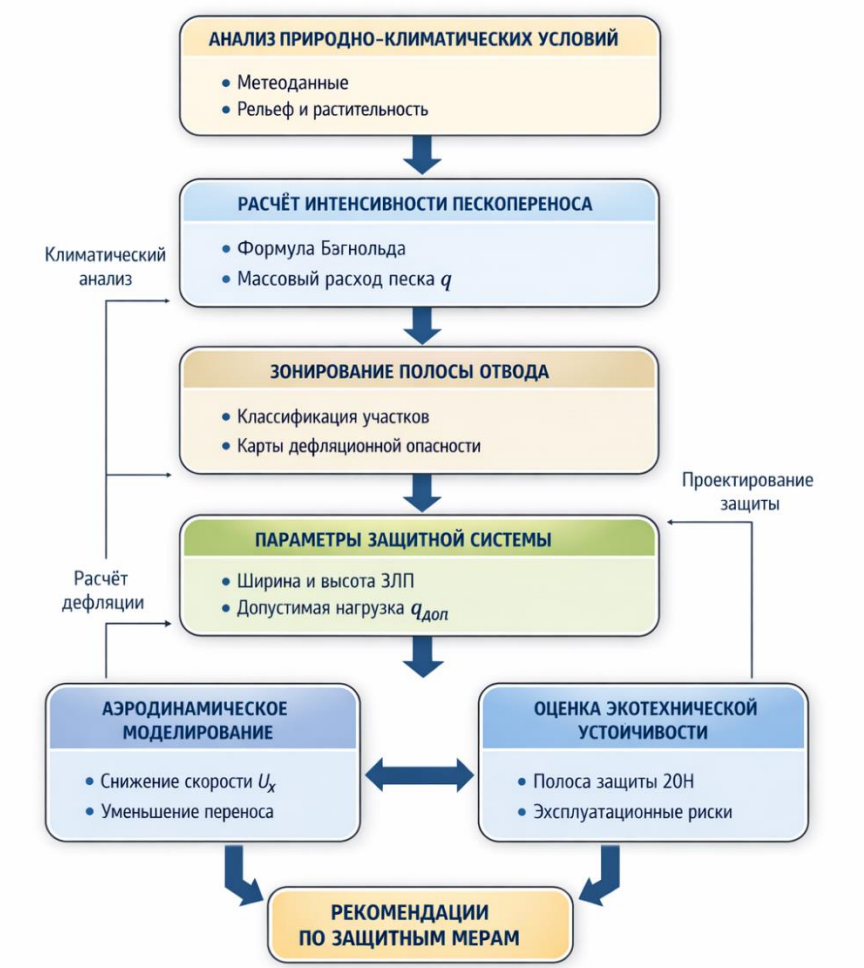

Рисунок 1 – Методическая схема расчётного обоснования системы защиты железной дороги от заносов подвижными песками

Для открытых песчаных поверхностей пустыни Кызылкум параметр шероховатости принимался в пределах z_0=0.001–0.005 м. Использование данной зависимости позволило связать метеорологические наблюдения со значениями динамической скорости трения, определяющей условия начала движения песчаных частиц, и перейти к расчёту параметров эолового транспорта песка [3, 5, 9].

Следующим этапом подготовки производства являлась количественная оценка интенсивности пескопереноса при отсутствии защитных мероприятий. В основе расчёта лежит физическая модель эолового транспорта песка,

предложенная Р. Бэгнольдом, согласно которой массовый расход песка определяется выражением

$$q = \frac{\rho}{g}(u_*^3 - u_{*t}^3)$$

где q – массовый расход песка, кг/(м·с);

u_* – динамическая скорость трения ветрового потока, м/с;

u_{*t} – пороговая динамическая скорость сдвига, м/с;

ρ – плотность воздуха, кг/м³;

g – ускорение свободного падения, м/с².

Интенсивность пескопереноса определяется превышением динамической скорости трения над пороговым значением. В инженерной интерпретации данная модель использовалась для количественной оценки потенциальной дефляционной нагрузки на железнодорожное полотно и перехода к расчётным показателям годового объёма переноса песка [1, 2, 11].

Для графической интерпретации процесса использовалась зависимость, представленная на рис. 2. На рисунке выделяются пороговая зона, зона начального переноса и зона интенсивной дефляции. Для песков пустыни Кызылкум пороговая скорость составляет примерно 4–6 м/с, а при скоростях ветра порядка 10–15 м/с формируется устойчивый режим сальтации, при котором интенсивность пескопереноса резко возрастает. Математически этот процесс описывается зависимостью

$$q \sim (U - U_t)^3$$

Такая запись использовалась для интерпретации эффекта ветроослабления и оценки изменения объёма пескопереноса при снижении скорости ветра под действием защитных мероприятий.

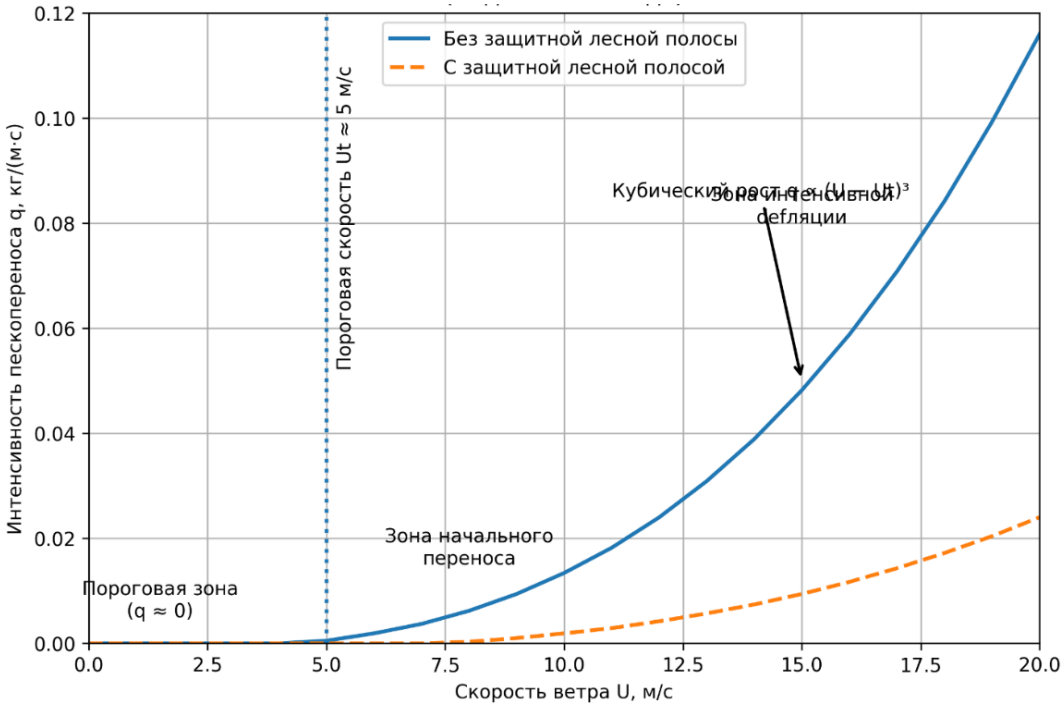

Рисунок 2 – Зависимость интенсивности пескопереноса от скорости ветра согласно модели Бэгнольда

На основе выполненных расчётов интенсивности пескопереноса осуществлялась дифференциация полосы отвода железной дороги по степени дефляционной опасности. При зонировании учитывались интенсивность пескопереноса, морфология песчаного рельефа, направление господствующих ветров, состояние растительного покрова и эксплуатационные наблюдения за заносимостью железнодорожного пути [7, 11, 12]. В пределах полосы отвода выделялись три категории участков: зона высокой заносимости, характеризующаяся активной миграцией барханов и значительным пескопереносом; зона средней заносимости, представленная слабозакреплёнными песками; зона локальной дефляции, формирующаяся вблизи откосов насыпей и нарушенных участков.

На основании выполненных исследований устанавливались основные параметры системы защитных лесных насаждений: снижение скорости ветра на

30–60 %, допустимый объём пескопереноса 20 м³/км·год, ширина защитной зоны 60–100 м и высота насаждений 4–5 м. Полученные параметры использовались для последующего аэродинамического моделирования эффективности защитных лесных насаждений и проектного обоснования системы защиты железной дороги [4, 6, 13, 16].

Результаты (Results)

Проведённое исследование показало, что для железнодорожных линий, проходящих по территории пустыни Кызылкум, подвижные пески формируют устойчивую дефляционную нагрузку на полосу отвода и земляное полотно. Анализ природно-климатических условий района, оценка ветрового режима и расчёт интенсивности пескопереноса позволили количественно охарактеризовать масштабы эолового воздействия и обосновать необходимость системной мелиорации подвижных песков в пределах полосы отвода железной дороги [11–14].

Расчётно-теоретический анализ подтвердил выраженную нелинейность процесса пескопереноса. При скоростях ветра ниже порогового значения перенос песчаных частиц практически отсутствует. После превышения порога $U_t \approx 4–6$ м/с начинается сальтационное движение песка, а при скоростях 10–15 м/с формируется зона интенсивной дефляции, в которой объём переноса резко возрастает. Использование зависимости $q \sim (U - U_t)^3$ показало, что даже частичное снижение скорости ветра обеспечивает выраженный инженерный эффект: уменьшение скорости ветра на 40 % приводит к снижению интенсивности переноса примерно на 75–80 %.

Расчётные значения интенсивности пескопереноса, полученные по модели Бэгнольда для диапазона скоростей ветра 0–20 м/с, показали быстрое возрастание годового переноса песчаного материала с увеличением скорости ветра. При скорости ветра 5 м/с годовой перенос составляет 143,35 м³/км·год, при 6 м/с –

503,72 м³/км·год. По данным расчётов, при дальнейшем росте скорости ветра объём переноса возрастает многократно. Табличные результаты, приведённые в п. 2.1, показывают, что после учёта снижения скорости ветра под воздействием защитных лесных полос объём переноса существенно уменьшается, а эффект защиты возрастает по мере перехода от пороговой зоны к зоне интенсивной дефляции [11, 13].

Выполненные расчёты подтвердили, что для условий железнодорожной линии Бухара–Мискин–Ургенч–Хива при отсутствии защитных мероприятий потенциальный годовой объём пескопереноса может достигать 55–60 м³/км·год. Это существенно превышает допустимые эксплуатационные значения и приводит к формированию устойчивых процессов заносимости железнодорожного пути. Указанный показатель рассматривается как интегральная характеристика дефляционной нагрузки на земляное полотно и как исходная основа для обоснования параметров системы защиты [11, 12].

На основе расчётных значений интенсивности пескопереноса выполнено зонирование полосы отвода по степени дефляционной опасности. Установлено, что наиболее опасными являются участки активной миграции барханных форм, относимые к зоне высокой заносимости. Участки слабозакреплённых песков формируют зону средней заносимости, а локальные очаги дефляции приурочены к откосам насыпей и нарушенным участкам. Это позволило перейти от общей оценки ветропесчаного воздействия к пространственно дифференцированному размещению защитных мероприятий [7, 11].

В результате обоснованы исходные параметры системы защитных лесных насаждений: требуемое снижение скорости ветра на 30–60 %, допустимый объём пескопереноса 20 м³/км·год, ширина защитной зоны 60–100 м и высота насаждений 4–5 м. Эти параметры имеют прикладное значение, поскольку задают расчётные ориентиры для последующего моделирования эффективности

защитных лесных полос и выбора рациональной структуры системы защиты железнодорожного пути [4, 6, 12].

Сопоставление полученных результатов с данными других авторов показывает их содержательную согласованность с существующими представлениями о защите железных дорог в аридных районах. Вместе с тем отличие настоящего исследования состоит в том, что основное внимание сосредоточено не на оценке отдельных защитных конструкций, а на расчётной последовательности формирования системы мелиорации: от анализа природных условий и расчёта пескопереноса до зонирования полосы отвода и определения параметров защитных мероприятий. Такой подход позволяет использовать результаты как расчётно-методическую основу для дальнейшего анализа эффективности защитных лесных насаждений и формирования устойчивой экотехнической системы железной дороги [1, 4, 10, 14, 15].

В работе обоснована система мелиорации подвижных песков в полосе отвода железных дорог как методически организованный комплекс аналитических, расчётных и организационно-технологических мероприятий, направленных на количественное определение дефляционной нагрузки, дифференциацию полосы отвода по степени опасности и формирование исходных параметров защитных лесных полос. Полученные результаты могут быть использованы при проектировании защитных мероприятий и оценке устойчивости железнодорожной инфраструктуры в аридных условиях [12, 16].

Обсуждение (Discussion)

Полученные результаты подтверждают, что мелиорация подвижных песков в полосе отвода железных дорог должна рассматриваться как расчётно обоснованная система инженерно-экологических мероприятий, а не как совокупность локальных мер по закреплению песчаных массивов. Применение такого подхода позволяет учитывать не только природно-климатические

особенности района, но и количественные параметры эолового воздействия, непосредственно влияющие на устойчивость железнодорожного пути [1, 2, 5].

Принципиальное значение имеет то, что расчёт интенсивности пескопереноса и зонирование полосы отвода по степени дефляционной опасности создают основу для дифференцированного проектирования защитных мероприятий. Это даёт возможность увязать параметры системы мелиорации с реальными условиями формирования заносов, распределением дефляционной нагрузки и особенностями отдельных участков железнодорожной линии [3, 7, 11].

Важным итогом исследования является обоснование защитных лесных полос как ключевого элемента системы мелиорации подвижных песков. Их роль заключается не только в снижении скорости ветра и уменьшении пескопереноса, но и в формировании более устойчивого экотехнического состояния полосы отвода. В сочетании с расчётной оценкой дефляционных процессов это позволяет перейти от эмпирического выбора защитных мер к научно обоснованному проектированию системы защиты железной дороги [4, 6, 13].

Сопоставление полученных результатов с данными других исследований показывает, что предложенный подход соответствует современным представлениям о защите железных дорог в аридных районах. Вместе с тем его отличие состоит в последовательной расчётной увязке природных условий, интенсивности пескопереноса, зонирования полосы отвода и параметров защитных мероприятий, что повышает достоверность и прикладную ценность проектных решений [8, 9, 10, 15].

Заключение (Conclusion)

В результате исследования установлено, что подвижные пески являются одним из существенных природных факторов, снижающих устойчивость и эксплуатационную надёжность железных дорог в аридных условиях.

Показано, что расчётное обоснование системы мелиорации должно включать анализ природно-климатических и ветровых условий, оценку интенсивности пескопереноса, зонирование полосы отвода по степени дефляционной опасности и определение параметров защитных лесных полос.

Обосновано, что применение такого подхода позволяет количественно оценить дефляционную нагрузку на железнодорожную инфраструктуру, дифференцировать участки полосы отвода по степени опасности и сформировать исходные параметры системы защитных мероприятий.

Установлено, что расчётно обоснованная система мелиорации подвижных песков создаёт основу для повышения устойчивости железнодорожного пути, снижения заносимости и повышения эффективности проектных решений в условиях активных эоловых процессов.

Полученные результаты могут быть использованы при проектировании, строительстве и эксплуатации железных дорог в зонах распространения подвижных песков.

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