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1-SECTION

УДК 667.633.26 : 678.744

ИССЛЕДОВАНИЕ КИНЕТИЧЕСКИХ ОСОБЕННОСТЕЙ СИНТЕЗА И СТРУКТУРНЫЙ АНАЛИЗ АЗОТСОДЕРЖАЩИХ АКРИЛОВЫХ СОПОЛИМЕРОВ

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Аннотация. *В статье изложены результаты разработки и оптимизации технологических параметров радикальной сополимеризации в водных средах. В качестве исходных мономеров использованы акриловая кислота и функциональный азотсодержащий олигомер локального происхождения. Изучено влияние pH среды и температурного режима на кинетику протекания сополимеризации в присутствии окислительно-восстановительной системы инициаторов.*

Методом ИК-спектроскопии проведен детальный молекулярный анализ структуры полученного сополимера. Подтверждено раскрытие двойных связей -C=C- и успешная интеграция амидных и карбонильных фрагментов в основную полимерную матрицу. Установлено, что оптимальные физико-химические свойства и высокая конверсия мономеров достигаются при температуре 60 ± 2 °C и значении pH 7,0–7,2, что позволяет существенно сократить время технологического цикла высыхания формируемых на их основе композиций до 16 часов.

Ключевые слова: *акриловая кислота, азотсодержащий олигомер, радикальная сополимеризация, кинетика синтеза, ИК-спектроскопия, молекулярная структура.*

Abstract. *The article describes the results of development and optimization of technological parameters of radical copolymerization in aqueous media. Acrylic acid and a functional nitrogen-containing oligomer of local origin were used as starting monomers. The*

influence of pH and temperature on the kinetics of copolymerization in the presence of a redox initiator system was studied.

A detailed molecular analysis of the structure of the prepared copolymer was carried out by IR-spectroscopy. The opening of -C=C- double bonds and successful integration of amide and carbonyl fragments into the main polymer matrix were confirmed. It was found that optimal physicochemical properties and high monomer conversion are achieved at a temperature of 60 ± 2 °C and a pH value of 7.0 - 7.2, which significantly reduces the drying cycle time of compositions formed on their basis to 16 hours.

Keywords: *acrylic acid, nitrogen-containing oligomer, radical copolymerization, synthesis kinetics, IR-spectroscopy, molecular structure.*

ВВЕДЕНИЕ

Развитие современных технологий в области синтеза высокомолекулярных соединений тесно связано с химической модификацией существующих полимерных матриц путем введения в их структуру функциональных полярных макрорадикалов [1]. Акриловые сополимеры находят широкое применение в различных отраслях химической промышленности благодаря комплексу ценных физико-химических свойств [2]. Однако классические гомополимеры акриловой кислоты обладают высокой гидрофильностью и жесткостью цепей, что требует введения модифицирующих сомономеров на стадии синтеза для регулирования молекулярной архитектуры [3].

Одним из перспективных направлений модификации является вовлечение в радикальную сополимеризацию гетероцепных азотсодержащих олигомеров, синтезированных на основе локальной сырьевой базы [4]. Введение функциональных амидных и аминных групп в структуру полиакрилатов позволяет не только перестроить пространственную сетку сополимера, но и существенно расширить диапазон его технологического применения [5].

Успешное протекание гидролитической и радикальной сополимеризации многокомпонентных систем жестко лимитировано

кинетическими параметрами процесса, такими как концентрация инициирующих систем, температурный интервал, ионогенное состояние мономеров и кислотность среды (pH) [6]. В связи с этим, детальный анализ стадии синтеза и последующая идентификация химических связей в полученных макромолекулах являются ключевой научно-практической задачей [7].

Целью настоящей работы является оптимизация технологических параметров синтеза новых функционализированных акриловых сополимеров на основе местных азотсодержащих олигомеров и акриловой кислоты, а также физико-химический и структурный анализ полученных высокомолекулярных продуктов.

ОСНОВНАЯ ЧАСТЬ

Методы и материалы. Базовым мономером в работе являлась акриловая кислота (АК) производства ИП ООО «Global Chemical» (Узбекистан), очищенная вакуумной перегонкой физические константы: ρ_{20} = 1,051 г/см^3, $T_{кип}$ = 141 °C. В качестве модифицирующего сомономера использовался азотсодержащий олигомер, содержащий реакционноспособные группы -NH_2 и -$CONH_2$. Инициирование процесса осуществляли с помощью водорастворимой окислительно-восстановительной системы (редокс-системы), состоящей из персульфата аммония $(NH_4)_2S_2O_8$ и метабисульфита натрия $Na_2S_2O_5$. Нейтрализацию реакционной среды проводили смесью гидроксида натрия (NaOH) и карбоната натрия (Na_2CO_3).

Радикальная сополимеризация проводилась в водных средах в четырехгорловом стеклянном реакторе периодического действия, снабженном обратным холодильником, механической мешалкой, капилляром для ввода инертного газа и термометром. Технологическая схема получения сополимера включала следующие стадии:

- стадия парциальной нейтрализации кислоты: Готовили 40 %-ный водный раствор акриловой кислоты. С целью предотвращения неконтролируемого саморазогрева реактора, емкость охлаждали в ледяной бане и порционно вводили гибридный нейтрализующий агент до установления строгого значения pH в пределах 7,0-7,2 (pH-метр SevenDirect SD20);

- стадия смешения и гомогенизации: В нейтрализованный раствор натриевой соли акриловой кислоты вводили заданные количества модифицирующего азотсодержащего олигомера (в соотношениях от 10 % до 50 % от массы исходной АК) и интенсивно перемешивали в течение 15 минут для достижения полной гомогенности фаз;

- стадия полимеризации: В систему подавали редокс-инициаторы. Реакционную среду продували очищенным азотом для удаления растворенного кислорода. Синтез проводили при фиксированной температуре 60 ± 2 °C на протяжении 120 минут;

- стадия очистки и сушки: Образовавшийся сополимер выделяли методом осаждения в избытке изопропилового спирта, многократно промывали и подвергали вакуумной сушке при температуре 40 °C до постоянного веса.

Молекулярная структура полученного продукта анализировалась методом ИК-спектроскопии на аналитическом комплексе Shimadzu IRAffinity-1S (Япония). Регистрацию спектров поглощения осуществляли в интервале волновых чисел 400-4000 $см^{-1}$ с разрешением 4 $см^{-1}$. Сухие образцы прессовали в тонкие таблетки с бромидом калия (KBr).

Результаты и их обсуждение. В ходе кинетических исследований установлено, что pH исходной среды оказывает определяющее влияние на скорость сополимеризации и молекулярную массу образующегося сополимера. При pH ниже 6,0 акриловая кислота находится преимущественно в недиссоциированной форме, что приводит к

чрезвычайно высокой скорости гомополимеризации и потере однородности системы. В свою очередь, в сильнощелочной среде (pH > 8,0) снижается активность редокс-системы. В связи с этим диапазон pH 7,0–7,2 был определен как наиболее оптимальный для контролируемого роста цепи сополимера.

Выбор температурного режима 60 ± 2 °C обусловлен кинетикой распада окислительно-восстановительной системы инициаторов. При температурах ниже 50 °C скорость генерации свободных радикалов недостаточна для эффективного инициирования сополимеризации азотсодержащего олигомера. Повышение температуры выше 70 °C вызывает дезактивацию инициатора и приводит к нежелательным процессам передачи цепи на растворитель. Экспериментально показано, что оптимизированная технология синтеза сополимера способствует ускорению процессов его последующего пленкообразования. Время высыхания композиций на основе разработанного полимера (до степени 3 по ГОСТ 19007-73) сокращается с 24 до 16 часов.

Для подтверждения факта протекания сополимеризации и раскрытия двойных связей мономеров был проведен детальный спектральный анализ. В ИК-спектре синтезированного модифицированного сополимера полностью отсутствуют полосы поглощения в области 1610-1630 $см^{-1}$, характерные для валентных колебаний свободных двойных связей –С = С– акриловой кислоты. Это прямо доказывает, что формирование сополимера протекает по радикальному механизму раскрытия связей углерод-углерод.

Основная полимерная матрица идентифицируется по интенсивной полосе поглощения при 1722 $см^{-1}$, которая соответствует валентным колебаниям карбонильных групп (С = О) карбоксилатных фрагментов. Успешное вхождение азотсодержащего олигомера в макромолекулярную структуру сополимера подтверждается появлением серии новых полос поглощения в диапазоне 1645-1660 $см^{-1}$, которые относятся к колебаниям

«Амид-I» (валентные колебания карбонила в амидной группе). Кроме того, широкая область поглощения с максимумом в интервале 3200-3450 $см^{-1}$ относится к валентным колебаниям связанных водородными связями -NH_2 и -OH групп (рис. 1).

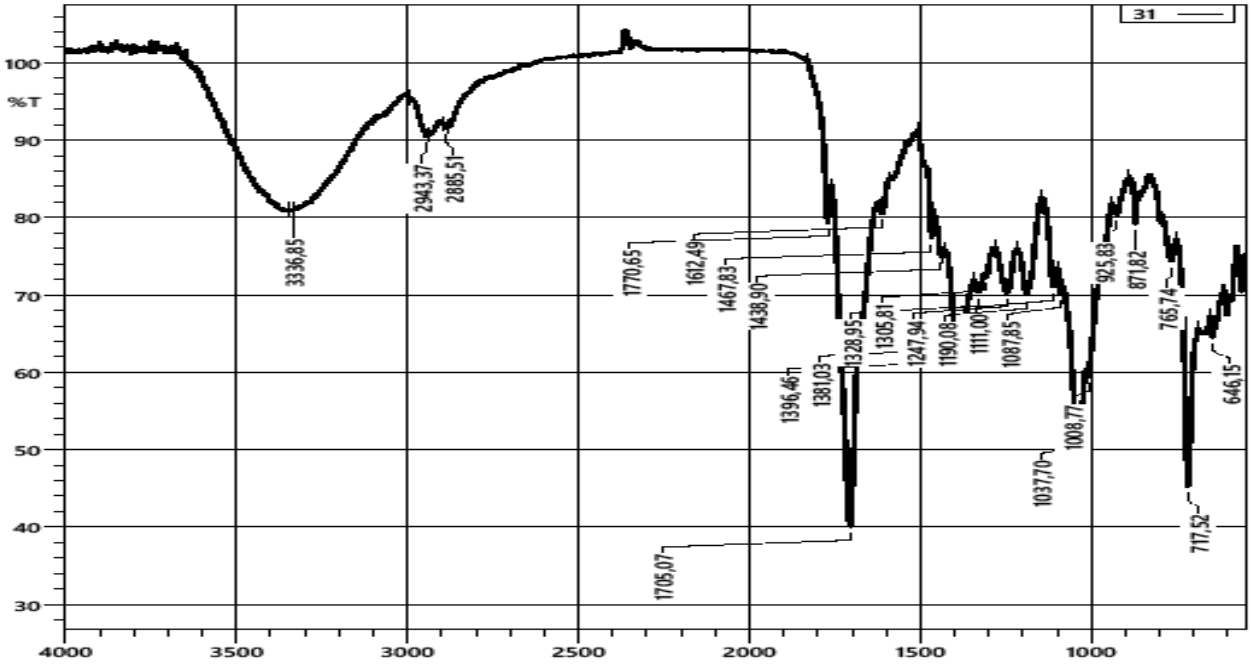

Рис. 1. ИК-спектр синтезированного сополимера.

Таким образом, спектральный анализ подтверждает образование химически однородного функционализированного акрилового сополимера.

ЗАКЛЮЧЕНИЕ (ВЫВОДЫ)

В ходе исследования разработана оптимальная технология синтеза азотсодержащих акриловых сополимеров в водной среде при температуре 60 ± 2 °C и значении pH 7,0–7,2 под воздействием бинарной редокс-системы. Методом ИК- спектроскопии прецизионно подтверждено раскрытие двойных связей –C = C– исходных мономеров и успешное вхождение характеристических карбонильных (1722 $см^{-1}$) и амидных (1645-1660 $см^{-1}$) функциональных групп в макромолекулярную структуру. Установлено, что предложенный технологический режим обеспечивает

высокую конверсию исходных компонентов и катализирует процессы последующего структурирования полимерных систем, снижая время их высыхания до 16 часов, что открывает широкие перспективы для их практического применения.

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Ag–n$Al_xGa_{1-x}As$–πGaAs–Ag FOTOELEKTRIK TUZILMASINING SPEKTRAL XARAKTERISTIKALARIGA TESKARI KUCHLANISHNING TA'SIRI

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***Annotatsiya**: Ushbu tezisda "taglik (+)–plyonka (–)" geometriyasidagi Ag–n$Al_xGa_{1-x}As$–πGaAs–Ag fotoelektrik tuzilmasining fototok zichligi, spektral sezuvchanligi va tashqi kvant unumdorligining λ = 0,4–2,2 mkm diapazondagi spektral taqsimoti 2–90 V teskari kuchlanishlarda tadqiq etilgan. $\lambda \approx$ 0,85–0,90 mkm va $\lambda \approx$ 1,2–1,6 mkm sohalarida ikkita xarakterli maksimum aniqlangan. Kuchlanish ortishi bilan ularning amplitudasi sezilarli oshgan, spektral holati esa deyarli o'zgarmagan. Natijalar ushbu tuzilmani keng spektrli, kuchlanish bilan boshqariladigan fotodetektor sifatida qo'llash imkoniyatini asoslaydi.*

***Kalit so'zlar**: fotodetektor, spektral sezuvchanlik, tashqi kvant unumdorligi, fototok, teskari kuchlanish, yarimo'tkazgich tuzilma.*

***Abstract**: This thesis investigates the spectral distributions of photocurrent density, spectral responsivity, and external quantum efficiency of an Ag-n$Al_xGa_{1-x}As$-πGaAs-Ag photoelectric structure with a "substrate (+)–film (–)" geometry over λ = 0.4-2.2 μm under reverse-bias voltages of 2-90 V. Two characteristic maxima were identified at $\lambda \approx$ 0.85-0.90 μm and $\lambda \approx$ 1.2-1.6 μm. Their amplitudes increased significantly with voltage, whereas their spectral positions remained nearly unchanged. The results support the use of this structure as a broadband, voltage-tunable photodetector.*

***Keywords:** photodetector, spectral responsivity, external quantum efficiency, photocurrent, reverse-bias voltage, semiconductor structure.*

KIRISH

Yarimo'tkazgichli fotodetektorlarning spektral-fotoelektrik xususiyatlarini takomillashtirish optoelektronikaning dolzarb yo'nalishlaridan

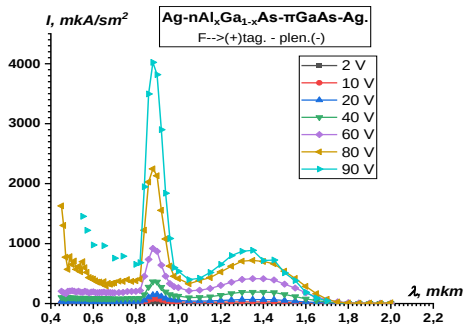
biridir [1-3]. Ikki o‘lchamli geterotuzilmalar keng spektral diapazon, yuqori kvant unumdorligi va tezkor fotojavob bilan ajralib, geterokontaktlarda fotogeneratsiyalangan elektron-kovak juftliklarini samarali ajratadi [2-4]. Ularni egiluvchan optoelektron qurilmalarga integratsiyalash amaliy imkoniyatlarni kengaytiradi [5].

Spektral sezuvchanlik va tashqi kvant unumdorligi tashqi kuchlanishga bog‘liq. Teskari kuchlanish elektr maydonni kuchaytirib, tashuvchilarning rekombinatsiyadan oldin ajralishi va kontaktlarda yig‘ilishini yaxshilaydi. Bunday xususiyat qora fosfor va InSe asosidagi fotodetektorlarda ko‘rinadigan hamda yaqin infraqizil diapazonlarda kuzatilgan [6, 7].

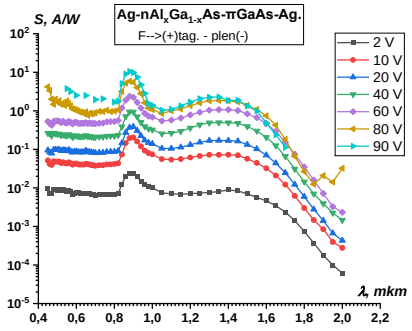
CdS, PbS hamda qatlamli $TlGaSe_2$ va $TlInSe_2$ yupqa pardalarida kuchlanish ortishi bilan fototok, spektral sezuvchanlik va tashqi kvant unumdorligining oshishi aniqlangan [8-15]. “Taglik–plyonka” geometriyasidagi bunday tuzilmalar 0,4-2,2 mkm diapazonda qisqa to‘lqinli keskin maksimum va uzunroq to‘lqinlarda qo‘shimcha fotosezgirlik sohalarini namoyon etadi [12–15].

Ushbu ishda “taglik (+) - plyonka (–)” geometriyasidagi Ag-n$Al_xGa_{1-x}As$-πGaAs-Ag tuzilmasining spektral xarakteristikalari 2, 10, 20, 40, 60, 80 va 90 V teskari kuchlanishlarda tadqiq etildi. Maqsad fototok, spektral sezuvchanlik va kvant unumdorligi spektrlariga kuchlanish ta’sirini aniqlash hamda xarakterli maksimumlarning tabiatini muhokama qilishdan iborat.

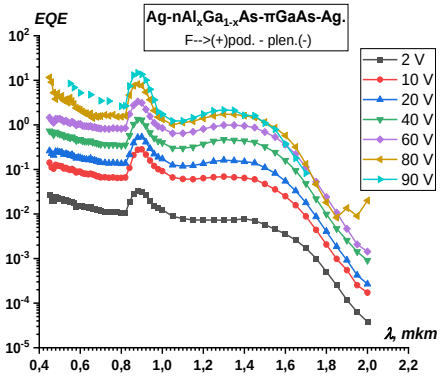
Asosiy qism



a)



b)



c)

1-rasm. Ag-nAl_xGa_{1-x}As-πGaAs-Ag tuzilmasining turli teskari kuchlanishlardagi spektral xarakteristikalari:

a) fototok zichligining to‘lqin uzunligiga bog‘liqligi, *I(λ)*;

b) spektral sezuvchanlikning to‘lqin uzunligiga bog‘liqligi, *S(λ)*;

c) tashqi kvant unumdorligining spektral taqsimoti, *EQE(λ)*.

Ag-nAl_xGa_{1-x}As-πGaAs-Ag tuzilmasining fototok zichligi I ning to‘lqin uzunligi λ ga bog‘liqligi 1a-rasmda keltirilgan. Barcha kuchlanishlarda λ ≈ 0,85-0,90 mkm da tor va keskin, λ ≈ 1,2-1,6 mkm da esa kengroq maksimum kuzatiladi. Kuchlanish 2 V dan 90 V gacha oshganda asosiy maksimum amplitudasi ortib, 90 V da taxminan 4000 mkA/sm² ga yetadi, uning spektral holati esa deyarli o‘zgarmaydi. Bu holat fotogeneratsiyalangan tashuvchilarning ajralishi va yig‘ilish samaradorligi oshishi bilan izohlanadi.

Spektral sezuvchanlik S (A/W) ning λ ga bog‘liqligi (1b-rasm) fototok spektriga o‘xshash: λ ≈ 0,85-0,90 mkm da keskin cho‘qqi, λ ≈ 1,0-1,6 mkm da keng plato kuzatiladi. Kuchlanish ortishi bilan S butun spektrda bir necha tartibga oshib, 2 V da 10^{-3}-10^{-1} A/W, 60-90 V da esa 10^{0}-10^{1} A/W darajasiga

yetadi. λ > 1,6 mkm da sezuvchanlikning kamayishi fundamental yutilish chegarasidan uzoqlashish bilan bog‘liq.

Tashqi kvant unumdorligi (EQE) spektrlari (1c-rasm) I-λ va S-λ bog‘lanishlariga mos keladi: λ ≈ 0,85-0,90 mkm da keskin cho‘qqi, λ ≈ 1,0-2,0 mkm da esa bir necha lokal maksimumli keng soha mavjud. Kuchlanishning 2 V dan 90 V gacha ortishi EQE ni butun spektr bo‘yicha oshiradi. 60-90 V da egri chiziqlarning yaqinlashishi tashuvchilarni yig‘ish samaradorligi to‘yinishga yaqinlashayotganini ko‘rsatadi.

Uchala spektral xarakteristikadagi maksimumlarning bir xil hududlarda joylashishi ularning qatlamlardagi fotogeneratsiya jarayonlari bilan bog‘liqligini ko‘rsatadi. Qisqa to‘lqinli tor maksimum yuza yaqinidagi kuchli yutilish va tashuvchilarning samarali ajralishi, uzun to‘lqinli keng soha esa chuqurroq qatlamlardagi yutilish hamda tashuvchilarning diffuziyasi bilan izohlanishi mumkin. Kuchlanish bilan signalning ortishi tuzilmaning teskari kuchlanishda ishlaydigan keng spektrli fotodetektor sifatidagi istiqbolini tasdiqlaydi.

XULOSA

Ag-n$Al_xGa_{1-x}As$-πGaAs-Ag tuzilmasining fototok zichligi, spektral sezuvchanligi va tashqi kvant unumdorligi 2-90 V teskari kuchlanishlarda o‘rganildi. λ ≈ 0,85–0,90 mkm da keskin maksimum va λ ≈ 1,2-1,6 mkm da keng ikkilamchi soha aniqlandi. Kuchlanish ortishi xarakteristikalar amplitudasini sezilarli oshirdi, maksimumlarning spektral holati esa deyarli o‘zgarmadi. Natijalar tuzilmani 0,4-2,0 mkm diapazonda ishlaydigan, kuchlanish bilan boshqariladigan fotodetektor sifatida qo‘llash mumkinligini ko‘rsatadi.

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MIRZACHO‘L VOHASI JIZZAX HUDUDI MOLLYUSKALARINING TUR TARKIBI VA TARQALISHI

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Annotatsiya. *Ushbu maqolada Mirzacho‘l vohasi hududida uchraydigan mollyuskalarning tur tarkibi va tarqalish xususiyatlari o‘rganildi. Tadqiqotlar Jizzax viloyatining G‘allaorol tumanida olib borildi. Natijada voha hududida uchraydigan qorinoyoqli va ikki pallali mollyuskalarning asosiy turlari aniqlandi hamda ularning biotoplar bo‘yicha tarqalishi tahlil qilindi.*

Kalit so‘zlar*: Mirzacho‘l vohasi, mollyuskalar, biologik xilma-xillik, tur tarkibi, tarqalish, Gastropoda, Bivalvia.*

KIRISH

Mirzacho‘l vohasi O‘zbekistonning markaziy qismida joylashgan bo‘lib, Sirdaryo va Aydar-Arnasoy ko‘llar tizimi oralig‘idagi keng tekisliklarni qamrab oladi. Hudud shimolda Qozog‘iston Respublikasi, janubi-sharqda Tojikiston Respublikasi, shimoli-g‘arbda Qizilqum hududi bilan chegaradosh. Vohaning janubiy va janubi-g‘arbiy qismlarida Turkiston, Morguzar hamda Nurota tog‘ tizmalari joylashgan. Mirzacho‘l hududining relyefi asosan tekisliklardan iborat bo‘lib, janubi-sharqdan shimoli-g‘arbga tomon pasayib boradi. Tekisliklarning o‘rtacha balandligi 250–350 m ni tashkil etsa, tog‘oldi hududlarida bu ko‘rsatkich 450–530 m gacha ko‘tariladi. Morguzar tog‘larining eng baland nuqtasi 2621 m, Nurota tizmasining Hayotboshi cho‘qqisi esa 2169 m balandlikka ega. Hudud iqlimi keskin kontinental xarakterga ega. Yanvar

oyining o‘rtacha harorati –1 dan –3°C gacha bo‘lib, ayrim yillarda –30°C gacha pasayishi kuzatiladi. Iyul oyida esa o‘rtacha harorat +26–28°C ni tashkil etadi va ayrim hollarda +44–45°C gacha ko‘tariladi. Yillik yog‘in miqdori tekisliklarda 200–350 mm, tog‘oldi va tog‘ hududlarida 400–600 mm gacha yetadi. Bug‘lanish miqdori yog‘in miqdoridan 4–5 barobar yuqori bo‘lib, bu hududning qurg‘oqchil xususiyatini belgilaydi. Mirzacho‘l vohasining asosiy suv manbalarini Sirdaryo, Sangzor daryosi, Zominsuv, Rovotsoy, Sayxonsoy, Achisoy va boshqa tog‘ soylarining suvlari tashkil etadi. Bundan tashqari, Aydar-Arnasoy ko‘llar tizimi ham hududning yirik gidrologik obyektlaridan hisoblanadi. Sug‘orish kanallari, kollektor-drenaj tarmoqlari, ariqlar va sun’iy suv havzalari voha hududida keng tarqalgan bo‘lib, mollyuskalarning yashashi va tarqalishi uchun muhim ekologik sharoit yaratadi. Hudud tuproqlari asosan och bo‘z, bo‘z-o‘tloq, sho‘rxok va taqir tuproqlardan iborat. Tog‘oldi hududlarida to‘q bo‘z va jigarrang tuproqlar uchraydi. O‘simlik qoplami cho‘l, adir va tog‘ mintaqalariga xos bo‘lib, tekisliklarda shuvoq (Artemisia spp.), yantoq (Alhagi spp.), yulg‘un (Tamarix spp.) kabi o‘simliklar, suv havzalari atrofida esa qamishzor va to‘qay o‘simliklari keng tarqalgan. Mirzacho‘l vohasining tabiiy-geografik sharoiti, ayniqsa suv havzalari va sug‘orish tizimlarining rivojlanganligi, quruqlik va chuchuk suv mollyuskalari uchun turli xil yashash muhitlarini hosil qiladi. Shu sababli hudud mollyuskalar faunasining shakllanishi va tarqalishini o‘rganish uchun muhim ilmiy ahamiyatga ega hisoblanadi. Mollyuska namunalari 2025–2026-yillarda dala ekspeditsiyalari davomida yig‘ildi. Namunalar qo‘l bilan terish va suv tubidan maxsus elaklar yordamida olindi. Turlar morfologik belgilari asosida aniqlanib, ilmiy adabiyotlar yordamida sistematik jihatdan tasniflandi. Tadqiqot davomida quyidagi mollyuska turlari qayd etildi: Xeropicta kandaharica, Cochlicopa nitens, Pupilla muscorum, Candaharia rutellum, Lymnaea auricularia.

Xeropicta kandaharica (Pfeiffer, 1846) quruqlikda yashovchi o‘rta kattalikdagi qorinoyoqli mollyuska hisoblanadi. Chig‘anog‘i yumaloq-yassi

shaklda bo‘lib, odatda oqish yoki sarg‘ish rangda uchraydi. Chig‘anoq yuzasida qo‘ng‘ir yoki kulrang spiral chiziqlar kuzatiladi. Chig‘anoq diametri odatda 12–20 mm atrofida bo‘ladi. Og‘iz qismi yumaloq shaklda, chetlari esa biroz qalinlashgan. Mazkur tur Markaziy Osiyo mamlakatlari, jumladan O‘zbekiston, Tojikiston, Turkmaniston, Qozog‘istonning janubiy hududlari hamda Afg‘onistonning ayrim qismlarida keng tarqalgan. O‘zbekistonda cho‘l, adir va tog‘oldi mintaqalarida uchraydi. X. kandaharica asosan quruq va yarim quruq biotoplarga moslashgan tur hisoblanadi. U adirlar, tog‘oldi hududlari, butazorlar, quruq o‘tloqlar hamda qishloq xo‘jaligi maydonlari chekkalarida yashaydi. Tur yuqori harorat va namlik tanqisligiga yaxshi moslashgan. Yozning issiq davrlarida tuproq yoriqlari, toshlar osti yoki o‘simlik qoldiqlari orasiga yashirinib, estivatsiya (yozgi tinim davri) holatiga o‘tadi. Tadqiqotlar davomida Xeropicta kandaharica asosan G‘allaorol, Forish va Zomin tumanlarining adir hamda tog‘oldi hududlarida qayd etildi. Tur quruq o‘simlik qoplami mavjud bo‘lgan yerlarda, ayniqsa shuvoq va yantoq bilan qoplangan maydonlarda ko‘proq uchradi. Sug‘oriladigan agrotsenozlar atrofida ham ayrim populyatsiyalari kuzatildi. Xeropicta kandaharica quruqlik ekotizimlarida organik qoldiqlarning parchalanishida ishtirok etadi va ayrim umurtqali hamda umurtqasiz hayvonlar uchun oziq manbai bo‘lib xizmat qiladi. Shu bilan birga, uning tarqalishi hududning ekologik holatini baholashda bioindikator sifatida ham muhim ahamiyat kasb etadi.

Cochlicopa nitens quruqlikda yashovchi mayda salyangoz turi bo‘lib, mollyuskalar (Mollusca) tipining qorinoyoqlilar (Gastropoda) sinfiga kiradi. Bu tur Yevropa va Osiyoning ayrim hududlarida uchraydi va nam muhitlarni afzal ko‘radi. Chig‘anog‘i juda kichik, odatda 5–7 mm uzunlikda bo‘ladi. Shakli cho‘zinchoq-oval va silliq yuzali. Rangi och jigarrangdan sarg‘ish-jigarranggacha o‘zgaradi. Chig‘anoq yuzasi yaltiroq bo‘lgani uchun lotincha “nitens” (“yaltiroq”, “porloq”) nomi berilgan. Cochlicopa nitens botqoqliklar, nam o‘tloqlar, daryo va ko‘l bo‘ylari, nam o‘rmonlar hamda yer yuzasidagi

chirigan barglar qatlamida ko‘proq uchraydi. U qurg‘oqchil hududlarda kam uchraydi, chunki tanasi namlikka bog‘liq. Germafrodit hisoblanadi, ya’ni bitta individda erkak va urg‘ochi jinsiy organlar mavjud. Tuxum qo‘yish orqali ko‘payadi. Tuxumlar nam tuproq yoki barglar orasiga qo‘yiladi.

Pupilla muscorum quruqlikda yashovchi juda kichik salyangoz turi bo‘lib, Pupillidae oilasiga mansub. U dunyoda eng keng tarqalgan mayda quruqlik salyangozlaridan biri hisoblanadi. Chig‘anoq uzunligi odatda 2,5–4 mm, kengligi 1,5–2 mm atrofida bo‘ladi. Shakli silindrsimon yoki tuxumsimon cho‘ziq. Rangi sarg‘ish-jigarrang, och jigarrang yoki qo‘ng‘ir. Chig‘anoq 5–7 buramadan iborat. Og‘iz qismi kichik va dumaloq. Quruq va yarim quruq o‘tloqlar, yaylovlar, toshloq hududlar, qumli joylar, o‘rmon chetlari hamda moxlar orasida uchraydi. Germafrodit organizm hisoblanadi. Tuxum qo‘yib ko‘payadi. Nam tuproq yoki moxlar orasiga tuxum qo‘yadi. Yosh salyangozlar tuxumdan chiqqach tez rivojlanadi. Pupilla muscorum quruqlikda yashovchi juda mayda salyangoz bo‘lib, Pupillidae oilasiga mansub.

Candaharia rutellum quruqlikda yashovchi salyangoz bo‘lib, Hygromiidae oilasiga mansub. Markaziy Osiyo faunasining xarakterli vakillaridan biridir. Chig‘anoq diametri 8–15 mm atrofida. Shakli yassi-konussimon. Rangi och jigarrang yoki kulrang-jigarrang. Chig‘anoq yuzasida nozik chiziqlar mavjud. Tog‘ oldi hududlari, adirlar, quruq butazorlar va toshli yonbag‘irlarda uchraydi.

Lymnaea auricularia (quloqsimon chuchuk suv salyangozi) Lymnaeidae oilasiga mansub bo‘lib, chuchuk suv havzalarida yashovchi yirik o‘pkali mollyuska hisoblanadi. Chig‘anoq balandligi 20–35 mm, ayrim hollarda 40 mm gacha yetadi. Chig‘anoq yupqa va mo‘rt. Og‘iz qismi juda katta bo‘lib, quloqqa o‘xshagani uchun “auricularia” (“quloqsimon”) deb ataladi. Rangi sarg‘ish-jigarrang. Ko‘llar, hovuzlar, sekin oqadigan daryolar va sug‘orish kanallarida uchraydi. Lymnaea auricularia ayrim parazit chuvalchanglarning oraliq xo‘jayini bo‘lishi mumkin. Xususan, fascioliaz kasalligini keltirib chiqaruvchi jigar qurti lichinkalarining rivojlanishida ishtirok etishi mumkin. Suv havzalarini

biologik tozalashda qatnashadi. Baliqlar va suv qushlari uchun oziqa hisoblanadi. Suv ekotizimlarining muhim tarkibiy qismi sanaladi.

Aniqlangan turlar orasida Physa acuta, Lymnaea auricularia va Planorbis planorbis keng tarqalgan turlar sifatida qayd etildi. Ular sug‘orish kanallari, kollektorlar va tabiiy suv havzalarining aksariyatida uchradi. Lymnaea truncatula asosan botqoqlashgan va nam hududlarda uchradi. Ushbu tur trematoda parazitlarining oraliq xo‘jayini sifatida muhim ahamiyatga ega.

XULOSA

Xulosa qilib aytganda, Mirzacho‘l vohasida mollyuskalarning tur tarkibi nisbatan boy bo‘lib, tadqiqot davomida 10 ta tur aniqlandi. Qorinoyoqli mollyuskalar turlar soni bo‘yicha ustunlik qildi. Ko‘pchilik turlar sug‘orish tarmoqlari va tabiiy suv havzalarida keng tarqalgan. Olingan natijalar voha mollyuskalari faunasini o‘rganish va ularning xo‘jalik hamda ekologik ahamiyatini baholash uchun muhim ilmiy asos bo‘lib xizmat qiladi.

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STUDY OF THE OPTIMAL CONDITIONS FOR THE PREPARATION OF THE SODIUM SALT OF p-CHLOROPHENOL

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Abstract. *This study systematically investigated the optimum neutralization conditions for the synthesis of sodium p-chlorophenolate through the reaction of p-chlorophenol with a concentrated sodium hydroxide solution. Particular attention was given to evaluating the effects of reagent composition on the physicochemical characteristics of the reaction medium, including pH and reaction temperature, which are critical parameters governing the efficiency of salt formation and the stability of the final product. A series of experiments was conducted by gradually introducing p-chlorophenol into a 40 wt.% sodium hydroxide solution under continuous stirring while monitoring changes in pH and temperature throughout the neutralization process.*

The experimental results demonstrated that the progressive addition of p-chlorophenol caused a gradual decrease in the alkalinity of the solution accompanied by an increase in reaction temperature due to the exothermic nature of the neutralization reaction. The optimum technological conditions were established when the concentration of p-chlorophenol reached 60.01 wt.%, corresponding to a solution pH of 5.90 and a reaction temperature of 67–68 °C. Under these conditions, the neutralization process proceeded efficiently, providing complete conversion of the phenolic compound into its sodium salt while maintaining favorable reaction stability.

The obtained results indicate that precise control of reagent ratio is essential for achieving the desired physicochemical properties of the reaction system and ensuring high process reproducibility. The identified optimum conditions provide a reliable basis for the preparation of sodium p-chlorophenolate intended for subsequent crystallization, physicochemical characterization, phase-equilibrium investigations, and the development of chlorophenol-based herbicidal formulations. These findings also contribute to the optimization of industrial synthesis technology by improving process efficiency, minimizing excess alkali consumption, and ensuring stable product quality.

Keywords.*p-chlorophenol, sodium hydroxide, neutralization, sodium salt, pH, temperature, technological parameters.*

INTRODUCTION

The sodium salt of p-chlorophenol is an important intermediate widely employed in the production of herbicides, defoliants, disinfectants, dyes,

pharmaceuticals, and other biologically active compounds. Owing to its high chemical reactivity and excellent nucleophilic properties, sodium p-chlorophenolate serves as a valuable precursor for numerous substitution and condensation reactions in organic synthesis. In agrochemical manufacturing, this compound is of particular interest because it can be used directly or as an intermediate in the preparation of highly effective plant protection agents with improved physicochemical characteristics.

The synthesis of sodium p-chlorophenolate is based on the neutralization reaction between p-chlorophenol and sodium hydroxide. Although the reaction appears relatively simple, the quality of the resulting product is governed by several technological parameters, including the reagent ratio, alkali concentration, solution pH, reaction temperature, mixing intensity, and reaction time. Variations in these parameters may lead to incomplete neutralization, excess alkali, undesirable side reactions, reduced product purity, and lower process efficiency. Therefore, systematic optimization of the neutralization process is essential for obtaining a stable product with reproducible physicochemical properties while minimizing reagent consumption and energy requirements.

Among the operating variables, the molar ratio of sodium hydroxide to p-chlorophenol plays a decisive role in determining the extent of phenol deprotonation and the stability of the resulting sodium salt. Simultaneously, continuous monitoring of solution pH and reaction temperature provides valuable information regarding reaction progress and allows the identification of the optimum operating conditions. The exothermic nature of the neutralization reaction requires careful temperature control to prevent local overheating, maintain homogeneous reaction conditions, and improve product quality.

Although several studies have reported the synthesis of alkali metal phenolates, comprehensive investigations addressing the relationship between reagent composition, pH variation, and thermal behavior during the

neutralization of p-chlorophenol remain limited. In particular, quantitative determination of the optimum technological parameters required for efficient preparation of sodium p-chlorophenolate has received comparatively little attention. Consequently, further investigation is necessary to establish reliable process conditions suitable for both laboratory-scale synthesis and industrial implementation.

The objective of the present study was to determine the optimum neutralization conditions for preparing sodium p-chlorophenolate by reacting p-chlorophenol with a 40 wt.% sodium hydroxide solution. The influence of reagent composition on solution pH and reaction temperature was systematically investigated to establish the optimum technological parameters for efficient salt formation. The results obtained provide a scientific basis for process optimization and may contribute to the development of improved technologies for producing chlorophenol-based intermediates used in herbicidal and defoliant formulations.

MATERIALS AND METHODS

Analytical-grade sodium hydroxide (NaOH) and p-chlorophenol were used without further purification. A 40 wt.% aqueous sodium hydroxide solution was prepared and employed as the initial reaction medium. The neutralization experiments were carried out under atmospheric pressure in a glass reactor equipped with a mechanical stirrer and a digital thermometer. The reaction mixture was continuously stirred to ensure homogeneous distribution of the reactants and efficient heat transfer throughout the experiment.

Solid p-chlorophenol was gradually introduced into the sodium hydroxide solution in predetermined portions. After each addition, the reaction mixture was allowed to reach equilibrium before measuring the solution pH and temperature. The pH values were determined using a calibrated digital pH meter, while the reaction temperature was monitored continuously with an electronic temperature probe. The reagent composition was varied systematically to establish the

relationship between the amount of p-chlorophenol and the physicochemical parameters of the reaction system.The neutralization process proceeds according to the following reaction:

$$Cl–C_6H_4OH + NaOH \rightarrow Cl–C_6H_4ONa + H_2O$$

The obtained experimental data were used to determine the optimum technological conditions for sodium p-chlorophenolate formation by evaluating changes in solution pH and reaction temperature as functions of reagent composition.

RESULTS AND DISCUSSION

The experimental investigation demonstrated that the gradual addition of p-chlorophenol to the 40 wt.% sodium hydroxide solution significantly influenced both the pH and thermal behavior of the reaction system. Initially, the highly alkaline solution exhibited a pH of 13.56, reflecting the excess concentration of hydroxide ions. As the neutralization reaction progressed, hydrogen ions released from the phenolic hydroxyl groups reacted with hydroxide ions to form water, resulting in the continuous decrease of solution alkalinity. Consequently, the pH gradually declined from 13.56 to 5.90, indicating the progressive conversion of p-chlorophenol into its sodium salt.

Simultaneously, the reaction temperature changed considerably during the neutralization process. Because the reaction between sodium hydroxide and p-chlorophenol is exothermic, the temperature increased from the initial 25 °C to a maximum of approximately 78 °C immediately after the addition of the reactant. As the concentration of free sodium hydroxide decreased and the reaction approached completion, heat evolution diminished, leading to a gradual decrease in temperature until a stable range of 67–68 °C was established.

The combined analysis of pH and temperature clearly revealed the existence of an optimum reaction region. At a p-chlorophenol concentration of 60.01 wt.%, the reaction system attained a pH of 5.90 and a stable temperature

of 67–68 °C, corresponding to the optimum technological conditions for sodium p-chlorophenolate synthesis. Under these conditions, the neutralization reaction proceeded efficiently, providing complete salt formation while preventing excessive alkali consumption and minimizing the possibility of undesirable side reactions.

The observed correlation between reagent composition, pH variation, and thermal behavior confirms that accurate control of process parameters is essential for obtaining a product with stable physicochemical properties and high purity. Furthermore, the optimized neutralization conditions provide favorable operating parameters for subsequent crystallization, physicochemical characterization, and technological processing of sodium p-chlorophenolate. These findings may also serve as a scientific basis for scaling up the synthesis process and improving the production technology of chlorophenol-based intermediates intended for herbicide and defoliant formulations.

CONCLUSION

The optimum technological parameters for the preparation of the sodium salt of p-chlorophenol were established. The addition of p-chlorophenol to a 40 wt.% sodium hydroxide solution until the p-chlorophenol content reached 60.01 wt.% produced the most favorable conditions, with a solution pH of 5.90 and a reaction temperature of 67–68 °C. These parameters provide a scientific basis for improving the synthesis technology of herbicides and other biologically active compounds.

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STUDY OF THE OPTIMAL CONDITIONS FOR THE PREPARATION OF THE MONOETHANOLAMINE SALT OF p-CHLOROPHENOL

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Abstract.*This study investigated the optimal technological parameters for synthesizing the monoethanolamine salt of p-chlorophenol through a neutralization reaction with monoethanolamine. The effects of the reagent ratio, solution pH, and reaction temperature were evaluated. The results showed that an equimolar (1:1) interaction between p-chlorophenol and monoethanolamine provided the optimal conditions for product formation, yielding a solution with pH 6.58 at a reaction temperature of 79 °C. These findings provide a scientific basis for improving the synthesis technology of herbicides and other physiologically active compounds.*

Keywords.*p-chlorophenol, monoethanolamine, phenolate, neutralization, organic synthesis, herbicide, pH, technological parameters.*

INTRODUCTION

Modern herbicides and defoliants play an important role in increasing agricultural productivity and improving harvesting efficiency. The effectiveness of these products depends on the chemical nature, physicochemical properties, and synthesis technology of their active ingredients. Phenolic derivatives, particularly p-chlorophenol-based compounds, are widely used as intermediates in organic synthesis because of their high biological activity. The

monoethanolamine salt of p-chlorophenol exhibits good water solubility, chemical stability, and high reactivity, making it a promising intermediate for the preparation of herbicides, defoliants, and other biologically active substances.

MATERIALS AND METHODS

Chemically pure p-chlorophenol (98%) and monoethanolamine (98%) were used as starting materials. Monoethanolamine was placed in the reactor, and solid p-chlorophenol was added gradually. After each addition, the solution pH, temperature, and component ratios were measured.

The neutralization reaction is represented as:

$$Cl–C_6H_4OH + NH_2CH_2CH_2OH \rightarrow [NH_3CH_2CH_2OH]+[Cl–C_6H_4O]^-$$

RESULTS AND DISCUSSION

As the amount of p-chlorophenol increased, the pH of the solution gradually decreased from a strongly alkaline medium toward neutrality. Because the neutralization reaction was exothermic, the temperature increased from 25 °C to 79 °C, reaching its maximum near the equimolar composition. At 61.54 wt.% p-chlorophenol and 38.46 wt.% monoethanolamine, corresponding to a 1:1 molar ratio, the solution pH reached 6.58, which is within the recommended range for the synthesis of physiologically active compounds. A further increase in p-chlorophenol content lowered the pH to 5.51 and reduced the reaction temperature to 73 °C, indicating completion of the neutralization process.

CONCLUSION

The optimal technological conditions for synthesizing the monoethanolamine salt of p-chlorophenol were established. An equimolar (1:1) ratio of p-chlorophenol to monoethanolamine, solution pH of 6.58, and reaction temperature of 79 °C ensured complete neutralization, stable product formation, and favorable conditions for subsequent synthesis stages.

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YAQIN SHARQ MINTAQASIDAGI GEOSIYOSIY JARAYONLARNI O‘RGANISHGA OID YONDASHUVLAR

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Anotatsiya. *Ushbu maqolada Yaqin Sharq mintaqasidagi geosiyosiy jarayonlarni tahlil qilishning nazariy va metodologik asoslari yoritilgan. Mintaqaning geostrategik ahamiyati, tabiiy resurslarga boyligi hamda siyosiy va madaniy murakkabligi geosiyosiy tadqiqotlarda turli yondashuvlarni qo‘llash zaruratini yuzaga keltirishi asoslab berilgan. Tadqiqotda klassik geosiyosiy nazariyalar bilan bir qatorda konstruktivizm, geoiqtisodiy yondashuv va mintaqaviy tizimlar tahlilining mazmuni hamda ularning Yaqin Sharqdagi siyosiy jarayonlarni izohlashdagi imkoniyatlari tahlil qilingan. Shuningdek, identitet, diniy omillar, energetika resurslari, iqtisodiy manfaatlar va global hamda mintaqaviy kuchlar o‘rtasidagi raqobatning mintaqa geosiyosatiga ta’siri ochib berilgan. Natijada Yaqin Sharqdagi zamonaviy geosiyosiy jarayonlarni kompleks yondashuvlar asosida o‘rganish mintaqadagi siyosiy dinamikani chuqurroq anglash imkonini berishi xulosa qilinadi.*

Annotation. *This paper examines the theoretical and methodological approaches to the analysis of geopolitical processes in the Middle East. It argues that the region's geostrategic location, abundant energy resources, political complexity, and ethno-religious diversity require comprehensive analytical frameworks for understanding contemporary geopolitical developments. The study reviews both classical geopolitical theories and modern approaches, including constructivism, geoeconomics, and regional systems analysis, highlighting their explanatory value in interpreting political dynamics in the Middle East. Particular attention is paid to the role of identity, religious factors, strategic energy resources, economic interests, and the interaction between regional and global powers in shaping the geopolitical environment of the region. The paper concludes that an integrated theoretical*

approach provides a more comprehensive understanding of the complex geopolitical processes and evolving balance of power in the Middle East.

Kalit so'zlar: *Yaqin Sharq, geosiyosat, geostrategiya, konstruktivizm, geoiqtisodiy yondashuv, mintaqaviy tizimlar tahlili, identitet, energetika resurslari, global raqobat.*

Keywords: *Middle East, geopolitics, geostrategy, constructivism, geoeconomics, regional systems analysis, identity, energy resources, global competition.*

ASOSIY QISM

Yaqin Sharq mintaqasi qadimdan buyon global siyosiy jarayonlarning markazida bo‘lib kelgan hududlardan biri hisoblanadi. Uning geostrategik ahamiyati, tabiiy resurslarga boyligi, siyosiy-huquqiy tizimlaridagi murakkablik va madaniy-diniy xilma-xillik geosiyosiy tahlil uchun alohida nazariy yondashuvlarni shakllantirishga sabab bo‘lgan. Geosiyosiy jarayonlarni o‘rganishda nazariyaning o‘rni nihoyatda muhim, chunki aynan nazariy asoslar mintaqadagi siyosiy qarama qarshiliklar, kuch markazlari o‘rtasidagi raqobat, tashqi kuchlarning strategik manfaatlari va mahalliy omillarning o‘zaro bog‘liqligini chuqur anglashga imkon yaratadi.

Klassik geosiyosat nazariyasiga ko‘ra, mintaqa xalqaro kuchlar uchun strategik markaz sifatida baholanadi. Mahan, Makinder va Spykman kabi geosiyosatchilar tomonidan ilgari surilgan konsepsiyalar Yaqin Sharqning ahamiyatini belgilashda muhim bo‘lgan. Masalan, Makinderning “Heartland Theory” si [1. B-162-169] bo‘yicha, Yevrosiyo kengliklarida hukmronlik qilgan davlatlar global siyosiy ustunlikka erishishi mumkin. Garchi Yaqin Sharq bevosita “Heartland” hududiga kirmasa-da, uning yo‘l o‘tish hududi sifatidagi funksiyasi nazariy asosda ko‘p marotaba ta’kidlangan. Spykmanning “Rimland Theory”si [2. B-38-44] esa Yaqin Sharqni Yevrosiyo bo‘ylab cho‘zilgan strategik yoyning markazlaridan biri sifatida tasvirlaydi. Shu bois, mintaqa ustidan nazoratni qo‘lga kiritishga qaratilgan global raqobat tabiiy jarayon hisoblanadi. Zamonaviy geosiyosiy tahlilda esa faqat hududiy ustunlik yoki harbiy kuch emas, balki siyosiy tizimlar, iqtisodiy imkoniyatlar, ijtimoiy

dinamikalar hamda tashqi kuchlarning strategik manfaatlarini o‘zida mujassam etgan ko‘p qirrali yondashuvlar muhim o‘rin tutadi. Yaqin Sharqdagi geosiyosiy jarayonlarni izohlashda realizm, liberalizm, konstruktivizm, geoiqtisodiy yondashuvlar, mintaqaviy tizimlar tahlili va kompleks tahlilga asoslangan zamonaviy metodlar qo‘llanadi. Bularning har biri mintaqaning o‘ziga xos siyosiy arxitekturasi va tarixiy kontekstini hisobga olgan holda shakllangan bo‘lib, ularni qo‘llash Yaqin Sharqni chuqurroq anglashga imkon yaratadi.

Konstruktivizm XX asr oxiridan boshlab xalqaro munosabatlar nazariyasida alohida o‘rin egallay boshlagan. Bu yondashuvga ko‘ra, xalqaro siyosat faqat moddiy resurslar yoki harbiy kuch orqali emas, balki identitetlar, madaniy tasavvurlar, diniy qadriyatlar, ijtimoiy konstruksiyalar va siyosiy diskurslar orqali shakllanadi [3. B-391-410]. Yaqin Sharq kabi murakkab hududda konstruktivistik yondashuv ayniqsa samarali, chunki bu mintaqaning asosiy geosiyosiy jarayonlarini tushunish uchun diniy omillar, tarixiy xotira, etnik identitetlar va madaniy qadriyatlar markaziy o‘rin tutadi. Mintaqa mamlakatlarida identitet omillari siyosiy tizimlarning shakllanishi va rivojlanishida katta ta’sirga ega. Masalan, arab identiteti, islomiy birlik g‘oyasi, sunniy-shia qarama-qarshiligi, kurd etnik identifikatsiyasi yoki turk, fors, arab sivilizatsiyaviy o‘zligini anglash kabi omillar siyosiy qarorlar qabul qilinishi jarayoniga bevosita ta’sir qiladi [4. B-61]. Bu omillar nafaqat mahalliy siyosatni, balki tashqi siyosiy orientatsiyani ham belgilab beradi. Masalan, Saudiya Arabistoni va Eron o‘rtasidagi raqobat faqat geosiyosiy va iqtisodiy manfaatlar bilan emas, balki mazhabiy identitet ziddiyatlari bilan ham izohlanadi. Shuningdek, konstruktivistik yondashuv Yaqin Sharqdagi siyosiy tizimlarni “G‘arb Sharq”, “diniy-sekulyar”, “arab-noarab”, “millat-ummah” kabi qarama-qarshi identitetlar tizimi orqali tahlil qiladi. Bu qarama-qarshi tasavvurlar natijasida shakllangan siyosiy diskurslar mamlakatlarning ichki barqarorligiga, mintaqaviy ittifoqlar va raqobatlarga, hatto xalqaro miqyosdagi hamkorlik jarayonlariga ta’sir ko‘rsatadi. Misol tariqasida, “Arab bahori” jarayonlari

mintaqadagi identitetlar qayta shakllanishi va siyosiy tasavvurlar o‘zgarishi bilan bog‘liq bo‘lib, konstruktivizm ularni chuqurroq anglashga imkon beradi. Shunday qilib, konstruktivistik yondashuv Yaqin Sharq geosiyosatini faqat kuchlar muvozanati yoki iqtisodiy manfaatlar bilan emas, balki ma’naviy, madaniy va ijtimoiy tasavvurlar bilan izohlashga yordam beradi. Bu yondashuv mintaqadagi nizolarni faqat moddiy resurslar talashuvi sifatida emas, balki tarixiy xotira, diniy fikrlash, milliy identitet va siyosiy diskurslarning to‘qnashuvi sifatida ko‘rishga imkon yaratadi.

Geoiqtisodiy yondashuv Yaqin Sharqni o‘rganishda eng dolzarb metodlardan biridir, chunki mintaqa dunyodagi eng yirik neft va gaz zaxiralariga ega bo‘lib, global energetika bozori uchun strategik ahamiyat kasb etadi. Bu resurslar neft eksportiga tayanadigan davlatlar siyosatini belgilabgina qolmay, balki tashqi kuchlarning mintaqaga bo‘lgan geosiyosiy qiziqishini kuchaytiradi. Shuning uchun geoiqtisodiy yondashuv Yaqin Sharqdagi siyosiy jarayonlarni energiya resurslari, iqtisodiy modernizatsiya, mintaqaviy iqtisodiy integratsiya va global iqtisodiy manfaatlar kontekstida tahlil qiladi. Mintaqa davlatlari o‘rtasidagi iqtisodiy raqobat ko‘p jihatdan energiya siyosati bilan bog‘liq. Saudiya Arabistoni, Qatar, BAA, Eron, Iroq kabi neftga boy mamlakatlar nafaqat energiya eksportida, balki global narxlar shakllanishida ham muhim o‘yinchilardir. Bundan tashqari, energiya siyosati orqali siyosiy ittifoqlar mustahkamlanadi yoki zaiflashadi. Masalan, OPEK va OPEK+ kabi tashkilotlar iqtisodiy manfaatlarga asoslangan bo‘lsa-da, ular ko‘p hollarda geosiyosiy qarorlar bilan chambarchas bog‘liqdir. Geoiqtisodiy yondashuv shuningdek, mintaqadagi iqtisodiy transformatsiyalarni ham o‘rganadi. Saudiya Arabistonining “Vision 2030” strategiyasi, BAAning diversifikatsiya siyosati, Turkiyaning eksportga yo‘naltirilgan iqtisodiy modeli yoki Isroilning texnologik rivojlanish strategiyasi geosiyosiy va iqtisodiy omillarning o‘zaro uyg‘unlashuvini ko‘rsatadi. Bu jarayonlar iqtisodiy raqobatni keltirib chiqarib, mintaqaviy kuchlar balansini shakllantiradi. Energetika resurslari Yaqin Sharq

siyosatida strategik qurol sifatida ham ishlatiladi. Masalan, neft narxini pasaytirish yoki ko‘tarish orqali ayrim davlatlar raqib mamlakatlarning iqtisodiga bosim o‘tkazishi mumkin. Shu bilan birga, mintaqa davlatlari o‘rtasidagi investitsiya oqimlari, infratuzilma loyihalari, portlar va logistika yo‘laklari ustidan nazorat ham geoiqtisodiy raqobatning muhim qismidir.

Mintaqaviy tizimlar tahlili Yaqin Sharq geosiyosiy jarayonlarini tushunishda muhim nazariy-metodologik yondashuvlardan biri bo‘lib, u mahalliy davlatlar va global kuchlarning o‘zaro ta’sirini tahlil qiladi. Yaqin Sharqda mintaqaviy tizimning murakkabligi quyidagi omillar bilan belgilanadi:

1. Mahalliy kuch markazlari - Saudiya Arabistoni, Eron, Turkiya, Isroil, Misr.

2. Global kuchlar ishtiroki - AQSH, Rossiya, Xitoy va Yevropa davlatlari.

3. Sub-mintaqaviy tizimlarning mavjudligi - Fors ko’rfazi, Sharqiy O‘rta Yer dengizi, Levant, Shimoliy Afrika.

4. Ko‘p qatlamli ittifoqlar - diniy, siyosiy, iqtisodiy va harbiy asosdagi ittifoqlar.

Mintaqaviy tizimlar tahlili bo‘yicha Yaqin Sharq “raqobat maydoni” sifatida baholanadi. Global kuchlar mintaqadagi o‘z manfaatlarini ilgari surar ekan, mahalliy davlatlar esa ularning ta’siridan foydalanib yoki unga qarshi siyosiy strategiyalar ishlab chiqadi. Masalan, Suriya mojarosida global va mintaqaviy kuchlar bir necha frontlarda to‘qnash kelgan: Rossiya-AQSH raqobati, Saudiya Arabistoni-Eron raqobati, Turkiya-kurd kuchlari qarama-qarshiligi va Isroilning xavfsizlik manfaatlari. Bundan tashqari, mintaqaviy tizimlar tahlili “kuch bo‘shliqlari” nazariyasiga asoslanadi. Davlatning markaziy hokimiyati zaiflashgan hududlarda tashqi kuchlar bevosita o‘z faoliyatini kuchaytiradi. Iroq, Suriya, Yaman va Liviyada kuzatilgan holatlar bunga yorqin misoldir. Bu jarayonlar davlatlararo munosabatlarni murakkablashtiribgina qolmay, balki mintaqaviy beqarorlikni kuchaytiradi. Shuningdek, mintaqa

ichidagi ittifoqlar ham juda o‘zgaruvchan xarakterga ega bo‘lib, ular ko‘p hollarda qisqa muddatli manfaatlarga asoslanadi. Masalan, Isroil va ayrim Fors ko’rfazi davlatlari o‘rtasidagi munosabatlarning yaxshilanishi Eronning mintaqadagi roliga qarshi qaratilgan strategik ittifoq shakllanishi bilan bog‘liq [5. B-21]. Bu esa mintaqaviy tizimlarning dinamik va o‘zgaruvchan ekanligini ko‘rsatadi.

XULOSA

Xulosa qilib aytganda, Yaqin Sharq mintaqasi geostrategik joylashuvi, tabiiy resurslarga boyligi, siyosiy jarayonlarining murakkabligi hamda etnik va diniy xilma-xilligi bilan zamonaviy geosiyosatning eng muhim tadqiqot obyektlaridan biri hisoblanadi. Mazkur mintaqadagi geosiyosiy jarayonlarni to'liq anglash uchun klassik geosiyosiy nazariyalar bilan bir qatorda zamonaviy nazariy va metodologik yondashuvlardan ham kompleks foydalanish zarur. Tahlillar shuni ko'rsatadiki, konstruktivistik yondashuv identitet, tarixiy xotira va diniy omillarning siyosiy qarorlar qabul qilinishidagi o'rnini ochib bersa, geoiqtisodiy yondashuv energetika resurslari, iqtisodiy manfaatlar va global raqobatning mintaqadagi siyosiy jarayonlarga ta'sirini izohlash imkonini beradi. Mintaqaviy tizimlar tahlili esa mahalliy va global kuchlar o'rtasidagi o'zaro ta'sir, ittifoqlar hamda raqobatning murakkab mexanizmlarini tizimli ravishda tushuntirishga xizmat qiladi. Shu bois, Yaqin Sharqdagi zamonaviy geosiyosiy jarayonlarni tahlil qilishda mazkur yondashuvlarni o'zaro uyg'un holda qo'llash mintaqadagi siyosiy dinamikani, kuchlar muvozanatini va xavfsizlik muhitining o'zgarishlarini chuqurroq anglash imkonini beradi. Bu esa nafaqat nazariy tadqiqotlarni rivojlantirish, balki mintaqaga oid amaliy siyosiy tahlillar va strategik qarorlar ishlab chiqishda ham muhim ilmiy-metodologik asos bo'lib xizmat qiladi.

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MICROPROPAGATION OF HALOPHYTIC CHENOPODIACEAE FROM THE ARAL SEA REGION AND FREE AMINO ACID CONTENT IN *ATRIPLEX* REGENERANTS

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Abstract. *This study focuses on the in vitro micropropagation of selected halophytic species belonging to the Chenopodiaceae (Amaranthaceae) family, collected from ecologically diverse and arid regions of Uzbekistan the drained Aral Sea zone (Muynak district). The primary objective was to establish sterile cultures, optimize the growth conditions, and evaluate the regenerative capacity and biomass accumulation of these salt-tolerant plants under controlled laboratory conditions.*

Sterile explants were obtained from seedlings germinated on Murashige and Skoog (MS) media supplemented with kinetin, BAP, or without growth regulators. Under these conditions, active germination was observed as early as days 3–6 of cultivation. The application of auxins and their combinations with kinetin, as well as 6-BAP-excluding media containing NAA - induced shoot regeneration across most annual halophyte species during both initial and subsequent subcultures. This led to a significant increase in explant proliferation and plant biomass production.

Key words: *in vitro, halophytes, explant, sterilization, cytokinins, auxins, propagation, regenerants.*

1. INTRODUCTION

In the desert regions of Uzbekistan, the leading environmental stressors include an arid, sharply continental climate, high salinity levels in water and soil, pollution, and a shortage of potable water resources, as well as widespread desertification of formerly productive lands [1]. These issues are particularly severe in the Aral Sea region, where the degradation of environmental conditions has been driven by a combination of natural and anthropogenic factors. This has led to a dramatic decline in sea levels and the frequent occurrence of dust and salt storms arising from the desiccated seabed.

Salinized soils are unsuitable for conventional agricultural crops, resulting in reduced productivity and economic losses in land management. However, certain promising halophytic species demonstrate high ecological adaptability and offer potential for the rehabilitation of saline lands and the establishment of specialized plantations. Halophytes serve as an important biological resource for agriculture, environmental restoration, and even medicinal applications [2; 3].

Many representatives of the *Chenopodiaceae* family are key edificators of halophytic vegetation in Uzbekistan. Modern scientific strategies for the sustainable use of plant resources in arid zones are closely linked to the development of plant biotechnology. In this context, the development of in vitro techniques for large-scale production of genetically stable microplants is of particular interest. This includes obtaining sterile and pathogen-free starting material suitable for regeneration, and optimizing micropropagation conditions to promote shoot development and root system formation [4].

Due to the extreme natural habitat of these species, successful in vitro introduction requires more intensive and multi-step sterilization protocols to eliminate microbial contamination.

2. Materials and Methods.

The study focused on long-vegetating halophytic species of the genera *Climacoptera*, *Atriplex*, *Suaeda*, *Halocnemum*, and various species of *Salsola*, collected in 2024 from the southern Aral Sea region, Republic of Karakalpakstan (Uzbekistan).

To establish *in vitro* cultures, both seeds and seedlings were used as explants.

The in vitro introduction process was divided into two main stages:

a) Sterilization (Decontamination)**:** Plant material was treated with strong sterilizing agents to eliminate bacterial and fungal contamination and to obtain sterile explants.

b) Cultivation**:** The sterilized explants were cultured under standard in vitro conditions using agar-solidified nutrient media, following well-established protocols in plant biotechnology. At the end of each subculture (passage), the developmental responses of explants were recorded and analyzed [5; 6].

Analysis of free amino acids. The isolation of free amino acids was carried out as follows: the dried plant material was extracted with water (hydraulic ratio 1/10) with constant stirring for 8 hours at room temperature. Proteins and peptides were precipitated from the aqueous extract by adding an equal volume of 10% TCA. After 10 min, the precipitate was separated by centrifugation at 8000 rpm. 0.1 ml of the supernatant was freeze-dried. Determination of free amino acids in the form of their PTC derivatives was carried out by the method of Steven A. and Cohen Daviel J [7].

3 Results and Discussion

3.1. Micropropagation of promising species of the family *Chenopodiaceae* under conditions *in vitro*.

At the initial stage of disinfection, a 70% ethanol solution was applied for one minute. This was followed by the main phase of seed treatment, during

which such parameters as reagent concentration and exposure time were optimized based on preliminary experiments. A variety of reagents were tested during the study, including Diacid, mercuric chloride, soap solutions, ethanol at different concentrations (70%, 75%, and 96%), and various dilutions of bleach solution (ratios of bleach to water: 1:10 and 1:20).

Subsequently, the treated material was transferred onto a specified nutrient medium. Analysis of experimental results revealed that the proportion of plants free from endogenous microbial contamination varied depending on the species. Some species exhibited minimal internal microbial presence, resulting in a high percentage of sterile plants-ranging from 60% to 90%.

In this context, detailed optimization of growth regulator concentrations was conducted for in vitro cultures of plant species such as *Climacoptera*, *Atriplex*, *Suaeda*, *Halocnemum*, and *Salsola*. It is important to highlight that members of the *Chenopodiaceae* family showed a positive response to the introduction of growth stimulators.

For the first subculture, the optimal conditions were full-strength MS; for the second, ½ MS supplemented with 0.5 mg/L 6-benzylaminopurine (BAP) and 0.3 mg/L indole-3-butyric acid (IBA). To increase the number of regenerants, the following combinations were tested: ½ MS + 0.5 mg/L BAP + 0.5 mg/L kinetin (Kin) and ½ MS + 0.5 mg/L BAP + 0.3 mg/L IBA.

The stunted growth observed in seedlings from the Muynak region is likely due to their adaptation to extreme environmental conditions, which may result in lower nutrient demand during microshoot development. For the continued growth of microshoots, a suitable medium was ½ MS supplemented with 0.5 mg/L BAP and 0.5 mg/L Kin, where the mortality rate of regenerants ranged from 12.1% to 28.7%.

Interestingly, optimal germination of aseptic seeds and formation of primary root systems in the studied species occurred under two conditions: ½ MS supplemented with 0.5 mg/L BAP + 0.3 mg/L IBA (60%) and hormone-free

MS (90%). These media significantly stimulated in vitro seedling propagation. In contrast, species such as *Halocnemum* and *Salsola* required longer periods and higher hormone doses: initial shoot emergence was observed on day 10 after sowing, while complete leaf formation occurred within the next 7–10 days.

For the induction of rhizogenesis in rooting experiments with all studied species of the *Chenopodiaceae* family, IBA at a concentration of 0.1 mg/L was shown to be optimal, with root induction ranging from 8% to 30%. However, increasing the IBA concentration to 0.3 mg/L improved rooting efficiency up to 97%. Nonetheless, at 0.1 mg/L IBA, roots appeared earlier and in greater numbers, making the concentration range of 0.1–0.3 mg/L IBA optimal for rhizogenesis in the studied halophytes.

3.2. Free amino acid composition of regenerant plants of *Atriplex* L. species.

It should be noted that, for many valuable halophytes, the characterization of amino acid composition remains insufficiently developed by current standards. Therefore, the development of advanced molecular biological approaches for the investigation of medicinal and forage halophyte species is of high relevance. Under experimental *in vitro* conditions, amino acid content showed only minor differences among all studied species. In the studied species of the genus Atriplex, 20 free amino acids were identified, of which 10 are essential - threonine, arginine, tyrosine, valine, methionine, isoleucine, histidine, tryptophan, phenylalanine, lysine, leucine. However, the addition of elevated NaCl concentrations to the culture medium resulted in altered accumulation dynamics and a twofold increase in proline content. The studied *Atriplex* species are of considerable scientific and ecological interest, which allows them to be regarded as promising candidates for cultivation in the Aralkum region [8].

4.CONCLUSION.

Thus, as a result of the conducted studies, it was determined that seeds of the studied halophyte species from the *Chenopodiaceae* family, when placed on

media supplemented with kinetin, as well as on media containing BAP or MS without hormones, germinated actively within 3 to 6 days of cultivation. Their high salt tolerance enables these halophytes to successfully survive under conditions of elevated salinity, making them promising candidates for use in restoration and land-reclamation projects in arid, desert, and saline regions of the Republic of Uzbekistan.

Acknowledgements.

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LAZER IMPULSLARINI SHAKLLANTIRISH USULLARINING ZAMONAVIY HOLATI

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Annotatsiya: *Bu maqolada lazer impulslarini shakllantirish usullari ko'rib chiqiladi. Ishning maqsadi — impuls shakllantirishning fizik asosini tushuntirish va bugungi kunda qo'llanilayotgan texnologiyalarni bir joyga jamlash. Avval Furye sintezi g'oyasi va 4f optik sxema tushuntiriladi. Keyin asosiy texnologiyalar — suyuq kristalli fazoviy yorug'lik modulyatori (SLM), akusto-optik dasturlashtiriladigan dispersiv filtr (AOPDF), raqamli mikroko'zgu qurilmasi (DMD), nochiziqli metayuza va ko'p o'tishli katak (multi-pass cell) — qiyoslanadi.*

Kalit so'zlar: *lazer impulsi, impuls shakllantirish, spektral faza, 4f sxema, fazoviy yorug'lik modulyatori, akusto-optik filtr, metayuza, moslashuvchan optika.*

Abstract: *This article reviews methods for laser pulse shaping. The aim of the study is to explain the physical principles of pulse shaping and to provide a comprehensive overview of the technologies currently used in this field. First, the concept of Fourier synthesis and the operating principle of the 4f optical configuration are introduced. Then, the main pulse-shaping technologies—including the Spatial Light Modulator (SLM), the Acousto-Optic Programmable Dispersive Filter (AOPDF), the Digital Micromirror Device (DMD), nonlinear metasurfaces, and the multi-pass cell (MPC)—are comparatively analyzed.*

Keywords: *laser pulse, pulse shaping, spectral phase, 4f optical system, Spatial Light Modulator (SLM), Acousto-Optic Programmable Dispersive Filter (AOPDF), metasurface, adaptive optics.*

KIRISH

Qisqa lazer impulslari spektroskopiya, tibbiyot, materiallarga ishlov berish va optik aloqa tizimlarida keng qo‘llaniladi. Biroq lazer hosil qiladigan impuls shakli har doim ham amaliy vazifalar talabiga mos kelmaydi. Shu sababli impulsning vaqt bo‘yicha shaklini boshqarish, ya'ni impuls shakllantirish zamonaviy fotonikaning muhim yo‘nalishlaridan biri hisoblanadi.

Impuls shakllantirish impulsning spektral tarkibidagi alohida komponentlarning fazasi va amplitudasini boshqarishga asoslanadi. Bu usul yordamida turli amaliy masalalar uchun zarur bo‘lgan impuls shakllarini hosil qilish mumkin. So‘nggi yillarda ushbu yo‘nalishda metayuzalar asosidagi shakllantirgichlar, sun'iy intellekt yordamida optimallashtirish usullari hamda ko‘p o‘tishli kataklar orqali impulslarni siqish texnologiyalari jadal rivojlanmoqda. Mazkur maqolada ushbu zamonaviy yondashuvlar tahlil qilinadi.

1. IMPULS SHAKLLANTIRISHNING FIZIK ASOSI

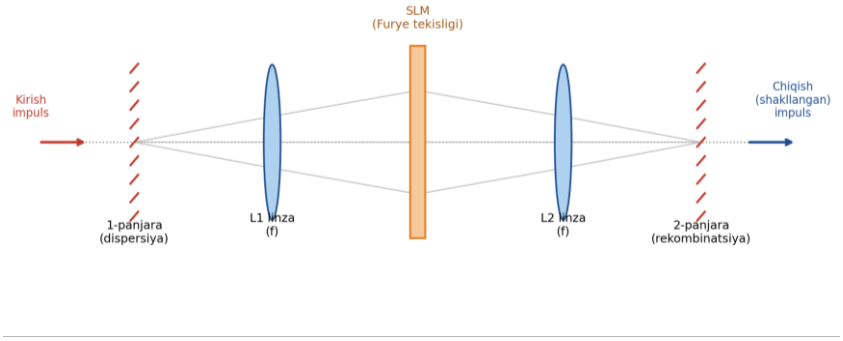
1.1. Furye sintezi g'oyasi

Qisqa lazer impulsi turli chastotali spektral komponentlarning ma'lum fazada qo‘shilishidan hosil bo‘ladi. Ushbu komponentlarning fazasi yoki amplitudasi o‘zgartirilganda impulsning vaqt bo‘yicha shakli ham o‘zgaradi. Bu jarayon vaqt va chastota sohalari o‘rtasidagi Furye almashtirishi orqali tavsiflanadi.

Impuls shakllantirishda chiqish spektri $\mathbf{E_{out}(\omega) = E_{in}(\omega) \cdot H(\omega)}$ ko‘rinishida ifodalanadi. Bu yerda $\mathbf{H(\omega)}$ spektral niqob funksiyasi bo‘lib, amplituda va fazani boshqaradi. Mazkur funksiyani mos tanlash orqali chiqish impulsining vaqt bo‘yicha shaklini kerakli ko‘rinishga keltirish mumkin.

1.2. 4f optik sxema

Amaliyotda spektral niqob funksiyasini qo‘llash uchun impulsning turli chastota komponentlarini fazoda ajratish talab etiladi. Buning uchun odatda **4f optik sxemasi** qo‘llaniladi (1-rasm).

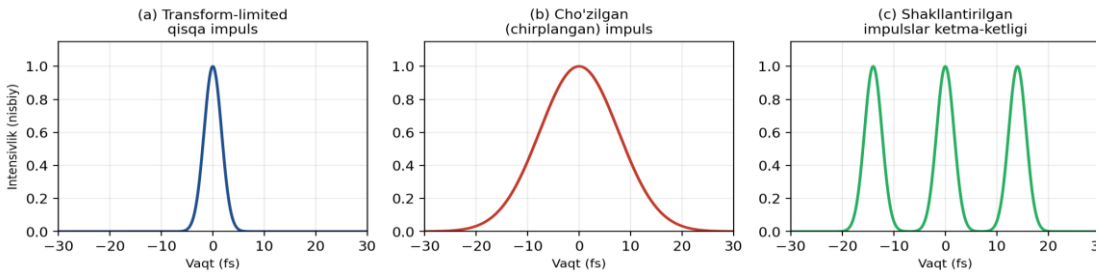


1-rasm. To’rt linzali (4f) impuls shakllantirgichning optik sxemasi

4f optik sxemasi ikkita difraksion panjara va ikkita linzadan tashkil topgan. Birinchi panjara impuls spektrini fazoda ajratadi, Furye tekisligida joylashgan shakllantiruvchi element esa har bir spektral komponentning fazasi va amplitudasini boshqaradi. Shundan so‘ng ikkinchi linza va panjara barcha komponentlarni qayta birlashtirib, kerakli shakldagi impulsni hosil qiladi.

1.3. Impulsni tavsiflovchi asosiy kattaliklar

Impuls sifatini baholashda transform-limited impuls, chirp va dispersiya asosiy ko‘rsatkichlar hisoblanadi. Transform-limited impuls berilgan spektr uchun eng qisqa impuls bo‘lsa, chirp impuls ichida chastotaning vaqt bo‘yicha o‘zgarishini ifodalaydi.



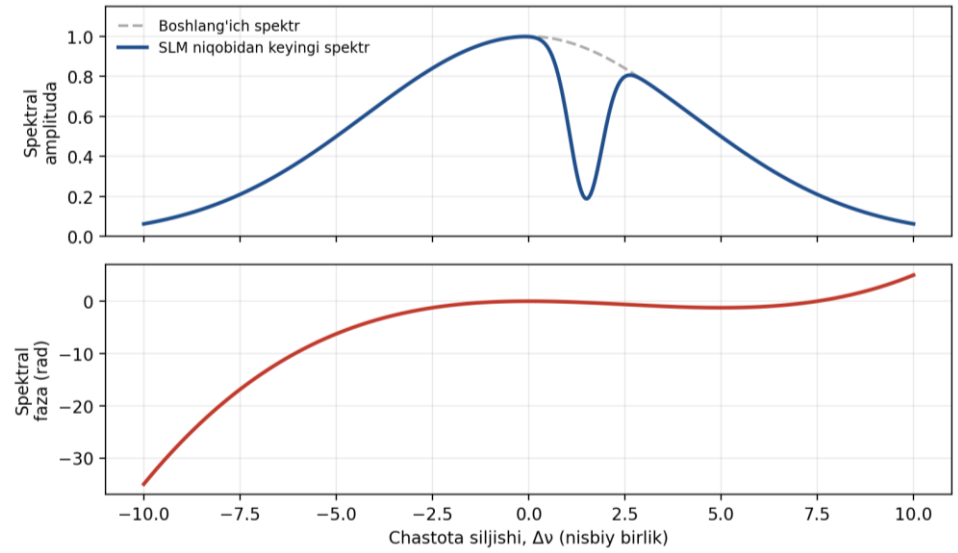
2-rasm.

Spektral faza va amplituda modulyatsiyasi orqali olinadigan turli impuls shakllari: (a) eng qisqa transform-limited impuls, (b) cho'zilgan (chirplangan) impuls, (c) bir nechta sub-impulsdan iborat ketma-ketlik.

Guruh kechikish dispersiyasi (GDD) va uchinchi tartibli dispersiya (TOD) impulsning cho‘zilishi hamda shaklining buzilishiga ta'sir ko‘rsatadi. Shuning

uchun impuls shakllantirishda spektral fazaning turli tartibli hadlarini boshqarish muhim ahamiyatga ega.

Spektral niqob amplituda va faza qismlaridan iborat. Amplituda niqobi ayrim spektral komponentlarning intensivligini boshqaradi, faza niqobi esa ularning nisbiy fazasini o‘zgartirib, impulsning cho‘zilishi, siqilishi yoki shaklining o‘zgarishini ta'minlaydi (3-rasm).



3-rasm.

SLM asosidagi impuls shakllantirgichda qo'llaniladigan spektral amplituda va faza niqoblariga misol

2. IMPULS SHAKLLANTIRISH TEXNOLOGIYALARI

2.1. Suyuq kristalli fazoviy yorug'lik modulyatori (LC-SLM)

Suyuq kristalli fazoviy yorug‘lik modulyatori (LC-SLM) impuls shakllantirishda eng keng qo‘llaniladigan qurilmalardan biridir. U alohida boshqariladigan piksellardan tashkil topgan bo‘lib, har bir piksel yorug‘likning fazasini mustaqil o‘zgartiradi. LC-SLM yuqori aniqlikni ta'minlasa-da, yangilanish tezligining nisbatan pastligi uning tezkor jarayonlarda qo‘llanishini cheklaydi.

2.2. Akusto-optik dasturlashtiriladigan dispersiv filtr (AOPDF)

Akusto-optik dasturlanuvchi dispersiv filtr (AOPDF, **Dazzler**) akustik to‘lqin yordamida optik impulsning fazasi va amplitudasini boshqaradi. Ushbu qurilma har bir impuls uchun tezkor qayta sozlanish imkoniyatiga ega bo‘lib, ayniqsa lazer kuchaytirgichlarida spektrning torayishini (gain narrowing) kompensatsiya qilishda keng qo‘llaniladi.

2.3. Raqamli mikroko'zgu qurilmasi (DMD)

Raqamli mikrozarrali qurilma (DMD) ko‘plab mikroko‘zgulardan tashkil topgan bo‘lib, asosan impuls amplitudasini boshqarishda qo‘llaniladi. Uning asosiy afzalligi yuqori yangilanish tezligi va nisbatan arzonligi bo‘lsa, fazani bevosita boshqarish imkoniyati cheklangan.

2.4. Nochiziqli metayuzalar

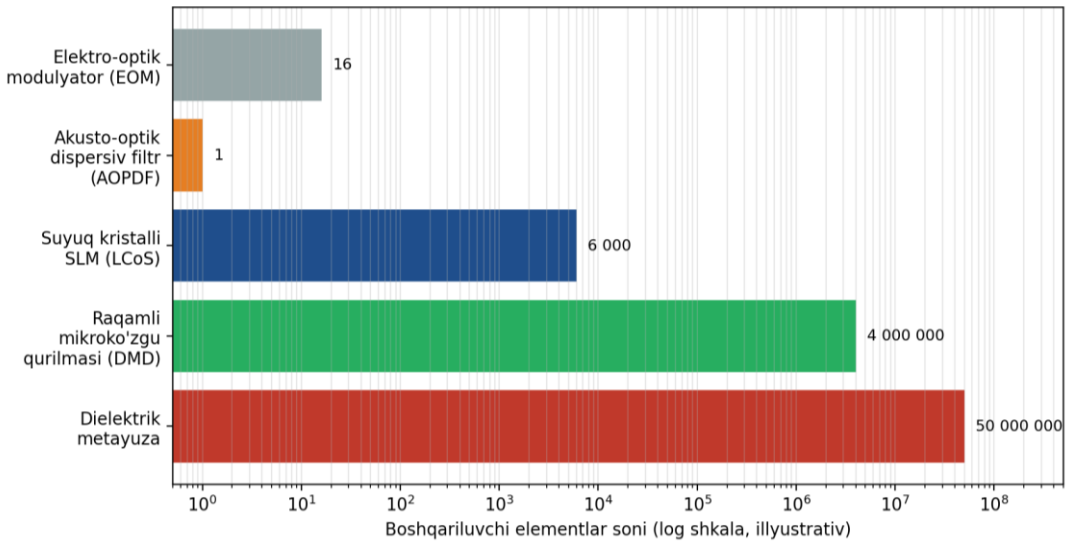
Metayuzalar asosidagi impuls shakllantirgichlar so‘nggi yillarda istiqbolli texnologiyalardan biriga aylandi. Ular yorug‘likning fazasi va amplitudasini nanostrukturalar yordamida boshqarib, impulsni yuqori aniqlikda shakllantirish imkonini beradi. Metayuzalarning asosiy afzalliklari ixchamligi, yuqori optik barqarorligi va fazoviy aniqligi bo‘lsa, ularning asosiy cheklovi real vaqt rejimida qayta dasturlash imkoniyatining cheklanganligidir.

2.5. Ko'p o'tishli katak orqali impulsni siqish

Ultrashort impulslarni olishda ko‘p o‘tishli katak (MPC) usuli keng qo‘llaniladi. Bu usulda impuls bir necha marta nochiziqli muhitdan o‘tkazilib, uning spektri kengaytiriladi, so‘ng dispersiya kompensatsiyasi yordamida bir necha fentosekundgacha siqiladi. So‘nggi yillarda MPC texnologiyasi yuqori energiyali ultrashort impulslarni olishda samarali usul sifatida o‘zini namoyon etdi. Ko‘rib chiqilgan impuls shakllantirish texnologiyalarining qiyosiy tavsifi 1-jadvalda, ularning boshqarish imkoniyatlari esa 4-rasmda keltirilgan.

1-jadval. *Impuls shakllantirish texnologiyalarining qiyosiy tavsifi.*

Texnologiya	Boshqariladigan parametr	Yangilanish tezligi	Asosiy afzalligi
LC-SLM	Faza, amplituda, qutblanish	Sekund atrofida (~10–100 Hz)	Yuqori spektral aniqlik, keng qo'llanilgan
AOPDF (Dazzler)	Faza, amplituda	Har bir impuls uchun (kHz gacha)	Har bir impulsni alohida sozlash imkoniyati
DMD	Amplituda (ikkilik)	Juda yuqori (~kHz–MHz)	Tez ishlaydi, narxi past
Nochiziqli metayuza	Faza, amplituda, qutblanish	Statik (loyihalash bosqichida belgilanadi)	Yupqa, yuqori quvvatga chidamli, yuqori aniqlik
Ko'p o'tishli katak (MPC)	Spektrni kengaytirish va siqish	Doimiy (lazer bilan sinxron)	Millijoul darajasidagi impulsni fentosekundgacha siqadi



4-rasm

Turli impuls shakllantirish texnologiyalarida spektral boshqarish elementlari sonining taqqoslanishi (log shkala, illyustrativ qiymatlar).

XULOSA

Lazer impulsini shakllantirish — bu fizikaning amaliy va qiziqarli yo'nalishi. Uning asosida oddiy g'oya yotadi: impulsning har bir spektral qismini alohida boshqarish. Bu g'oya 4f optik sxema orqali amalga oshiriladi va turli texnologiyalar — SLM, AOPDF, DMD, metayuza va ko'p o'tishli katak — orqali

qo'llaniladi. Har bir texnologiyaning o'z afzalligi va cheklovi bor, shu sababli tanlov aniq vazifaga bog'liq. So'nggi yillarda metayuzalar va sun'iy intellekt asosidagi usullar sohani yangi bosqichga olib chiqdi. Kelgusida bu ikki yo'nalish — yangi materiallar va aqlli algoritmlar — birgalikda rivojlanib, impuls shakllantirishni yanada tez, aniq va avtonom qiladi deb kutish mumkin.

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МОДЕРНИЗАЦИЯ ЦИКЛОННЫХ СЕПАРАТОРОВ НА ОСНОВЕ УПРАВЛЕНИЯ ВИХРЕВОЙ СТРУКТУРОЙ ПОТОКА ДЛЯ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ УЛАВЛИВАНИЯ МЕЛКОДИСПЕРСНЫХ ЧАСТИЦ

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Аннотация: *В работе рассмотрены проблемы эффективности циклонных сепараторов при очистке газа от мелкодисперсных частиц. Выполнен анализ недостатков традиционных конструкций, связанных с повторным уносом частиц, коротким замыканием потока и нестабильностью вихревой структуры. Предложена модернизация циклона, включающая предварительную закрутку потока, оптимизацию выходного патрубка и установку конической вставки. Показано, что комплексный подход позволяет повысить эффективность сепарации без существенного увеличения гидравлического сопротивления.*

Abstract: *The paper addresses the limitations of cyclone separators in fine particle removal. The shortcomings of conventional designs related to re-entrainment, short-circuit flow, and vortex instability are analyzed. A модернизация concept is proposed, including inlet swirl generation, vortex finder optimization, and a conical insert in the hopper. The integrated approach is shown to improve separation efficiency without significant pressure drop increase.*

Ключевые слова: *циклонный сепаратор, вихревой поток, эффективность сепарации, vortex finder, гидродинамика.*

Keywords: *cyclone separator, vortex flow, separation efficiency, vortex finder, fluid dynamics.*

ВВЕДЕНИЕ

Циклонные сепараторы широко применяются в системах очистки газа благодаря своей конструктивной простоте, надежности и способности

функционировать в широком диапазоне рабочих условий. Однако эффективность традиционных циклонов существенно снижается при улавливании мелкодисперсных частиц, особенно в диапазоне 5–10 мкм. Это ограничение обусловлено особенностями движения частиц в вихревом потоке, где доминирующую роль играют аэродинамические силы и турбулентные пульсации.

Современные исследования показывают, что структура потока внутри циклона представляет собой сложную систему двойного вихря, где взаимодействуют нисходящий и восходящий потоки. При этом значительная часть частиц может не достигать стенок аппарата, а также повторно вовлекаться в поток после осаждения. Эффективность циклонных сепараторов резко снижается при уменьшении размера частиц вследствие снижения инерционных сил [1, с. 35].

Дополнительной проблемой является короткое замыкание потока, при котором часть газа проходит напрямую в выходной патрубок, минуя зону интенсивного закручивания. Таким образом, актуальной задачей является разработка методов повышения эффективности циклонных аппаратов за счёт управления гидродинамической структурой потока.

МАТЕРИАЛЫ И МЕТОДЫ ИССЛЕДОВАНИЯ

В рамках настоящего исследования предложен комплексный подход к модернизации циклонного сепаратора, основанный на управлении вихревым потоком на различных этапах движения газа. В отличие от традиционных методов, рассматривающих отдельные элементы конструкции, в данной работе реализуется системная оптимизация геометрии циклона.

Первым элементом модернизации является установка направляющих лопаток на входе в циклон, обеспечивающих предварительную закрутку потока. Это позволяет увеличить

тангенциальную составляющую скорости и, как следствие, центробежную силу, действующую на частицы.

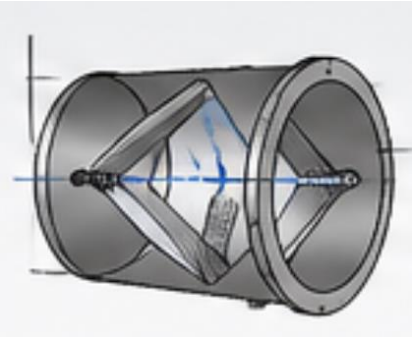

Рисунок 1. Модуль предварительной закрутки (направляющие лопатки).

Вторым элементом является оптимизация геометрии выходного патрубка (vortex finder), включая регулирование его диаметра и глубины погружения. Известно, что изменение этих параметров оказывает существенное влияние на структуру вихря и распределение скоростей внутри циклона. Глубина погружения выходной трубы оказывает значительное влияние на эффективность разделения и перепад давления [2, с. 55].



Рисунок 2. Выходной патрубок (Vortex Finder).

Третьим элементом является установка конической вставки в нижней части циклона, предназначенной для подавления повторного уноса частиц. Данный элемент изменяет структуру восходящего потока и препятствует вовлечению осевших частиц.

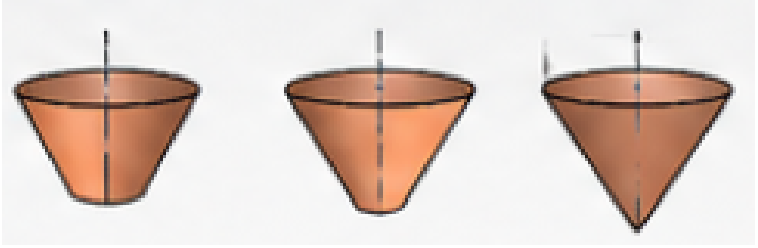

Рисунок 3. Коническая вставка в бункере.

Физическая модель процесса основана на балансе сил, действующих на частицу в вихревом потоке. Центробежная сила определяется выражением:

$$F_c = \frac{mv_\theta^2}{r}$$

где v_θ— тангенциальная скорость, r— радиус вращения. Сопротивление среды определяется законом Стокса:

$$F_d = 3\pi\mu d_p v$$

где d_p— диаметр частицы, μ— динамическая вязкость газа.

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЯ

Проведённый анализ показывает, что предложенная модернизация оказывает комплексное влияние на структуру потока внутри циклона. Предварительная закрутка приводит к увеличению тангенциальной скорости, что способствует более интенсивному перемещению частиц к стенкам аппарата. Одновременно оптимизация выходного патрубка позволяет снизить короткое замыкание потока и увеличить время пребывания частиц в зоне сепарации.

Особое значение имеет коническая вставка, которая существенно снижает эффект повторного уноса частиц. Это особенно важно для частиц малого размера, склонных к повторному вовлечению в поток. Использование дополнительных внутренних элементов позволяет снизить унос частиц и повысить эффективность сепарации [3, с. 78].

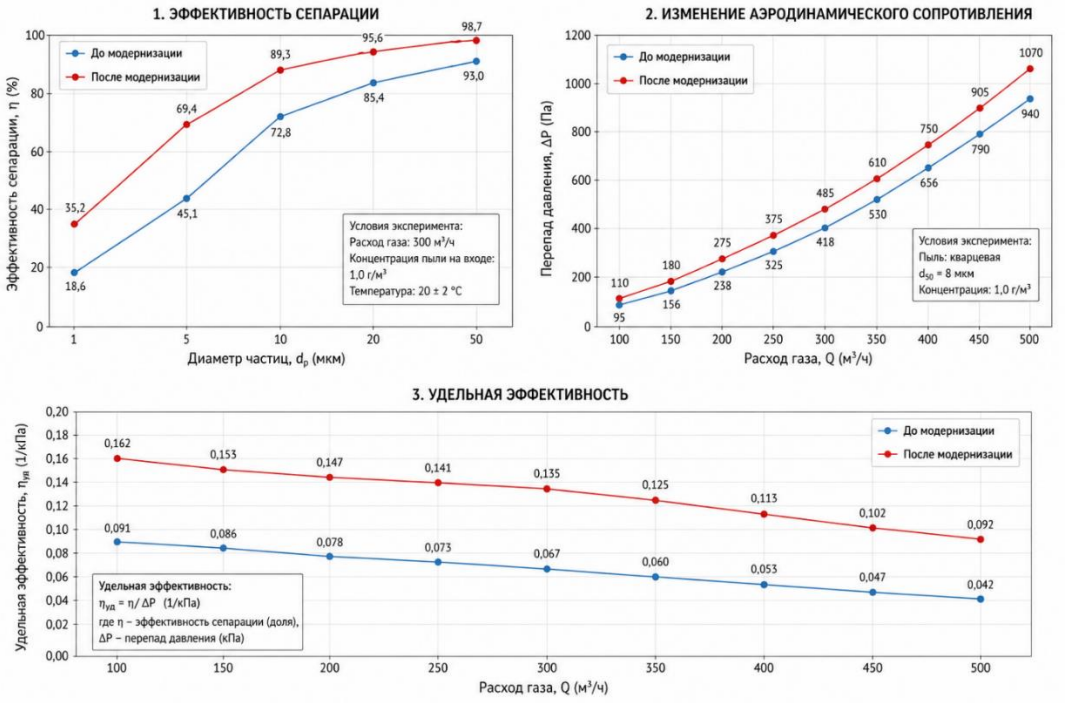

Рисунок 4. Сравнительный анализ эффективности и аэродинамических характеристик циклонного сепаратора до и после модернизации.

Анализ показывает, что комбинированное использование всех трёх методов позволяет добиться синергетического эффекта. При этом наблюдается смещение кривой эффективности в область меньших размеров частиц, что свидетельствует о повышении эффективности улавливания мелкодисперсных фракций.

Однако увеличение эффективности сопровождается ростом гидравлического сопротивления. Поэтому ключевой задачей является поиск оптимального соотношения между эффективностью и энергозатратами. Полученные зависимости могут быть представлены в виде:

$$\eta = f(Re, \alpha, L/D, geometry)$$

где α— угол закрутки, L/D— относительная глубина vortex finder.

ЗАКЛЮЧЕНИЕ

В работе выполнен анализ недостатков традиционных циклонных сепараторов и предложен комплексный подход к их модернизации. Показано, что ключевыми факторами, ограничивающими эффективность, являются повторный унос частиц, короткое замыкание потока и нестабильность вихревой структуры.

Предложенная модернизация, включающая предварительную закрутку потока, оптимизацию выходного патрубка и установку конической вставки, позволяет существенно повысить эффективность сепарации. Комплексное управление структурой потока является перспективным направлением повышения эффективности циклонных аппаратов [4, с. 102].

Результаты исследования могут быть использованы при проектировании новых циклонных сепараторов и модернизации существующих установок. Дальнейшие исследования должны быть направлены на экспериментальную верификацию полученных зависимостей и разработку численных моделей процесса.

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RESEARCH ON THE CHEMICAL COMPOSITION OF BENTONITE FROM THE NURATA DEPOSIT

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Abstract: *This scientific article presents the results of work on determining the physicochemical properties, chemical-mineralogical composition, and structure of bentonite clay from the Nurata deposit, as well as studying the properties of associated impurities such as quartz, iron, and gypsum compounds to select the optimal adsorbent. Bentonite samples were taken, and experiments were conducted to determine their physicochemical composition and adsorption properties. The Nurata deposit is located on the southern slope of the southeastern Nurata mountain range, 110 km north of the city of Navoi. In order to expand the areas of application of bentonite clays as commercial raw materials, it is proposed to develop and apply effective methods for their enrichment with additives.*

Keywords: *chemical composition, hydroxyl, crystal, structure powder, dispersion, silicon oxides, aluminum, iron, alkaline-earth, carbonate.*

INTRODUCTION

To date, scientists are paying attention to the study and application of bentonite clay for water purification due to its ecological purity, low cost, and ease of use as a good adsorbent for water purification [1, 2].

The peculiarity of the chemical-mineralogical composition and structure of bentonite, as a natural aluminosilicate, opens the possibility of its use as a primary raw material for obtaining new sorbent materials with specified properties. [3].

The peculiarity of the chemical-mineralogical composition and structure of bentonite, as a natural aluminosilicate, opens the possibility of its use as a primary raw material for obtaining new sorbent materials with specified

properties. For example, using modern chemical activation methods, new organomineral compositions can be obtained. [4-7]

Practical results on the activation of clay minerals have been achieved for several years. Using acids (15% aqueous sulfuric acid solution) and microwave radiation, local adsorbents (montmorillonite, kaolin) were activated, and effective adsorbent compositions for vegetable oil purification were created using them. The adsorption properties and physicochemical properties of the obtained adsorbents have been investigated [8-11].

When using clay minerals as adsorbents, the amount of montmorillonite and vermiculite in their composition is of great importance. In recent years, scientific research has been conducted in the literature on the modification of montmorillonite and vermiculite and the study of their adsorption properties. Currently, our scientists [12-15] are achieving scientific and practical results in obtaining adsorbents based on local raw materials and applying them for industrial and environmental purposes.

The purpose of this work. The study of the chemical and mineralogical composition of bentonite from the Nurata deposit in the Navoi region of Uzbekistan, the determination of the quality of the studied bentonite clay, and the study of its potential use.

RESEARCH OBJECTS AND METHODS

The object of the research work is bentonite of the Nurata deposit. The study of the mineralogical and adsorption properties of bentonite clay, which is a natural raw material, was carried out using physicochemical and chemical analysis methods. The chemical composition of the bentonite was analyzed using ED-XRF, while the remaining properties were studied in accordance with standard requirements. This method of analysis is used to quickly and accurately identify chemical elements in various samples (solid, powder, liquid).

RESULTS AND DISCUSSION

According to the research results, the bentonite clay of the Nurata deposit has an oily, shiny, and waxy appearance, with an aqueous solution pH of 7-8. Sampling of bentonite clays from the deposit was carried out on an area of approximately 6,000 m^2. Samples were also taken from landslide sites in this area. About 60 kg of samples were taken, reflecting the average composition of the deposit in different layers.

Under laboratory conditions, bentonite clay was ground in a mortar and ground into powder on a laboratory mill. Then, it was passed through a sieve measuring 65 μm. Then, the sifted bentonite samples were placed in containers.

In our previous studies, the results of the chemical composition of bentonite from 3 deposits, including the Nurata deposit, were presented. Samples were taken from a depth of 60-70 cm, which is the primary source for obtaining bentonite clay samples; therefore, differences in mineralogical composition are possible. Bentonite clay components—silicon, aluminum, and iron oxides—as a percentage of the total mass: 55.15–68.87; 14.17–16.89 and 2.22–2.20. Bentonite clay differs not only in elemental composition and the amount of compounds.

Bentonite of the Nurata deposit is characterized by the presence of titanium (IV) oxide, magnesium oxide, sodium oxide, potassium oxide, and other oxides. The most significant difference in mineralogical composition is observed in sorption properties, where the carbonate contains low amounts of aluminum oxide, silicon (IV) oxide, and magnesium oxide, while calcium oxide is relatively high (Table 1).

Table 1

Mineralogical composition of the sample	SiO_2	TiO_2	AI_2O3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	FeO	ппп*
Sample of bentonite from the Nurata deposit	55,15	0,62	14,17	9,03	2,22	0,30	2,20	1,54	0,11	0,10	-	13,76

Note: CPP (combustion loss), which includes the total amount of removed hygroscopic, crystallization water and the combustion of organic impurities, as well as the decomposition of certain mineral compounds at high temperatures (up to 1000 °C).

Chemical composition of bentonite samples from the Nurata deposit

The elemental composition of the bentonite sample was studied using energy-dispersive X-ray fluorescence spectrometry (ED-XRF). In the obtained spectrum, a series of characteristic peaks were observed in the range of 1–40 keV. The spectral results indicate the presence of elements such as aluminum (Al), silicon (Si), phosphorus (P), sulfur (S), chlorine (Cl), potassium (K), calcium (Ca), barium (Ba), titanium (Ti), chromium (Cr), manganese (Mn), iron (Fe), nickel (Ni), copper (Cu), zinc (Zn), bromine (Br), rubidium (Rb), yttrium (Y), zirconium (Zr), strontium (Sr), tin (Sn), and lead (Pb) in the sample (Fig. 1).

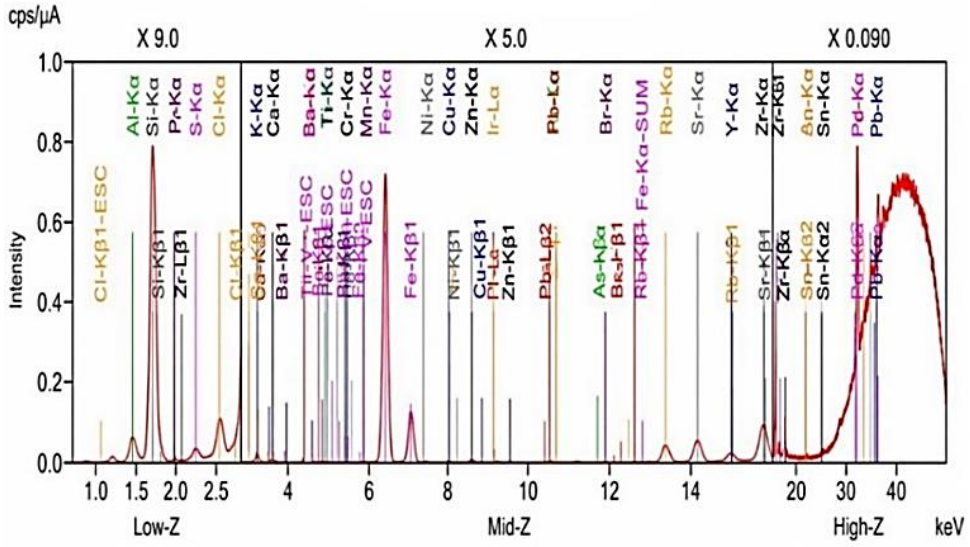

Figure 1. Elemental composition of bentonite from the Nurata deposit

ED-XRF

ED-XRF analysis showed that the primary composition of the bentonite sample consists of aluminosilicate minerals. High-intensity peaks of Si and Al elements in the spectrum, the significant presence of Fe, Ca, and K elements, and the detection of trace amounts of other elements correspond to the natural mineral composition of bentonite. These results confirm the mineralogical

properties of the sample and serve as a basis for comparison with subsequent XRD, FTIR, and SEM analyses.

CONCLUSION

In conclusion, it can be stated that montmorillonite is the primary mineral in the chemical composition of the bentonite clay of the Nurata deposit. The mineral montmorillonite plays an important role in the adsorption process. Additionally, bentonite clay contains calcium and magnesium ions that are not involved in the adsorption process. Therefore, it is recommended to pre-enrich and modify bentonite clay for use as an adsorbent. As a result of enrichment and modification, the amount of montmorillonite increases, while calcium and magnesium ions are replaced by sodium ions, which enhances adsorption properties.

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DORIVOR O'SIMLIKLARNI YETISHTIRISH VA QAYTA ISHLASH TEXNOLOGIYASI

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Oziq-ovqat texnologiyasi va boshqaruv fakulteti (oziq-ovqat texnologiyasi) ta'lim yo'nalishi bo'yicha 3-bosqich 1.23-guruh talabasi

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Annotatsiya. *Ushbu maqolada dorivor o'simliklarni yetishtirish qayta ishlash texnologiyasining nazariy va amaliy asoslari yoritilgan. Dorivor o'simliklarning biologik xususiyatlari, ularni yetishtirishning agrotexnik usullari,xomashyoni yig'ish quritish va saqlash jarayonlari tahlil qilingan. Shuningdek, farmatsevtika sanoatida dorivor o'simliklardan foydalanish samaradorligini oshirish masalalari ko'rib chiqilgan.*

Kalit so'zlar: *dorivor o'simliklar, agrotexnologiya, qayta ishlash, quritish, xomashyo, farmatsevtika, biologik faol moddalar, hosildorlik, flavonoidlar, alkaloidlar.*

Abstract. *This article discusses the theoretical and practical foundations of the cultivation and processing technology of medicinal plants. The biological characteristics of medicinal plants, agrotechnical methods of cultivation, and the processes of harvesting, drying, and storing raw materials are analyzed. Furthermore, the study examines issues related to improving the efficiency of the use of medicinal plants in the pharmaceutical industry.*

Keywords: *medicinal plants, agrotechnology, processing, drying, raw materials, pharmaceutical industry, biologically active compounds, yield, flavonoids, alkaloids.*

KIRISH

Dorivor osimliklar insoniyat tarixida qadimdan davolash vositasi sifatida keng qo'llanib kelinmoqda. Hozirgi kunda ham tibbiyotda qo'llaniladigan dori vositalarining qariyb 40-47 foizi o'simlik xomashyosidan olinadi. Yer yuzida 10-12 mingga yaqin dorivor o'simlik turlari mavjud bo'lib, O'zbekistonda ularning 700 dan ortiq turi uchraydi. Dorivor o'simliklarni yetishtirish va qayta ishlash texnologiyasi qishloq xo'jaligi va farmatsevtika sanoati kesishgan muhim yo'nalish bo'lib, u yuqori sifatli xomashyo yetishtirish, uni qayta ishlash

va saqlash jarayonlarini o’z ichiga oladi. Jahon miqyosida ham tabiiy dori vositalariga bo’lgan talab ortib borayotgan bir sharoitda dorivor o’simliklarni yetishtirish va qayta ishlash masalasi alohida ahamiyat kasb etmoqda. O’zbekiston Respunlikasida ham bu yo’nalishni rivojlantirish maqsadida Prezident tomonidan qator muhim qarorlar qabul qilinib, sohaga innovatsion yondashuvlar joriy etilmoqda.

1.Dorivor o’simliklarning biologik xususiyatlari. Dorivor o’simliklar tarkibida biologik faol moddalar- alkaloidlar, flavonoidlar, efir moylari, vitaminlar va glikozidlar mavjud. Ushbu moddalar o’simliklarning ma’lum qismlarida (ildiz, poya, barg, gul va mevada) to’planadi. O’simliklarning biologik xususiyatlarini bilish ularni to’g’ri yetishtirish va maksimal hosil olish uchun muhimdir. Har bir tur uchun iqlim, tuproq namlik talablari farq qiladi.

2.Dorivor o’simliklarni yetishtirish texnologiyasi.

2.1. Yer tanlash va tayyorlash. Dorivor o’simliklar unumdor, yaxshi drenajlangan va ekologik toza tuproqlarda yaxshi o’sadi. Yer tanlashda quyidagilar hisobga olinadi:

- tuproq unumdorligi
- suv bilan ta’minlanganlik
- ekologik tozaligi

2.2. Urug’ va ko’chat tayyorlash. Ko’paytirish usullari:

- urug’ orqali
-vegetativ (ildiz, poya, tugunak orqali)

Zamonaviy texnologiyalarda yuqori hosilli navlar va introduksiya qilingan turlar keng qo’llaniladi.

2.3. Ekish va parvarishlash. Ekish muddati o’simlik turiga bog’liq. Parvarishlash jarayonlari:

- sug’orish
- og’itlash
- begona o’tlarni yo’qotish

- kasallik va zararkunandalarga qarshi kurash

2.4. Hosilni yig’ish. Dorivor moddalarning maksimal miqdori o’simliklarning ma’lum rivojlanish bosqichida to’planadi. Masalan:

- barglar (gullashdan oldin)
- ildizlar (vegetatsiya oxirida)
- gullar (to’liq ochilganda yig’iladi)

3. Dorivor o’simliklarni qayta ishlash texnologiyasi.

3.1. Birlamchi qayta ishlash. Bu bosqich quyidagilarni o’z ichiga oladi:

- tozalash
- saralash
- maydalash

3.2. Quritish. Quritish eng muhim bosqichlardan biri bo’lib, noto’g’ri quritish biologik faol moddalar yo’qolishiga olib keladi. Quritish usullari tabiiy (quyoshda) sun’iy (maxsus quritgichlarda)

3.3. Saqlash. Dorivor xomashyo quruq, salqin va qorong’I joyda saqlanadi. Namlik va yorug’lik ta’sirida faol moddalar parchalanishi mumkin.

3.4. Qayta ishlash va tayyor mahsulot. Dorivor o’simliklardan quyidagi mahsulotlari olinadi:

- damlamalar
- ekstraktlar
- kukunlar
- efir moylari

4. Zamonaviy texnologiyalar va innovatsiyalar. Bugungi kunda dorivor dorivor o’simliklarni yetishtirishda quyidagi innovatsiyalar qo’llanilmoqda:

- issiqxona texnologiyalari
- tomchilatib sug’orish
- biotexnologiya va klonlash
- ekologik toza (organik) yetishtirish

Bu usullar hosildorlikni oshirish va mahsulot sifatini yaxshilashga xizmat qiladi.

5.Iqtisodiy va ekologik ahamiyati. Dorivor o’simliklarni yetishtirish:

- farmatsevtika sanoatini xomashyo bilan ta’minlaydi.
- eksport salohiyatini oshiradi.
- ekologik barqarorlikni ta’minlaydi.

Dorivor o’simliklarda biologik faol moddalar sintezi tashqi va ichki omillarga bog’liq holda yuz beradi. Bu jarayon o’simlikning ontogenez bosqichlarida turlicha kechadi. Asosiy omillar:

Fotosintez intensivligi- quyosh nuri ta’sirida faol moddalar ko’proq to’planadi. *Tuproq tarkibi*- azot, fosfor va kaliy miqdori modda sinteziga ta’sir qiladi. *Stress omillari*- qurg’oqchilik yoki sovuq sharoitida ba’zi moddalar (masalan, alkaloidlar) ko’payadi.

O’zbekiston hududi iqlim va tuproq xilma-xilligi sabab dorivor o’simliklarga juda boy hisoblanadi. Respublikamizda 400 mingdan ortiq o’simlik turlari uchraydi. Shulardan 1500 ta o’simlik dorivor xususiyatga ega. Bu o’simliklar tog’, adir, cho’l hududlarida keng tarqalgan. Dorivor o’simliklar tarkibida alkaloidlar, flavonoidlar, efir moylari va boshqa biologik faol moddalar bo’lib, ular inson organizmiga ijobiy ta’sir ko’rsatadi. Shu sababli bunday o’simliklar xalq tabobatida qadimdan qo’llanilib kelinadi va hozirgi zamon tibbiyotida ham ahamiyat kasb etmoqda. Bugungi kunda dorivor o’simliklarni ilmiy asosda o’rganish, ularni madaniy holda yetishtirish va qayta ishlashga katta e’tibor qaratilmoqda. Farmatsevtika sanoatida ko’plab dorilar aynan o’simlik xomashyosidan olinadi. Bu esa tabiiy dori vositalariga bo’lgan ehtiyoj ortib borayotganini ko’rsatadi. Quyida mamlakatimizda keng tarqalgan va amaliy ahamiyatga ega bo’lgan eng muhim dorivor o’simliklar haqida keltirib o’tamiz.

Yalpiz – dorivor o’simliklar inson salomatligini saqlashda muhim o’rin tutadi. Shunday o’simlkiklardan biri yalpiz bo’lib, u qadimdan xalq tabobatida keng qo’llaniladi. Yalpiz ko’p yillik o’simlik bo’lib, u asosan nam joylarda, ariq

bo’ylarida, bog’larda va dala chetlarida o’sadi. Yalpizning barglari yashil, xushbo’y hidga ega bo’lib, tarkibida mentol moddasi mavjud. Yalpiz O’zbekistonning deyarli barcha hududlarida uchraydi va oson yetishtiriladi. O’simlik tarkibida ko’plab foydali moddalar mavjud bo’lib, u quyidagi kasalliklarda qo’llaniladi: oshqozon faoliyatini yaxshilaydi, hazm qilishni osonlashtiradi, asab tizimini tinchlantiradi, shamollash va yo’talda foydali, o’g’iz boshlig’ini dezinfeksiya qiladi.

Shirinmiya – dukkakdoshlar oilasiga mansub ko’p yillik o’simlik hisoblanadi. U asosan iliq iqlimli hududlarda, jumladan O’zbekistonning cho’l va yarim cho’l zonalarida uchraydi. O’simlikning ildizi dorivor hisoblanadi. Shirinmiya shirin ta’mga ega bo’lgani uchun shunday nom olgan. Shirinmiya tarkibida foydali moddalardan: glitsirrizin, flavonoidlar, efir moylari, vitamin va minerallar mavjud.Shirinmiya quyidagi kasalliklarni davolashda foydalaniladi: yo’tal va bronxit, shamollash kasalliklari, oshqozon yarasi, yallig’lanish jarayonlarida shuningdek balg’am ko’chiruvchi ta’sirga ega, immunitetni oshiradi, organizmni mustahkamlaydi.

Isiriq – bo’yi odatda 30-60sm atrofida bo’lib, hayotiy shakli ko’p yillik o’simlik. O’zbekistonda keng tarqalgan, ayniqsa quruq va issiq iqlim sharoitida yaxshi rivojlanadi. Isiriq tarkibida: alkaloidlar, efir moylari, organik kislotalar bor. Shifobaxsh xususiyatlariga quyidagilar kiradi: mikroblarga qarshi ta’sir ko’rsatadi, shamollash kasalliklarida foydali, asab tizimini tinchlantiradi, og’riq qoldiruvchi xususiyatga ega.

Zamonaviy texnologiyalar dorivor o’simliklarning dorivor moddalarini maksimal darajada saqlashga yordam beradi. Biotexnologiya va seleksiya yordamida hosildorlik va kasallikka chidamli navlar yetishtiriladi. Avtomatlashtirilgan quritish va paketlash tizimlari mahsulot sifatini barqaror saqlashga imkon beradi. Shu bilan birga, farmatsevtik standartlar asosida sifat nazorati olib borilishi dorivor o’simliklardan tayyorlangan dori vositalarining samaradorligini oshiradi. Demak bizda dorivor o’simliklarni yetishtirish va

qayta ishlash texnologiyalari ularning sifatli va foydali xususiyatlarini saqlash hamda inson salomatligi uchun maksimal foda berish imkonini beradi.

XULOSA

Dorivor o’simliklarni yetishtirish va qayta ishlash texnologiyasi zamonaviy agrar va farmatsevtika sohalarining muhim yo’nalishlaridan biridir. Ilmiy asoslangan agrotexnik tadbirlar, to’g’ri yig’ish va qayta ishlash usullarini qo’llash orqali yuqori sifatli dorivor xomashyo olish mumkin. Bu esa aholi salomatligini yaxshilash va iqtisodiy samaradorlikni oshirishga xizmat qiladi. Dorivor o’simliklarni yetishtirishda nafaqat agrotexnik tadbirlar, balki biokimyoviy va molekulyar darajadagi tadqiqotlar ham muhim ahamiyat kasb etadi. Bu esa yuqori sifatli farmatsevtik mahsulotlar ishlab chiqarish imkonini beradi.

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NUMIDA MELEAGRIS RATSIONINI SUT ZARDOBI BILAN BOYITISHNING ILMIY-FIZIOLOGIK ASOSLARI (ADABIYOTLAR TAHLILI)

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Annotatsiya. *Mazkur tadqiqotda parrandachilikning istiqbolli tarmog‘i hisoblangan sessarkalar (*Numida meleagris*) ratsionini sut zardobi bilan boyitishning ilmiy-fiziologik asoslari tizimli tahlil qilindi. Tadqiqot maqsadi so‘nggi 15 yillik fundamental ma’lumotlar asosida zardob komponentlarining parrandalar hazm fiziologiyasi, metabolizm va immunologik xususiyatlariga ta’sir mexanizmlarini nazariy asoslashdan iborat. Tahlillar sut zardobi tarkibidagi organik kislotalar oshqozon-ichakda pH muhitini optimallashtirib, patogen mikroflorani kuchsizlanishini va fermentativ faollikni oshirishini ko‘rsatdi. Shuningdek, zardob ta’sirida qondagi umumiy oqsil, eritrotsitlar miqdori ko‘payishi hamda metabolik muvozanatlashuv bo‘yicha fiziologik qonuniyatlar tizimlashtirildi. Ratsionga sut zardobini kiritish parrandalar tabiiy chidamliligini oshirib, ozuqa tannarxini pasaytiradi va mahalliy iqlim sharoitida amaliy tadqiqotlar uchun ilmiy zamin yaratadi.*

Kalit so‘zlar. *Numida meleagris, sut zardobi, ozuqa ratsioni, metabolizm, qon ko‘rsatkichlar, adabiyotlar tahlili.*

Abstract. *This study provides a systematic analysis of the scientific and physiological principles of supplementing the diets of guinea fowl (Numida meleagris), a promising branch of poultry farming, with cheese whey, a secondary dairy by-product. The research aims to theoretically substantiate the mechanisms through which whey components influence poultry digestive physiology, metabolism, and immunological traits, based on fundamental data from the last 15 years. The analyses revealed that organic acids in whey optimize the gastrointestinal pH environment, inhibiting pathogenic microflora and enhancing enzymatic activity. Furthermore, physiological patterns were systematized regarding the increase in total blood protein and erythrocyte counts, alongside the stabilization of metabolic*

homeostasis under the influence of whey. Integrating cheese whey into the diet enhances the natural resistance of poultry, reduces feed costs, and establishes a solid scientific foundation for conducting practical physiological research unlocal climatic conditions.

Keywords. Numida meleagris, *whey, dietary ration, metabolism, hematological parameters, literature review.*

KIRISH

Aholini ekologik xavfsiz hamda parhezbop hayvon oqsili bilan ta’minlash bugungi kunda oziq ovqat muommolarining ustuvor vazifalari qatoriga kiradi. Shu sababli, respublika chorvachilik hamda parrandachilik tarmoqlarida noananaviy ammo yuqori qiymatli oqsil manbalariga hamda iqtisodiy samaradorlikka ega bo‘lgan mahsulotlardan xususan, sesarklar (*Numida meleagris*) parvarishini kengaytirishga ehtiyoj ortmoqda. Sesarkalar o‘zining issiq iqlim sharoitlariga hamda turli xildagi kasaliklarga va stress omillariga nisbatan chidamlilik xususiyatlarini broyler tovuqlariga qaraganda yuqori darajada namoyon qiladigan genetik tizimi kuchli saqlanib qolgan.[6]. Ushbu parranda go’shtining tarkibiy qismiga ko‘ra, yuqori miqdordagi oqsil hamda juda past ko‘rsatkichdagi yog‘ miqdordagi parhezboplik xususiyatlarini namoyon etadi[12]. Hozirgi parrandachilik sanoatining asosiy muammosi esa ozuqa tannarxini pasaytirgan holda rasionni balanslashgan protein va almashtirib bo‘lmaydigan aminokislotalar hamda makro-mikroelementlar bilan to‘yintirishdan iborat hisoblanadi[11]. Xorijdan keltiriladigan, oqsilli qo‘shimchalarning narxi yuqoriligi sababli, ishlab chiqarishda arzon va biologik faol mahalliy resurslarni izlab topish zarurati yuzaga kelmoqda. Ushbu muammoni hal etishda sut sanoatining yirik ikkamchi yon mahsuloti sifatida, sut zardobidan foydalanish istiqbolli hisoblanadi[2]. Mazkur mahsulot tarkibidagi quruq modda ulushi kam bo‘lishiga qaramasdan, undagi oqsillar, sut uglevodi (laktoza), mineral tuzlar va suvda eruvchi vitaminlar kompleksi ushbu parranda organizmi uchun yuqori bioaktivlik xususiyatiga ega [3]. Fiziologik nuqtayi nazardan, zardob tarkibiga kiruvchi oqsillar (alfa-laktalbumin, beta-

laktoglobulin, immunoglobulinlar) parrandalar tomonidan oson gidrolizlanadi va to‘qimalarda tez so‘riladi [9]. Yaqin yillarda o‘tqazilgan tadqiqot ishlariga ko‘ra, tropik iqlim sharoitlarida boqiluvchi *Numida meleagris* turlarining genotipik ko‘rsatkichlarini qiyosiy tahlil qilgan holda o‘rganilgan. Tajribaga ko‘ra ularning 14 haftalik yakuniy vazni orasida deyarli farqning mavjud emasligini aniqlashgan. Biroq, bizning keskin kontinental iqlim sharoitida qushlarning o‘sish dinamikasini sanoat chiqindisi bo‘lgan (sut zardobi) yordamida, ratsionni muvofiqlashtirish hamda 120 kunlik davrga kelib, go'sht sifatini boshqarish kabi masalalar o‘rganilmagan[7].

Tadqiqotning maqsadi, so‘nggi yillardagi xalqaro va mahalliy fundamental hamda eksperimental ilmiy ishlarni qiyosiy tahlil qilish orqali sut zardobi komponentlarining *Numida meleagris* ovqat hazm qilish va immun tizimi fiziologik ko‘rsatkichlariga ta’sir etish mexanizmlarini nazariy asoslash hamda kelgusi amaliy tajribalar uchun funksional bilimlar yaratishdan iborat.

Materal va metodlar. Ushbu ishda, *Numida meleagris* ratsionini sut zardobi bilan boyitishning ilmiy-fiziologik jihatlarini yorituvchi mahalliy va xorijiy ilmiy manbalar, monografiyalar hamda davriy nashrlar materiallaridan foydalanildi. Mavzuga oid ma’lumotlar bazasini shakllantirishda Scopus, Web of Science, PubMed va Google Scholar kabi xalqaro qidiruv tizimlariga tayanildi. Axborotlarni saralash *"Numida meleagris"*, *"guinea fowl"*, *"sut zardobi"*, *"whey protein"*, *"poultry nutrition"* hamda *"parranda fiziologiyasi"* kalit so‘zlari va ularning kombinatsiyalari asosida olib borildi. Tahlil uchun so‘nggi 15 yillik (2011–2026-yy.) davrni qamrab olgan ilmiy materiallar tanlab olindi. To‘plangan ma’lumotlarni tizimlashtirishda qiyosiy-fiziologik tahlil, deduktiv induksiya hamda ozuqaviy omillarning parrandalar organizmiga ta’sirini umumlashtirish usullaridan foydalanildi.

Natija va ularning muhokamasi. Ilmiy manbalar tahlili shuni ko‘rsatadiki, sut zardobi tarkibidagi laktoza va sut kislotasi *Numida meleagris* (sesarka) ichak muhitini barqarorlashtirish xususiyatiga ega. Ushbu biologik faol

omil mikrofilora tarkibida foydali laktobakteriyalar (*Lactobacillus spp.*) titrini (kislotalilik) o‘rtacha 12–15% ga oshishini ta’minlaydi[5]. Natijada ichak pH muhitining kislotali tomonga siljishi hisobiga *Salmonella* va *E.coli* kabi patogen mikroorganizmlar soni nazorat guruhiga nisbatan 18–22% gacha tormozlanadi. Ichak mikroflorasining bunday fiziologik jihatdan yaxshilanishi, organizmning morfologik ko‘rsatkichlarga bevosita ta’sir ko‘rsatadi [13 10]. Xususan, ingichka ichak devoridagi so‘rg‘ichlar (vorsinkalar) uzunligi o‘rtacha 8–11% ga ortadi. Bu esa shilliq qavatning so‘rilish yuzasini kengaytirib, ozuqa moddalarining, ayniqsa kalsiy va oqsillarning hazm bo‘lish koeffitsiyentini yaxshilaydi.[4]. Fiziologik xususiyatlarning bunday tartibdagi o‘zgarishi parrandalarning tirik vazni ortishini ta’minlaydi hamda 1 kg go‘sht mahsulotini olish uchun sarflanadigan yem miqdorini (FCR) 5% dan 8% gacha samarali pasaytiradi [1]. Adabiyotlardagi qon tahlillari shuni ko‘rsatadiki, sut zardobi ta’sirida gemoglobin miqdori va umumiy oqsil fraksiyalari metabolik me’yor chegarasida 6–10% atrofida ko‘payishi kuzatiladi[14]. Mazkur omil sesarkalar organizmining immunologik reaktivligini mustahkamlab, ularning ekzogen stress omillarga chidamliligini hamda umumiy yashovchanlik darajasini 96–98% gacha oshiradi[8].

XULOSA

Xorijiy hamda mahalliy ilmiy manbalar sintezi shundan dalolat beradiki, *Numida meleagris* ratsioniga sut zardobini kiritish parrandalar organizmida chuqur fiziologik-biokimyoviy o‘zgarishlarni yuzaga keltiradi. Ushbu ozuqaviy omil ichak mikrobiomasini optimallashtirish, patogen florani ta’sir mexanizmini susaytirish va shilliq qavat morfologiyasini yaxshilash orqali ozuqa moddalarining hazm bo‘lish koeffitsiyentini oshiradi. Biologik va zootexnikaviy samaradorlik mezonlariga ko‘ra, sesarkalar uchun sut zardobining eng maqbul (optimal) dozasi omuxta yem massasiga nisbatan 5–10% miqdorida aralashtirilishi yoki suv o‘rniga cheklanmagan holda ichirilishi hisoblanadi. Mazkur tartibdagi ratsion parrandalarning immunologik reaktivligini

barqarorlashtirish bilan birga, ozuqa konversiyasini (FCR) kamaytirish va umumiy yashovchanlik darajasini maksimal darajaga yetkazish imkonini beradi. Olingan xulosalar parrandachilikda ekologik toza va arzon ozuqa qo‘shimchalaridan foydalanish hamda sesarkachilik mahsulotlarini sanoat asosida yetishtirish istiqbollarini belgilashda muhim nazariy asos bo‘lib xizmat qiladi.

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DETERMINATION OF MOLYBDENUM(VI) AND VANADIUM(IV) IONS IN ENVIRONMENTAL SAMPLES USING SORPTION AND SPECTROPHOTOMETRIC METHODS

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Abstract. *In this study, spectrophotometric methods for the determination of molybdenum(VI) and vanadium(IV) ions were developed. Alizarin Red S was used as the analytical reagent for molybdenum(VI), while Xylenol Orange was employed for vanadium(IV). The UV–Vis absorption spectra of the formed complexes were investigated, and the optimum analytical conditions were established. The developed methods were validated using wastewater samples and demonstrated high accuracy, sensitivity, and reproducibility. The proposed methods are suitable for the determination of heavy metal ions in environmental monitoring and analytical laboratories.*

Keywords: *molybdenum(VI), vanadium(IV), spectrophotometry, Alizarin Red S, Xylenol Orange, UV–Vis, heavy metal ions, wastewater, environmental monitoring.*

INTRODUCTION

The rapid development of industrial production, mining, metallurgy, and the increasing use of mineral fertilizers and various chemicals in agriculture have significantly contributed to the accumulation of heavy metal ions in environmental media [1]. In particular, molybdenum(VI) and vanadium(IV) ions can accumulate in soils and aquatic systems, causing ecological imbalance and posing potential risks to human health [2,3]. Although molybdenum is an essential trace element, its excessive concentration can disrupt aquatic ecosystems and exhibit toxic effects [4]. Vanadium, a major component of many industrial wastes, is also hazardous to living organisms at elevated concentrations [5]. Therefore, the rapid,

sensitive, and selective determination of these ions at low concentrations is an important task in environmental monitoring [6].

Although modern instrumental techniques, such as ICP-MS, ICP-OES, and AAS, provide high analytical accuracy, their high cost and the requirement for sophisticated laboratory equipment limit their routine application [7]. Consequently, the development of simple, cost-effective, and highly sensitive spectrophotometric and sorption-spectrophotometric methods remains an important research direction [8,9]. For the determination of molybdenum(VI), Alizarin Red S (ARS) was immobilized on the surface of a PPD-1 fibrous sorbent [10]. The absorption spectra of the resulting metal complex were recorded using a UV–Vis spectrophotometer, and the effects of pH, reagent concentration, and sorption conditions on complex formation were investigated [11]. For the determination of vanadium(IV), a UV–Vis spectrophotometric method based on Xylenol Orange was employed. The absorption spectra of the vanadium(IV)–Xylenol Orange complex were measured using an EMC-30PC-UV-1800 spectrophotometer [12]. The reaction medium, pH, reagent concentration, reaction time, and complex stability were optimized to achieve the best analytical performance [13].

MATERIALS AND METHODS

In this study, spectrophotometric methods were developed for the determination of molybdenum(VI) and vanadium(IV) ions. Alizarin Red S (ARS) was selected as the analytical reagent for molybdenum(VI), while Xylenol Orange was used for the determination of vanadium(IV). The absorption spectra of both systems were recorded against a blank solution using an EMC-30PC-UV-1800 UV–Vis spectrophotometer**.** The spectral analysis showed that the maximum absorption wavelength of Alizarin Red S was λmax= 428 nm**,** whereas the molybdenum(VI)–Alizarin Red S complex exhibited a maximum absorption at λmax = 530 nm. A bathochromic shift of $\Delta\lambda$ = 102 nm was observed, confirming the formation of a stable colored

complex between molybdenum(VI) ions and Alizarin Red S, as well as the high analytical contrast of the reaction.

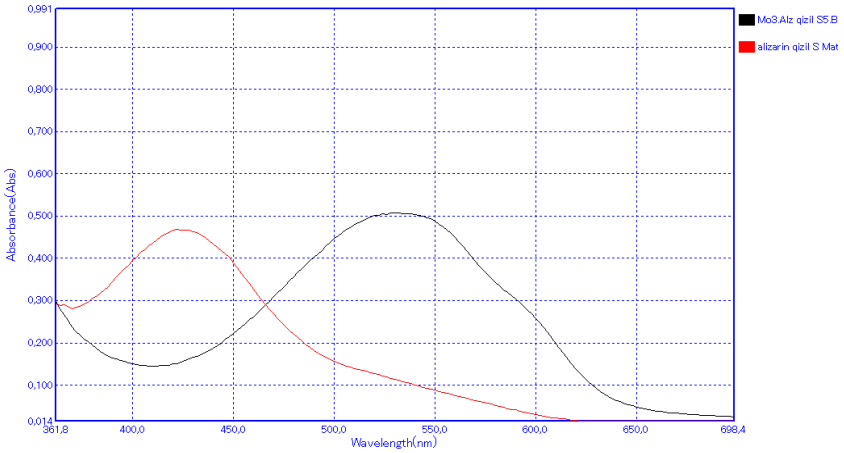

Figure 1. *Absorption spectra of Alizarin Red S immobilized on the surface of a PPD-1 fibrous sorbent and its complex with molybdenum(VI): (1) ARS (λmax= 428 nm); (2) Mo(VI)–ARS complex (λmax = 530 nm).*

Similarly, the maximum absorption wavelength of Xylenol Orange was found to be λmax=432 nm, while the vanadium(IV)–Xylenol Orange complex exhibited a maximum absorption at λmax=578 nm. A bathochromic shift of Δλ = 146 nm was observed, confirming the formation of a stable colored complex between vanadium(IV) ions and Xylenol Orange and indicating the generation of a strong analytical signal suitable for spectrophotometric determination.

The obtained results demonstrate that Alizarin Red S and Xylenol Orange are highly sensitive and selective analytical reagents for the determination of molybdenum(VI) and vanadium(IV) ions, respectively.

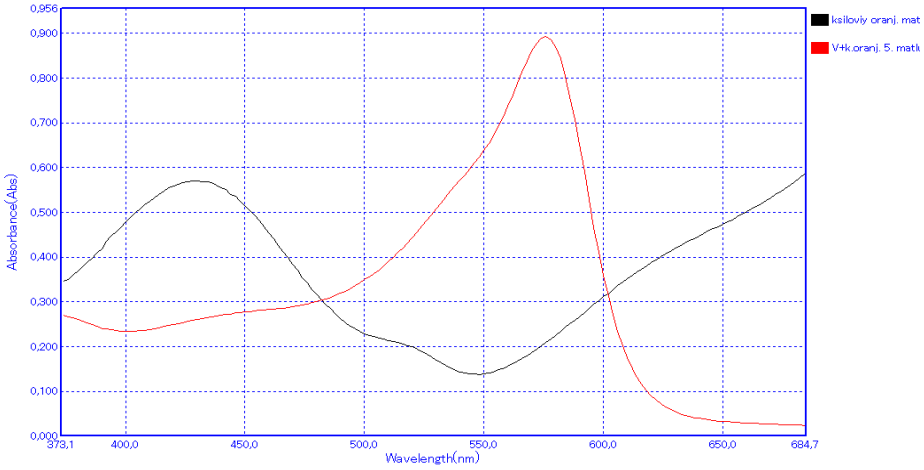

Figure 2. *UV–Vis absorption spectra of Xylenol Orange and its complex with vanadium(IV): (1) Xylenol Orange (λmax=432 nm**);** (2) V(IV)–Xylenol Orange complex (λmax = 578 nm**).***

RESULTS AND DISCUSSION

To evaluate the practical applicability of the developed spectrophotometric methods, experiments were carried out using wastewater samples collected from the Shurtan Oil and Gas Production Department in the Kashkadarya region**.** The concentrations of molybdenum(VI) and vanadium(IV) ions were determined using the spike-and-recovery method. This approach was employed to assess the accuracy, precision, reproducibility, and applicability of the proposed methods for the analysis of real environmental samples.

Me^{n+}	**Entered, mg/l**	**Found, mg/l**	**S**	**Sr**
Mo^{6+}	1,00	1,24±0,02	0,015	0,012
	1,50	1,86±0,06	0,051	0,027
	2,00	2,47±0,03	0,026	0,011
VO^{2+}	1,00	1,0±0,04	0,076	0,052
	1,50	1,54±0,06	0,055	0,038
	2,00	2,05±0,09	0,083	0,04

RESULTS AND DISCUSSION

The results obtained for the determination of molybdenum(VI) showed good agreement between the added and measured concentrations within the range of 1.00–2.00 mg/L. The standard deviation (**S**) ranged from 0.015 to 0.051, while the relative standard deviation **(**Sr**)** was 0.011–0.027**.** These findings confirm the high accuracy, precision, and reproducibility of the developed sorption-spectrophotometric method and demonstrate its suitability for the reliable determination of molybdenum(VI) ions in environmental water samples.

The developed method for the determination of vanadium(IV) also exhibited excellent analytical performance. Within the concentration range of 1.00–2.00 mg/L, the measured values were in close agreement with the added concentrations. The standard deviation (S) ranged from 0.055 to 0.083, and the relative standard deviation (Sr) did not exceed 0.052. These results indicate that the method is reliable, reproducible, and suitable for determining vanadium(IV) ions in wastewater and other natural water samples.

Overall, the results demonstrate that the proposed spectrophotometric methods provide sensitive, selective, and reliable determination of molybdenum(VI) and vanadium(IV) ions in real environmental water samples. The low values of S and Sr confirm the high analytical performance and good recovery of the developed methods, making them promising tools for environmental monitoring, wastewater quality control, and routine analytical laboratory applications.

CONCLUSION

Sensitive, selective, and reliable spectrophotometric methods for the determination of molybdenum(VI) and vanadium(IV) ions were successfully developed. The complex formation of Alizarin Red S with molybdenum(VI) and Xylenol Orange with vanadium(IV) was investigated, and the optimum analytical conditions were established. The proposed methods were successfully applied to real wastewater samples, demonstrating high accuracy,

precision, and reproducibility. Owing to their simplicity, rapid analysis, high sensitivity, and cost-effectiveness, these methods are suitable for the determination of molybdenum(VI) and vanadium(IV) ions in environmental and industrial water samples, as well as for routine environmental monitoring and analytical laboratory practice.

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Si TAGLIKLARDA O‘STIRILGAN $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ EPITAKSIAL PLYONKALARNING RENTGENSTRUKTURAVIY XOSSALARI

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Annotatsiya: *Ushbu tezisda Si tagliklarda suyuqlik fazali epitaksiya usuli orqali o‘stirilgan* $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ *epitaksial plyonkalarning rentgenstrukturaviy xossalari tahlil qilindi. Tadqiqotda epitaksial qatlamlarning kristallografik yo‘nalishi, panjara parametrlari, qalinlik bo‘yicha tarkibiy taqsimoti hamda Si taglikdagi strukturaviy nuqsonlar XRD natijalari asosida baholandi. Olingan natijalarga ko‘ra, hosil qilingan epitaksial plyonka asosan (111) yo‘nalishli monokristall tuzilishga ega bo‘lib, uning panjara parametri* $a_{exp} = 0{,}5658$ *nm ni tashkil etadi. Qatlam qalinligi bo‘yicha ZnSe va* $GaAs_{1-\delta}Bi_\delta$ *birikmalarining notekis taqsimlanishi aniqlanib, bu holat eritma-rasplavdagi komponentlarning turlicha eruvchanligi va kristallanish jarayoni bilan izohlanadi. Rentgenogramma tahlili Si taglikda (111), (222) va (333) reflekslarining mavjudligini, shuningdek, kislorod bilan bog‘liq* SiO_2 *va* SiO_x *klasterlari hosil bo‘lishini ko‘rsatdi. Panjara parametrlarining mos kelmasligi, lokal mexanik kuchlanishlar va mikrodefektlarning shakllanishi epitaksial qatlamning strukturaviy xossalariga sezilarli ta’sir ko‘rsatadi.*

Kalit so‘zlar: *Si taglik, epitaksial plyonka,* $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$*, suyuqlik fazali epitaksiya, rentgenstrukturaviy tahlil, XRD, kristallografik yo‘nalish, panjara parametri, ZnSe,* $GaAs_{1-\delta}Bi_\delta, SiO_2$*,* SiO_x *klasterlari, mikrodefektlar, lokal mexanik kuchlanish, yarimo‘tkazgich geterotuzilma.*

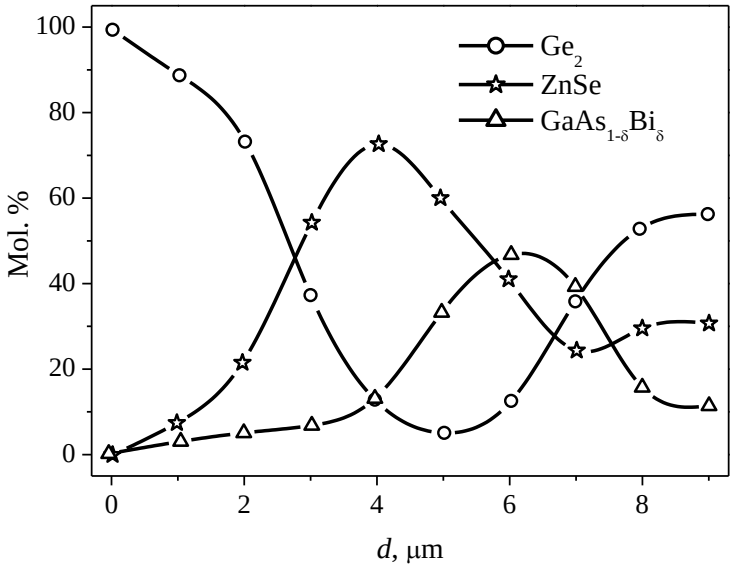
Abstract: *This thesis presents an analysis of the X-ray structural properties of* $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ *epitaxial films grown on Si substrates by the liquid-phase epitaxy method. The crystallographic orientation, lattice parameters, compositional distribution across the film thickness, and structural defects in the Si substrate were evaluated based on XRD measurements. According to the obtained results, the grown epitaxial film predominantly exhibits a single-crystalline structure oriented along the (111) direction, with a lattice parameter of* $a_{exp} = 0{,}5658$ *nm. A non-uniform distribution of ZnSe and* $GaAs_{1-\delta}Bi_\delta$ *compounds across the layer thickness was identified. This behavior is attributed to differences in the solubility of the components in the solution–melt and to the crystallization process. Analysis of the X-ray diffraction pattern revealed the presence of the (111), (222), and (333) reflections in the Si substrate, as well as the formation of oxygen-related* SiO_2 *and* SiO_x *clusters. Lattice mismatch, local mechanical stresses, and the formation of microdefects were found to have a significant effect on the structural properties of the epitaxial layer.*

Keywords: *Si substrate, epitaxial film, , liquid-phase epitaxy, X-ray structural analysis, XRD, crystallographic orientation, lattice parameter, ZnSe,* $GaAs_{1-\delta}Bi_\delta, SiO_2$*, clusters, microdefects, local mechanical stress, semiconductor heterostructure.*

KIRISH

Zamonaviy yarimo‘tkazgichlar fizikasi va materialshunosligi oldida turgan eng muhim masalalardan biri — keng harorat diapazonida barqaror ishlay oladigan, ko'p funksiyali nano- va mikroelektron tizimlarni yaratishdir. Ushbu murakkab texnologik vazifani hal qilishda kremniy (Si), germaniy (Ge) va galiy arsenid (GaAs) kabi an'anaviy monokristallarni legirlash, ularda yuzaga keladigan nuqsonlarni va faza o'zgarishlarini boshqarish katta ahamiyatga ega. Xususan, n-tip o'tkazuvchanlikka ega bo'lgan Si tagliklarida o‘stirilgan murakkab $(Ge2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ epitaksial plyonkalari so'nggi yillarda o'ziga xos qiziqish uyg'otmoqda. Monokristall kremniy namunalarida kristall panjaraning sirtqi nanostrukturalarini rentgendiffraktometriya (XRD) va boshqa analitik usullar yordamida o'rganish bunday murakkab qattiq eritmalarning xossalarini to'liq tushunish uchun kalit bo'lib xizmat qiladi [1]. Tadqiqotlarda epitaksial qatlamlarni o'stirish uchun maxsus vismut saqlovchi eritma-rasplavdan foydalanilgan. Kristallarni o'stirish jarayoni suyuqlik fazali

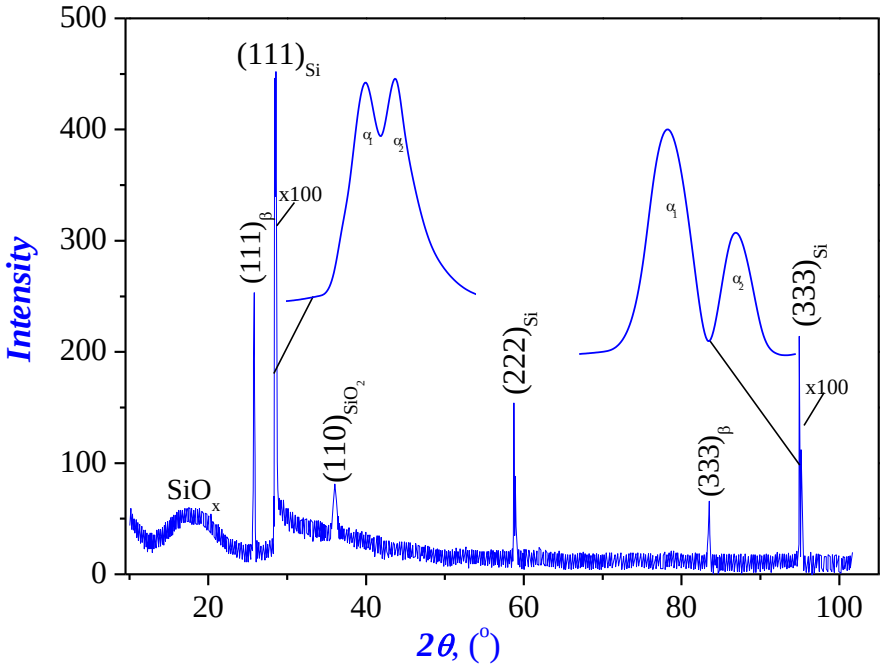
epitaksiya usulida, tozalangan vodorod atmosferasida palladiy filtri orqali amalga oshiriladi. Ushbu jarayonda kristallizatsiyaning boshlang‘ich harorati 730 °C ni, eritmani sovutish tezligi esa taxminan 1 °C/min ni tashkil etishi belgilangan. Ushbu o'ziga xos termik ishlov natijasida qalinligi qariyb 10 mkm bo'lgan, p-tip o'tkazuvchanlikka hamda 0,1 Om·sm solishtirma qarshilikka ega plyonkalar olinadi. Rentgenstrukturaviy tahlil natijalari shuni tasdiqlaydiki, hosil bo'lgan epitaksial plyonka asosan (111) kristallografik yo'nalishga ega bo'lgan monokristalldir [2].



1-rasm. ZnSe, Ge_2 va $GaAs_{1-\delta}Bi_\delta$ birikmalari molekulalarining $(Ge_2)_{1-x-\gamma}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_\gamma$ epitaksial qatlami qalinligi bo‘yicha taqsimlanish profili

Uning kristall panjarasi olmossimon tuzilishdagi elementar yacheykalardan iborat bo'lib, eksperimental aniqlangan panjara parametri $a_{exp} = 0{,}5658$ nm ni tashkil etadi. Hosil qilingan plyonkaning o'ziga xosligi uning tarkibiy qismlari plyonka qalinligi bo'ylab bir tekisda taqsimlanmaganligidadir. 1-rasmda tarkibning qalinlik bo'yicha taqsimlanish grafigiga e'tibor qaratsak, chuqurlik (d, mkm) o'zgarishi bilan ZnSe, Ge_2 va $GaAs_{1-\delta}Bi$ molekulalarining miqdoriy nisbati qanday dinamikada o'zgarishini ko'ramiz [3]. Qatlam qalinligi oshib borishi bilan dastlab ZnSe va $GaAs_{1-\delta}Bi_\delta$ birikmalarining molyar miqdori

mutanosib ravishda o'sib boradi va mos ravishda x = 0,72 hamda y = 0,46 qiymatlarida o'z cho'qqisiga chiqadi. Bu o'sish kristallizatsiya sohasida eritma-rasplavning aynan shu birikmalar bilan yuqori darajada to'yinganligini ko'rsatadi. Plyonkaning yuzasiga yaqin sohalarda esa bu birikmalarning miqdori asta-sekin pasaya boshlaydi va x = 0,31, y = 0,12 qiymatlariga tushadi. Sirt qatlamidan 1 mkm chuqurlikdan boshlab ZnSe 31% dan, $GaAs_{1-\delta}Bi_{\delta}$ esa 12% dan oshmaydi. Bu nomutanosiblikning asosiy sababi kristall o'stirilayotgan cheklangan hajmdagi suyuq vismutda rux selenidning (ZnSe) eruvchanligi germaniynikiga nisbatan 3 baravar, galiy arsenid ($GaAs_{1-\delta}Bi_{\delta}$) birikmasiniki esa 5 baravar katta ekanligi bilan bog'liqdir. Buning natijasida taglik va sirtqi qatlam orasida keng energetik zonaga ega bo'lgan birikmalarga boy maxsus o'tish qatlami shakllanadi. Epitaksial jarayon sifatini belgilovchi eng muhim omillardan biri bu asos vazifasini bajaruvchi kremniy tagligining kristallografik mukammalligidir [4].



2-rasm. Kremniy monokristall tagligining rentgenogrammasi

Buni tahlil qilish uchun olingan kremniy tagligining rentgenogramma grafigi juda muhim ma'lumotlarni taqdim etadi. Rentgenogrammada 2θ = 28,4° va 2θ = 94,9° burchaklarda kuzatiladigan o'ta yuqori intensivlikdagi selektiv

cho'qqilar $(111)_{Si}$ va $(333)_{Si}$ kristallografik yo'nalishlariga mos tushadi. Bu sirtning aynan (111) orientatsiyada ekanligini mutlaq tasdiqlaydi. (111) cho'qqisining o'ziga xos intensivligi va yarim kengligi (FWHM = $6{,}49 \cdot 10^{-3}$ rad) tahlili orqali kremniy subkristallitlarining o'lchami o'rtacha 23 nm ekanligi aniqlangan. Grafikdagi eng e'tiborli jihatlardan biri bu $2\theta = 58{,}8°$ burchak ostida $(222)_{Si}$ yo'nalishiga tegishli strukturaviy cho'qqining paydo bo'lishidir. Odatda yuqori sifatli, nuqsonlardan xoli bo'lgan kremniy monokristallari uchun bunday cho'qqining paydo bo'lishi xos emas. Uning yuzaga kelishi kristall panjarada fon aralashmalari, xususan, kislorod atomlarining notekis taqsimlanishi natijasida hosil bo'lgan kuchli lokal mexanik kuchlanishlar va elastik mikrobuzilishlar mavjudligini ko'rsatadi. Kislorod va kremniy ionlari radiuslaridagi farq tufayli kislorod atomlari asosan subkristallitlar chegaralarida to'planadi. Natijada, rentgenogrammaning $2\theta = 35{,}9°$ qismida kristallografik yo'nalishi (110) bo'lgan, o'lchami 13,8 nm ga teng SiO2 qattiq fazasining cho'qqisi qayd etilgan. Shuningdek, kichik burchaklar hududida ($2\theta \approx 15°$) uzoq tartibga ega bo'lmagan, o'lchami bor-yo'g'i 0,9 nm bo'lgan SiO_x klasterlariga tegishli keng diffuz cho'qqi aniqlangan.

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KO‘P KOMPONENTLI $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ EPITAKSIAL QATLAMINING n-Si ASOSIDAGI GETEROTUZILMANING SPEKTRAL FOTOSENSITIVLIK XOSSALARI

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Annotatsiya: *Mazkur tezisda ko‘p komponentli* $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ *epitaksial qatlamining n-Si asosidagi geterotuzilmaning spektral fotojavobiga ta’siri o‘rganilgan. Olingan geterotuzilmaning fotosensitivlik spektri nazorat namunasi sifatida tayyorlangan n-Si–p-Si tuzilmasi bilan taqqoslangan. Tajriba natijalariga ko‘ra, ko‘p komponentli epitaksial qatlam mavjud bo‘lgan geterotuzilmada fotosensitivlik maksimumi taxminan 1,26 eV foton energiyasida kuzatilgan. Hisoblangan taqiqlangan zona energiyasi* $E_g = 1{,}248\ eV$ *bo‘lib, tajribada aniqlangan maksimum bilan yaxshi mos kelishi kuzatildi. Spektral fotojavobning o‘zgarishi* Ge_2*, ZnSe va* $GaAs_{1-\delta}Bi_\delta$ *komponentlarining geterotuzilmaning energetik zona tuzilishiga hamda kovalent bog‘lanishlarning ionlanish energiyasiga birgalikdagi ta’siri bilan izohlandi. Olingan natijalar mazkur geterotuzilmadan yaqin infraqizil va ko‘rinadigan spektr diapazonlarida ishlovchi selektiv fotoelektrik qurilmalarni yaratishda foydalanish mumkinligini ko‘rsatadi.*

Kalit so‘zlar: *Geterotuzilma, epitaksial qatlam, spektral fotosensitivlik, fotojavob, epitaksiya, yarimo‘tkazgich, foton energiyasi, selektiv fotosensitivlik, optoelektronika.*

Abstract: *This thesis investigates the influence of a multicomponent* $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ *epitaxial layer on the spectral photoresponse of an n-Si-based heterostructure. The photosensitivity spectrum of the fabricated heterostructure was compared with that of a reference n-Si/p-Si structure. Experimental results showed that the heterostructure containing the multicomponent epitaxial layer exhibited a photosensitivity maximum at a photon energy of approximately* $E_g = 1{,}248\ eV$*. The calculated bandgap energy was found to be in good agreement with the experimentally observed maximum. The variation in the spectral photoresponse is explained by the combined influence of the* Ge_2*,*

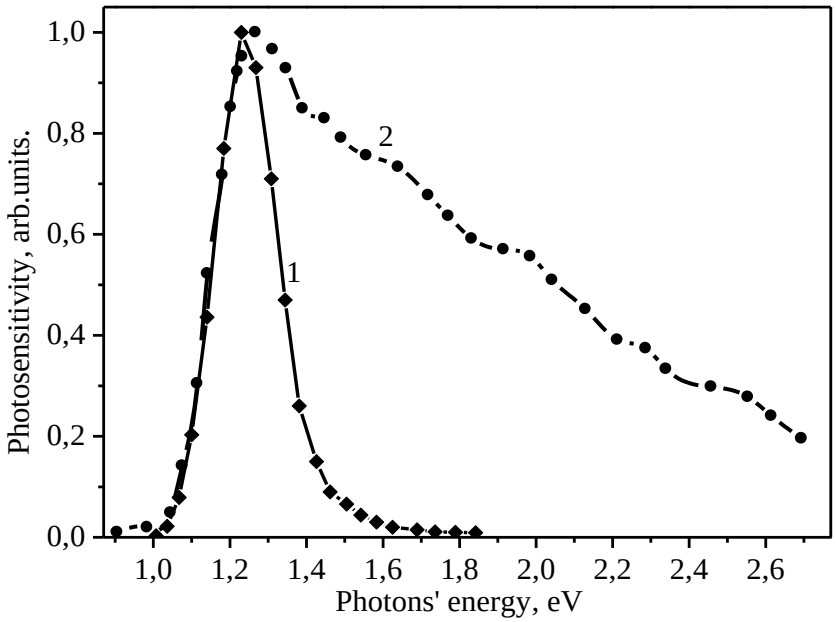
ZnSe, and $GaAs_{1-\delta}Bi_{\delta}$components on the energy band structure of the heterostructure as well as on the ionization energy of covalent bonds. The obtained results demonstrate that this heterostructure has promising potential for the development of selective photoelectric devices operating in the near-infrared and visible spectral regions.

Keywords: *heterostructure, epitaxial layer, spectral photosensitivity, photoresponse, epitaxy, semiconductor, photon energy, selective photosensitivity, optoelectronics.*

Zamonaviy yarimo‘tkazgichlar fizikasi va optoelektronika oldida turgan muhim vazifalardan biri spektrning ma’lum sohalarida yuqori va selektiv sezgirlikka ega bo‘lgan fotoaktiv materiallar hamda geterotuzilmalarni yaratishdan iborat. Bunday tuzilmalarning spektral fotojavobini boshqarish fotodetektorlar, quyosh elementlari, infraqizil datchiklar va boshqa optoelektron qurilmalarning funksional imkoniyatlarini kengaytiradi. Shu nuqtai nazardan, kremniy tagligida turli taqiqlangan zona kengligi va kovalent bog‘lanish energiyasiga ega komponentlardan tashkil topgan ko‘p komponentli epitaksial qatlamlarni hosil qilish muhim ilmiy va amaliy ahamiyat kasb etadi. Mazkur tadqiqotda n-tip o‘tkazuvchanlikka ega kremniy tagligida o‘stirilgan p – $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_{\delta})_y$epitaksial qatlamining spektral fotojavobga ta’siri o‘rganildi. Ushbu murakkab qattiq eritma tarkibiga kiruvchi Ge_2, ZnSe va $GaAs_{1-\delta}Bi_{\delta}$ komponentlari turli energetik xossalarga ega bo‘lib, ularning o‘zaro ta’siri natijasida geterotuzilmada yangi optik o‘tishlar va selektiv fotosensitivlik shakllanishi mumkin. Ge komponentining mavjudligi past energiyali fotonlarning yutilish ehtimolini oshirsa, ZnSe va $GaAs_{1-}$δBiδ komponentlari yuqori energiyali spektr sohasida fotojavobning shakllanishiga sezilarli ta’sir ko‘rsatadi [1,2].

Tadqiqot uchun qalinligi taxminan 10 mkm bo‘lgan p-tip epitaksial qatlamli geterotuzilmalar tayyorlandi. Namunalarning spektral fotosensitivligi CARL ZEISS JENA monoxromatori va kvarts optikasi bilan jihozlangan optik spektrometr yordamida 1–3 eV foton energiyasi oralig‘ida o‘lchandi. Olingan

natijalar nazorat namunasi sifatida tayyorlangan n-Si–p-Si tuzilmasining fotosensitivlik spektri bilan taqqoslandi.



1-rasm. $n-Si-p-(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ *geterotuzilmasi (1) va n-Si–p-Si nazorat tuzilmasining (2) spektral fotosensitivlik egri chiziqlari.*

1-rasmdan ko‘rinib turibdiki, ko‘p komponentli epitaksial qatlam mavjud bo‘lgan geterotuzilmada spektral fotojavobning shakli sezilarli darajada o‘zgaradi. $n-Si-p-(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ geterotuzilmasida fotosensitivlik maksimumi taxminan 1,26 eV foton energiyasida kuzatiladi va undan keyin fotojavob keskin kamayadi [3]. Aksincha, n-Si–p-Si nazorat tuzilmasida fotosensitivlik nisbatan keng energiya diapazonida saqlanib qoladi. Hisoblangan taqiqlangan zona energiyasi $E_g = 1{,}248\,eV$ bo‘lib, tajribada aniqlangan maksimum bilan atigi 0,012 eV farq qilishi nazariy hisoblash va eksperimental natijalarning o‘zaro mosligini tasdiqlaydi. Kuzatilgan spektral o‘zgarishlar Ge_2, ZnSe va $GaAs_{1-\delta}Bi_\delta$ komponentlarining geterotuzilmaning energetik zona tuzilishiga ko‘rsatadigan birgalikdagi ta’siri hamda fotonlarning selektiv yutilishi bilan izohlanadi [4,5].

O‘tkazilgan tadqiqotlar natijasida ko‘p komponentli $(Ge_2)_{1-x-y}(ZnSe)_x(GaAs_{1-\delta}Bi_\delta)_y$ epitaksial qatlamining n-Si asosidagi

geterotuzilmaning spektral fotojavobini sezilarli darajada o‘zgartirishi aniqlandi. Geterotuzilmada 1,26 eV atrofida selektiv fotosensitivlik maksimumining hosil bo‘lishi ko‘p komponentli epitaksial qatlamning energetik zona tuzilishiga ta’siri bilan bog‘liq. Olingan natijalar mazkur geterotuzilmalarni yaqin infraqizil va ko‘rinadigan spektr diapazonlarida ishlovchi selektiv fotodetektorlar hamda zamonaviy optoelektron qurilmalarni yaratishda istiqbolli material sifatida qo‘llash mumkinligini ko‘rsatadi.

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BIOPREPARATLARNING DONLI EKINLAR PATOGENLARIGA CHIDAMLILIGINI SHAKLLANTIRISHDAGI ROLI: FIZIOLOGIK MEXANIZMLAR TAHLILI

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Annotatsiya. *Mazkur maqolada biopreparatlarning donli ekinlarda patogenlarga qarshi chidamlilikni shakllantirishdagi o‘rni hamda ushbu jarayonning asosiy fiziologik mexanizmlari tahlil qilingan. Biopreparatlarning o‘simlik immun tizimini faollashtirishi, antioksidant fermentlar faoliyatini kuchaytirishi, fitogormonlar muvozanatini tartibga solishi va himoya metabolitlari sintezini rag‘batlantirishi natijasida kasalliklarga chidamlilik ortishi yoritilgan. Shuningdek, donli ekinlarni biologik himoya qilishda biopreparatlardan foydalanishning ekologik va amaliy afzalliklari baholangan.*

Kalit so‘zlar: *biopreparatlar, donli ekinlar, patogenlar, fiziologik mexanizmlar, induksiyalangan chidamlilik, antioksidant fermentlar, fitogormonlar, biologik himoya.*

Abstract. *This article analyzes the role of biopreparations in enhancing resistance of cereal crops to pathogens and examines the underlying physiological mechanisms. Particular attention is given to the activation of plant immune responses, stimulation of antioxidant enzyme activity, regulation of phytohormonal balance, and induction of protective metabolites, which collectively improve disease resistance. The ecological and practical advantages of using biopreparations in the biological protection of cereal crops are also discussed.*

Keywords: *biopreparations, cereal crops, pathogens, physiological mechanisms, induced resistance, antioxidant enzymes, phytohormones, biological protection.*

Аннотация. *В статье проанализирована роль биопрепаратов в формировании устойчивости зерновых культур к патогенам и рассмотрены основные физиологические механизмы данного процесса. Показано, что биопрепараты активируют иммунную систему растений, усиливают активность антиоксидантных*

ферментов, регулируют баланс фитогормонов и стимулируют синтез защитных метаболитов, что способствует повышению устойчивости к заболеваниям. Также рассмотрены экологические и практические преимущества применения биопрепаратов в биологической защите зерновых культур.

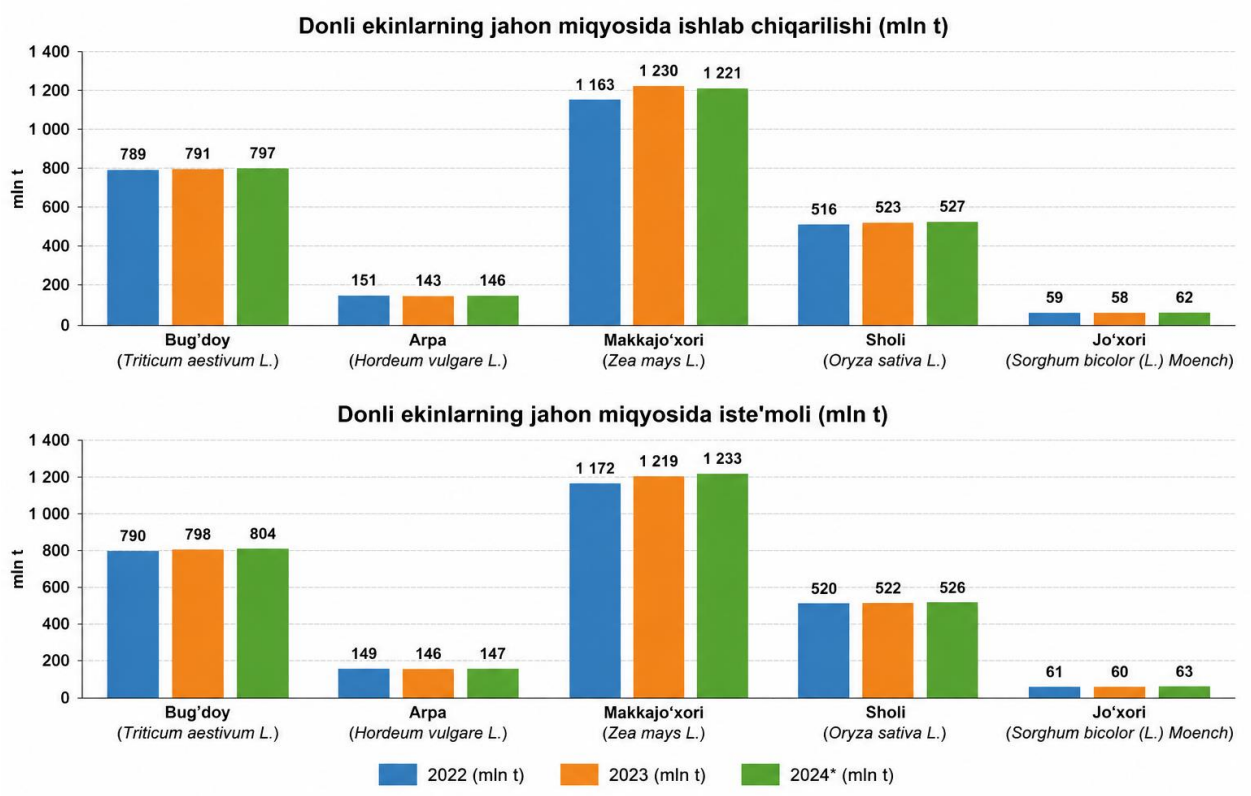
Ключевые слова: *биопрепараты, зерновые культуры, патогены, физиологические механизмы, индуцированная устойчивость, антиоксидантные ферменты, фитогормоны, биологическая защита.*

Donli ekinlar jahon qishloq xo‘jaligi tizimining eng muhim ekinlari hisoblanib, insoniyat oziq-ovqat xavfsizligini ta’minlashda asosiy o‘rin tutadi. Bug‘doy (*Triticum aestivum* L.), arpa (*Hordeum vulgare* L.), makkajo‘xori (*Zea mays* L.), sholi (*Oryza sativa* L.) va Jo‘xori (*Sorghum bicolor* (L.) Meonch) kabi donli ekinlar nafaqat oziq-ovqat manbai, balki chorvachilik va qayta ishlash sanoati uchun muhim xomashyo hisoblanadi. Biroq ushbu ekinlarning biologik hosildorligi va mahsulot sifati turli xil biotik stress omillari, ayniqsa fitopatogen mikroorganizmlar ta’sirida sezilarli darajada kamayadi.

Qishloq xo‘jaligi ekinlarida kasalliklarni keltirib chiqaruvchi zamburug‘, bakteriya va viruslar global miqyosda hosil kamayishlarining asosiy sabablaridan biri hisoblanadi. Tadqiqotlarga ko‘ra, o‘simlik kasalliklari natijasida dunyo miqyosida ekinlarning potensial hosildorligining 10–16 % gacha qismi yo‘qotilishi mumkin [7]. Savary et al. [10] tomonidan olib borilgan keng qamrovli tahlillarda fitopatogenlar qishloq xo‘jaligi mahsulotlari yetishtirish barqarorligiga jiddiy xavf tug‘dirishi va oziq-ovqat xavfsizligini ta’minlashda muhim cheklovchi omil ekanligi ko‘rsatilgan.

Donli ekinlarda keng tarqalgan patogenlar qatoriga *Fusarium spp.*, *Puccinia spp.*, *Bipolaris sorokiniana*, *Alternaria spp.*, *Septoria spp.* va boshqa mikroorganizmlar kiradi. Ushbu patogenlar urug‘larning fiziologik holatiga, unuvchanlik jarayonlariga, ildiz tizimining rivojlanishiga, fotosintez faoliyatiga hamda o‘simliklarning umumiy metabolik jarayonlariga salbiy ta’sir ko‘rsatadi. Masalan, *Fusarium* turkumiga mansub zamburug‘lar don ekinlarida fusarioz kasalligini keltirib chiqarib, nafaqat hosildorlikning pasayishiga, balki

mikotoksinlar hosil bo‘lishi sababli don sifatining yomonlashuviga ham olib keladi [3].

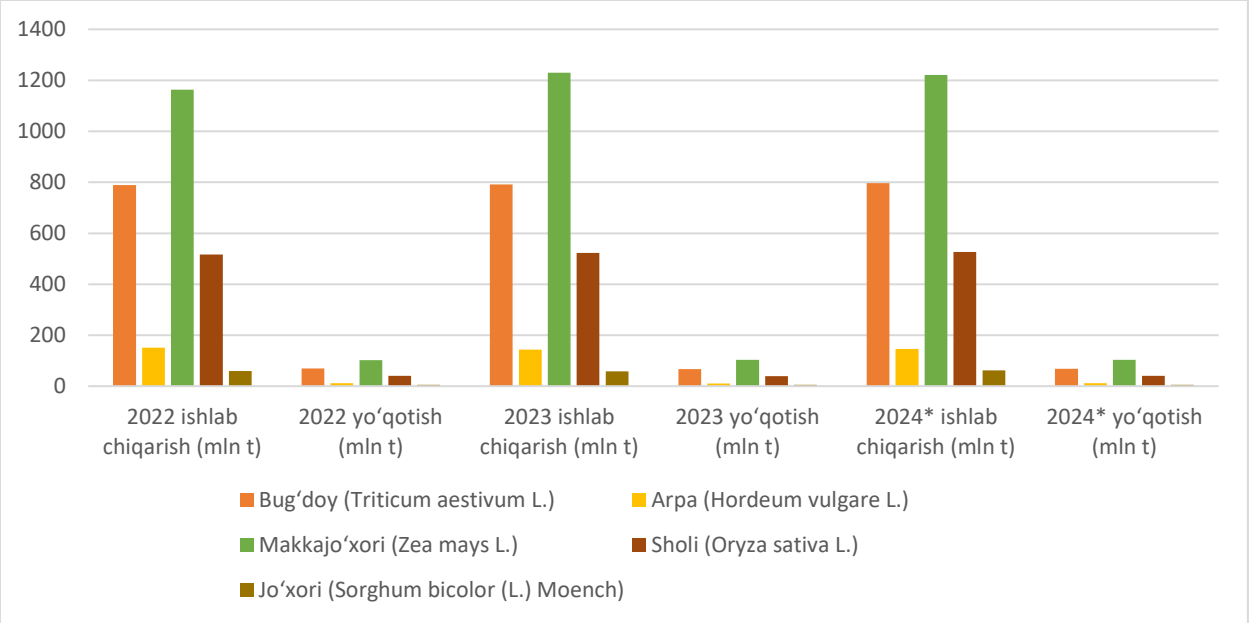


1-rasm. Jahon miqyosida donli ekinlarning yetishtirilishi va iste’moli

An’anaviy ravishda o‘simliklarni patogenlardan himoya qilishda kimyoviy fungitsidlar va pestitsidlardan keng foydalanib kelinmoqda. Ushbu preparatlar qisqa muddatda yuqori samaradorlik ko‘rsatishiga qaramay, ularning uzoq muddatli qo‘llanilishi ekologik muammolarni keltirib chiqarishi, tuproq mikroflorasining tabiiy muvozanatini buzishi, patogenlarning chidamli shakllari paydo bo‘lishiga sabab bo‘lishi mumkin. Shu sababli zamonaviy qishloq xo‘jaligida ekologik xavfsiz himoya vositalarini ishlab chiqish va amaliyotga joriy etish dolzarb ilmiy yo‘nalishlardan biri hisoblanadi [9].

So‘nggi yillarda o‘simliklarni himoya qilish tizimida mikrobiologik asosdagi biopreparatlardan foydalanishga katta e’tibor qaratilmoqda. Biopreparatlar tarkibida o‘simliklar bilan foydali munosabatga kirishuvchi yoki patogen mikroorganizmlarning rivojlanishini cheklovchi mikroorganizmlar mavjud bo‘lib, ular o‘simliklarning o‘sishi va rivojlanishini rag‘batlantirish

bilan birga kasalliklarga chidamlilik mexanizmlarini ham faollashtiradi. Ayniqsa, *Trichoderma spp.*, *Bacillus spp.*, *Pseudomonas fluorescens* va *Azospirillum spp*. kabi foydali mikroorganizmlar asosidagi preparatlar biologik himoya vositalari sifatida keng tadqiq qilinmoqda.



2-rasm. Jahon miqyosida donli ekinlarning zararkunandalar bilan zararlanishi

Trichoderma turkumiga mansub zamburug‘lar patogenlarga qarshi antagonistik xususiyatga ega bo‘lib, mikoparazitizm, antibiotik moddalar ishlab chiqarish, oziqa uchun raqobat va o‘simlik immun tizimini rag‘batlantirish orqali kasalliklarni kamaytiradi. Harman et al. [5] tomonidan olib borilgan tadqiqotlarda *Trichoderma* asosidagi preparatlar o‘simliklarda himoya reaksiyalarini kuchaytirishi va stress sharoitlariga moslashuvchanlikni oshirishi ko‘rsatilgan.

Bakterial biopreparatlar, xususan *Bacillus subtilis* va *Bacillus amyloliquefaciens* asosidagi preparatlar ham o‘simliklarni himoya qilishda katta istiqbolga ega. Ushbu bakteriyalar tomonidan ishlab chiqariladigan lipopeptidlar, sideroforlar, gidrolitik fermentlar va boshqa biologik faol moddalar patogenlarning rivojlanishini cheklaydi. Bundan tashqari, ular o‘simliklarda o‘sishni rag‘batlantiruvchi gormonlar sintezini kuchaytirib, ildiz tizimining rivojlanishiga ijobiy ta’sir ko‘rsatadi [6, 1]

Biopreparatlarning samaradorligini baholashda faqat patogenlarni bostirish darajasini aniqlash yetarli emas. Zamonaviy tadqiqotlarda ushbu preparatlarning o‘simliklarning fiziologik, biokimyoviy va molekulyar-genetik jarayonlariga ta’sirini kompleks o‘rganishga alohida e’tibor berilmoqda. Chunki foydali mikroorganizmlar o‘simliklarda antioksidant fermentlar faolligini oshirishi, himoya oqsillari sintezini rag‘batlantirishi hamda patogenlarga qarshi immun javobni kuchaytirishi mumkin.

O‘simliklarning patogenlarga qarshi chidamliligida induksiyalangan sistematik qarshilik va sistematik orttirilgan qarshilik mexanizmlari muhim ahamiyatga ega. Ushbu jarayonlarda patogenez bilan bog‘liq genlar, fenilalanin-ammiak-liaza, lipoksigenaza, xitinaza va β-1,3-glukanaza kabi himoya fermentlarini kodlovchi genlarning faollashuvi kuzatiladi. Molekulyar biologiya va genomika usullarining rivojlanishi natijasida biopreparatlarning o‘simlik gen ekspressiyasiga ta’sirini o‘rganish imkoniyatlari kengaymoqda [8].

Shu sababli patogenlarga qarshi qo‘llaniladigan biopreparatlarning donli o‘simliklarning fiziologik-biokimyoviy va genetik xususiyatlariga ta’sirini kompleks baholash zamonaviy o‘simlikshunoslik, fitopatologiya va biotexnologiyaning dolzarb yo‘nalishlaridan biri hisoblanadi. Mazkur yo‘nalishdagi tadqiqotlar ekologik xavfsiz dehqonchilik tizimlarini rivojlantirish, kimyoviy preparatlardan foydalanishni kamaytirish hamda yuqori sifatli va barqaror don hosilini shakllantirish uchun ilmiy asos yaratadi.

Donli ekinlarning hosildorligi va mahsulot sifati ko‘plab biotik stress omillari bilan chegaralanadi. Ayniqsa, fitopatogen mikroorganizmlar don ekinlarining rivojlanish davrida katta iqtisodiy zarar keltirib, urug‘larning fiziologik faolligi, o‘simliklarning vegetativ rivojlanishi va reproduktiv jarayonlariga salbiy ta’sir ko‘rsatadi. Fitopatogenlarning ta’siri natijasida o‘simliklarda metabolik muvozanat buziladi, fotosintetik apparat faoliyati pasayadi, oksidlovchi stress kuchayadi va hosil shakllanish jarayonlari izdan chiqadi [3].

Zamburug‘li patogenlar orasida *Fusarium spp.*, *Puccinia spp.*, *Bipolaris sorokiniana*, *Alternaria spp.*, *Septoria spp.* kabi turlar bug‘doy, arpa va boshqa don ekinlarida keng tarqalgan bo‘lib, hosil yo‘qotishlarining asosiy sabablaridan biri hisoblanadi [10].

Fusarium spp. donli ekinlarning eng xavfli patogenlaridan biri hisoblanadi. Ayniqsa, bug‘doy va arpa ekinlarida *F. graminearum*, *F. culmorum*, *F. avenaceum* kabi turlar fusarioz kasalligini keltirib chiqaradi. Ushbu kasallik boshoq, don va ildiz tizimini zararlab, o‘simlikning butun vegetatsiya davridagi fiziologik jarayonlarini buzadi.

Fusarium infeksiyasi ta’sirida urug‘larning unish qobiliyati pasayadi, embrion to‘qimalarining zararlanishi natijasida nihollarning shakllanish jarayoni sekinlashadi. Patogen tomonidan ishlab chiqariladigan mikotoksinlar, jumladan deoksinivalenol, zearalenon va T-2 toksinlar o‘simlik hujayralarida metabolik jarayonlarni izdan chiqaradi [2].

Alternaria spp. va *Septoria spp.* vakillari donli ekinlarning barg kasalliklarini keltirib chiqaruvchi muhim patogenlar hisoblanadi. Ushbu kasalliklar barg yuzasida nekrotik dog‘lar hosil qilib, fotosintetik faol to‘qimalarning kamayishiga olib keladi.

Fotosintez jarayonining pasayishi natijasida o‘simliklarda uglevodlarning hosil bo‘lishi kamayadi, bu esa donning pishishiga salbiy ta’sir qiladi. Ayniqsa, vegetatsiyaning oxirgi bosqichlarida barglarning erta qurishi don massasining kamayishiga sabab bo‘ladi [4].

Bundan tashqari, ushbu patogenlar o‘simlik hujayralarida himoya reaksiyalarining faollashishiga sabab bo‘ladi. Patogen ta’sirida o‘simliklarda fenilpropanoid yo‘li faollashib, fenolik moddalar va himoya fermentlari sintezi oshadi.

Donli ekinlarda patogenlarning rivojlanishi bir qator umumiy fiziologik o‘zgarishlarni keltirib chiqaradi. Barg yuzasining zararlanishi va xloroplast faoliyatining buzilishi natijasida fotosintezning pasayishi, ildiz tizimining

zararlanishi va transpiratsiya jarayonlarining o‘zgarishi sababli suv almashinuvi buzilishi. antioksidant himoya mexanizmlarining faollashishi natijasida fermentativ tizimlarning o‘zgarishi, hujayra bo‘linishi va metabolik jarayonlarning buzilishi hisobiga o‘sish va rivojlanishning sekinlashishi kabilar.

Donli ekinlarda patogen mikroorganizmlar nafaqat kasalliklarni yuzaga keltiradi, balki o‘simliklarning fiziologik va biokimyoviy tizimlariga kompleks ta’sir ko‘rsatadi. Shu sababli patogenlarning zararli ta’sirini kamaytirish va o‘simliklarning tabiiy himoya mexanizmlarini kuchaytirishga qaratilgan biologik preparatlardan foydalanish zamonaviy qishloq xo‘jaligida istiqbolli yo‘nalishlardan biri hisoblanadi.

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YARIMO‘TKAZGICHLI NANOTUZILMALARDA KRISTALLIK SIMMETRIYA VA BRILLYUEN ZONALARI TAHLILI

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Annotatsiya. *Ushbu maqolada qattiq jismlarning strukturaviy tuzilishi, ularning mikrotarkibidagi zarrachalarning joylashish tartibiga ko‘ra kristall va amorf fazalarga ajralish qonuniyatlari tizimli tahlil qilingan. Tadqiqot doirasida kristall panjaralarning translyatsion simmetriya xossalari, elementar yacheyka parametrlari hamda ularning geometrik xususiyatlariga ko‘ra 7 ta kristallografik singoniya va 14 ta Brave panjaralariga tasniflanishi ko‘rib chiqilgan. Kristall tekisliklarining fazoviy yo‘nalishlarini aniqlashda Miller indekslarining o‘rni va ularni hisoblash uslubiyoti bayon etilgan. Shuningdek, to‘g‘ri panjara vektorlari asosida teskari panjara fazosini qurish hamda kvaziimpuls qiymatlarini ifodalovchi Brillyuen zonalarining fizik mohiyati yoritilgan. Olmos tipidagi panjaraga ega bo‘lgan kremniy (Si) va germaniy (Ge) yarimo‘tkazgich kristallarining birinchi Brillyuen zonasi o‘ziga xos 14 qirrali figura misolida tahlil qilingan. Maqola materialshunoslik va yarimo‘tkazgichlar fizikasida elektron jarayonlarni modellashtirish uchun fundamental asos bo‘lib xizmat qiladi.*

Kalit so‘zlar: *Kristall panjara, translyatsiya, inversiya akslanish, tetrogonal tizim, Miller indekslari, to‘lqin vektor, Brillyuen zonasi.*

Аннотация. *В этой статье систематически проанализированы закономерности разделения твердых тел на кристаллические и аморфные фазы в зависимости от расположения частиц в их микроструктуре. В рамках исследования рассмотрены свойства трансляционной симметрии кристаллических решёток, параметры элементарной ячейки, а также их классификация по геометрическим особенностям на 7 кристаллографических сингоний и 14 решёток Брейва. Объяснено значение индексов Миллера и методика их расчета при определении пространственных направлений кристаллографических плоскостей. Также освещены построение обратного*

решеточного пространства на основе векторов прямой решетки и физическая суть зон Бриллюэна, соответствующих значениям квазимомента. На примере кристаллов полупроводников кремния (Si) и германия (Ge) с решёткой типа алмаза проанализирована первая зона Бриллюэна в форме характерного 14-гранного многоугольника. Статья служит фундаментальной основой для моделирования электронных процессов в материаловедении и физике полупроводников.

Ключевые слова: *кристаллическая решётка, трансляция, обратное отражение, тетрагональная система, индексы Миллера, вектор волны, зона Бриллюэна.*

Abstract. *This article systematically analyzes the structural structure of solid materials and the rules of phase separation into crystalline and amorphous phases based on the arrangement of particles in their microstructure. The study examines the translational symmetry properties of crystal lattices, the parameters of the unit cell, and their classification into 7 crystallographic systems and 14 Bravais lattices based on their geometric features. The role of Miller indices and the methodology for calculating them in determining the spatial orientation of crystal planes is explained. Additionally, the article discusses constructing the reciprocal lattice space based on the direct lattice vectors and the physical nature of Brillouin zones representing quasi-momentum values. The first Brillouin zone of silicon (Si) and germanium (Ge) semiconductor crystals with a diamond-type lattice is analyzed using the example of a distinctive 14-faced figure. The article serves as a fundamental basis for modeling electronic processes in materials science and semiconductor physics.*

Keywords: *Crystal lattice, translation, inversion reflection, tetragonal system, Miller indices, wave vector, Brillouin zone.*

KIRISH

Qattiq jism fizikasi va yarimo‘tkazgichlarning asosi moddalarning ichki tuzilishi, ya’ni ularning kristallik strukturasi bilan bog‘liq. Tabiatdagi barcha qattiq jismlar atomlarining joylashish tartibiga ko‘ra amorf va kristall moddalarga bo‘linadi. Yarimo‘tkazgichlar va dielektriklarning aksariyati esa o‘ziga xos mukammal davriy kristall panjaraga ega. Aynan ushbu davriylik va atomlararo kuchli kovalent yoki ionli bog‘lanishlar ushbu materiallarning o‘ziga xos elektr, optik va issiqlik xossalarini belgilab beradi.

Kristall panjaraning davriyligini oddiy real fazoda o‘rganish va hisoblash ishlarini olib borish murakkablik tug‘diradi. Shu sababli, kvant mexanikasi va

zona nazariyasida mikrozarrachalar (elektronlar, teshiklar) hamda kvazizarrachalar (fononlar) harakatini tavsiflash uchun teskari panjara tushunchasidan foydalaniladi. Teskari panjara fazosidagi eng muhim va fundamental tushunchalardan biri esa Brillyuen zonalari hisoblanadi.

ADABIYOTLAR TAHLILI VA MUNOZARA

Qattiq jismlar ularni tashkil kilgan zarralarning joylashish tartibiga qarab, kristall va amorf jismlarga bo‘linadi. Kristall jismlarni tashkil kilgan atomlar joylashishida muayyan, qat’iy tartib mavjud: ma’lum yo‘nalishda xar qanday ikki atom orasidagi masofa bir xil. Undan tashqari ularda aniq erish, qotish temperaturasi mavjud. Amorf jismlarda atomlar joylashishida qat’iy tartib mavjud emas. Ularning fazalarini o‘zgartirishida aniq o‘tish temperaturalari mavjud emas. Kristallni tashkil qilgan atomlarning markazlari bir-biri bilan tutashtirilsa fazoviy panjara xosil bo‘ladi. Unga kristall panjara deyiladi. Kristall simmetriyasi almashtirishlar yoki simmetriya amallari deyiladigan muayyan o‘rin almashtirishlar natijasida jismning o‘z-o‘zi bilan ustma-ust tushishi. Simmetriya almashtirishlariga quyidagilar kiradi:

1) jismning barcha nuqtalarini muayyan masofaga parallel ko‘chirish. (translyatsiya)

2) jismning biror o‘q atrofida muayyan burchakka burilishi.

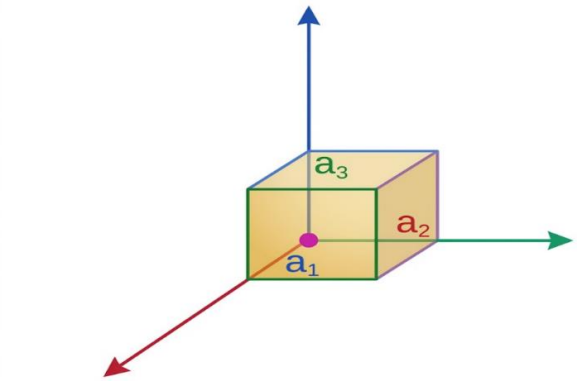
3) tekislikda akslanish.

4) nuqtada yoki inversiya akslanish.

Kristallarda atomlarning joylashishi translyatsion simmetriya xossasiga ega. Kristallda bir-biriga perpendikular bo‘lgan uchta yo‘nalish olamiz va undagi qo‘shni atomlar orasidagi masofalarni a_1, a_2, a_3 vektorlar orqali belgilaymiz. Bu yerda a_i-vektorlar asosiy vektorlar yoki translyatsion davrlar deyiladi. Shu uchta a_i vektorlar ustiga qurilgan parallelepiped elementar yacheyka deyiladi. Butun kristallni uni elementar yacheykasini ketma-ket takrorlanishi deb tasavvur qilish mumkin. Ideal kristallning asosiy xossalaridan biri-agar cheksiz kristal

$$\overrightarrow{a_n} = n_1\overrightarrow{a_1} + n_2\overrightarrow{a_2} + n_3\overrightarrow{a_3} \quad (1)$$

vektor qadar ko‘chirilsa, u o‘z-o‘ziga ustma-ust tushadi. Bu operatsiya translyatsion simmetriya deyiladi.[1]



1- rasm

Elementar yacheykaning xajmi:

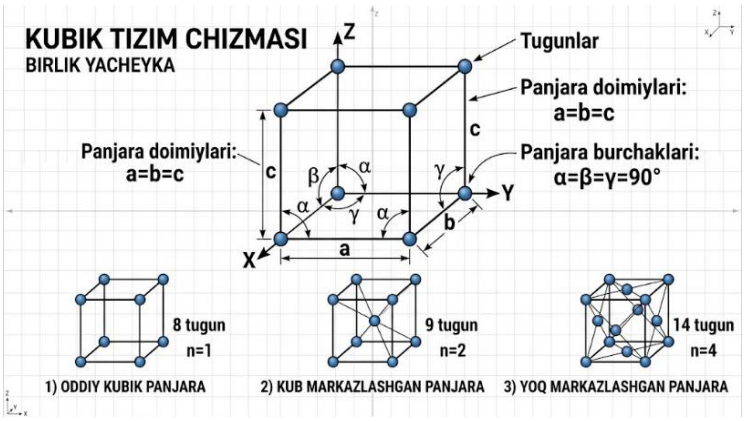
$$V_0 = \overrightarrow{a_1}\,[\overrightarrow{a_2}\,\overrightarrow{a_3}] \qquad (2)$$

bo‘ladi. Bitta atomli elementar yacheyka bu sodda panjara, bir qancha atom mavjud elementar yacheyka murakkab panjara hisoblanadi. Kristall panjarada atomlarning markazlari joylashadigan nuqtalar **tugunlar** deyiladi. Har qanday murakkab fazoviy panjara bir-biriga nisbatan siljigan sodda panjaralardan tuzilgan bo‘ladi. Bu sodda panjaralar Brave panjaralari deyiladi. Ularning soni 14 ta.[2]

Har xil strukturalar kristall panjarani asosiy vektorlari uzunliklari va ular orasidagi burchaklarga qarab, 7 ta kristall singoniyaga bo‘linadi:

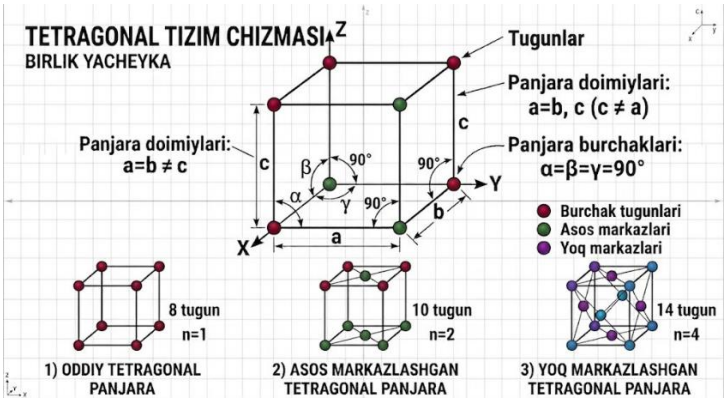
Kubik tizim. Bu singoniyaga uch xil panjara**:** sodda**,** xajmiy markazlashgan, yoqlari markazlashgan panjaralar kiradi. Asosiy parametr-kub qirrasining a uzunligidir

$$a = b = c,\ \alpha = \beta = \gamma = 90$$



2- rasm

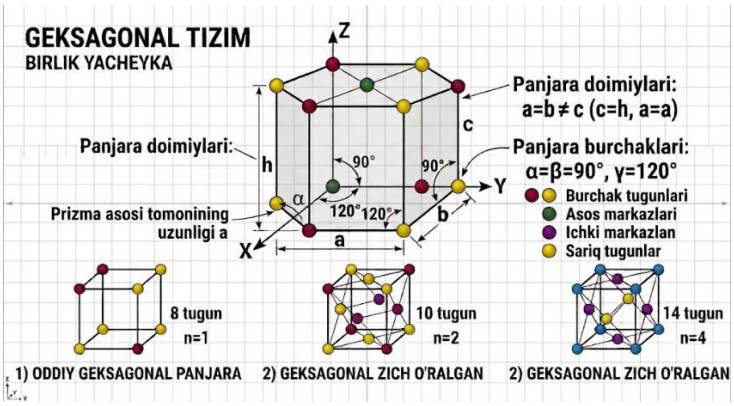
Tetrogonal tizim. Brave parallelipipedi asosi kvadrat bo‘lgan to‘g ‘ri prizmadir. Bu tizimga sodda va xajmiy markazlashgan panjaralar kiradi. Asosiy parametrlar ikkita-kvadrat asosi qirrasining *a* uzunligi, parallelipipedning h balandligi. $a = b \neq c,\ \alpha = \beta = \gamma = 90$



3- rasm

Geksagonal tizim. Bu tizimning asosini muntazam olti kirrali prizma tashkil qiladi. Asosiy parametrlar-prizma asosi tomonining *a* uzunligi va prizmaning h balandligi.

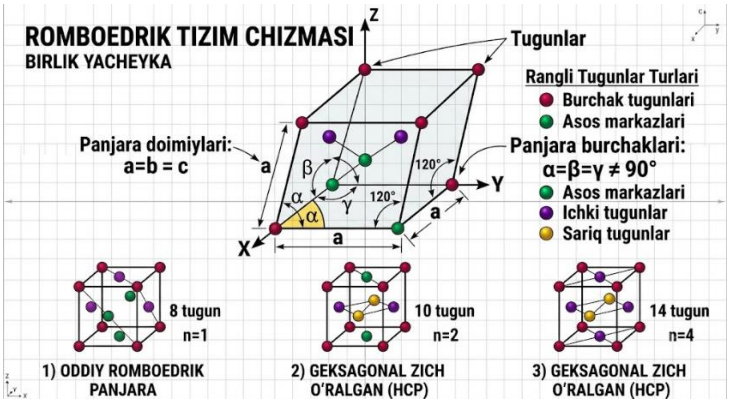
$a = b \neq c, \alpha = 120^0, \beta = \gamma = 90^0$



4- rasm

Romboedrik tizim. Brave parallelipipedi romboedr shaklga ega. Bu tizimning yagona panjarasi yoqlari bir xil romblardan iborat sodda panjaralardir. Uning ikki parametri bor:

romb qirrasining a uzunligi va qirralar orasidagi α burchak. $a = b = c,\ \alpha = \beta = \gamma \neq 90$

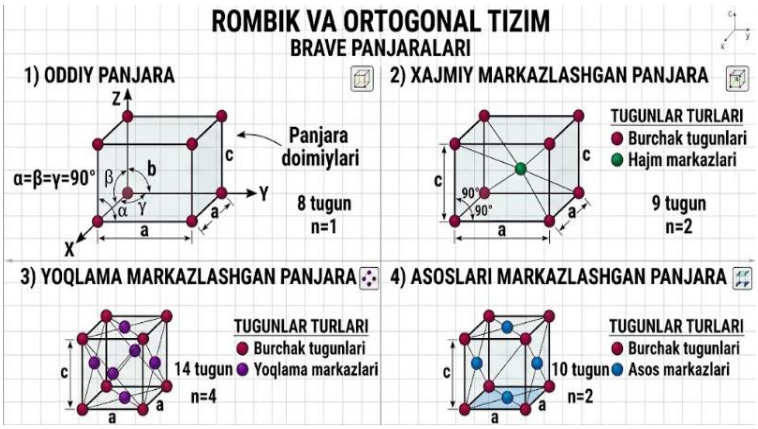


5- rasm

Rombik va ortogonal tizim. Panjaraning asosiy parametrlari – to‘g‘ri burchakli Brave parallelipipedining qirralarining uzunliklari - a,b,c . Bu tizimda Brave panjarasining 4 xili:

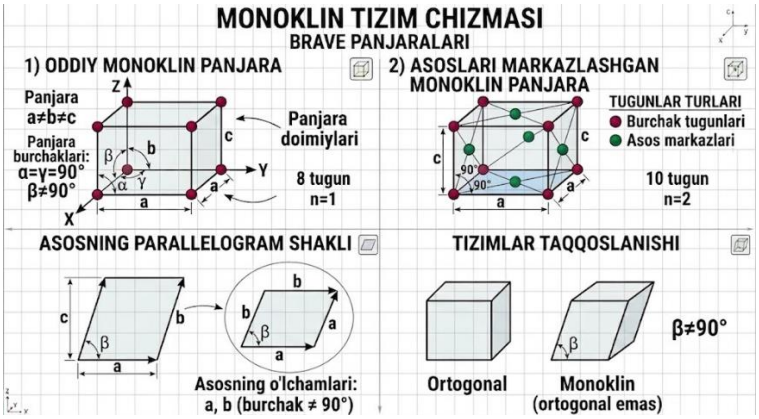
sodda, xajmiy markazlashgan, yoqlama markazlashgan va asoslari markazlashgan panjaralar

mavjud. $a \neq b \neq c,\ \alpha = \beta = \gamma = 90$



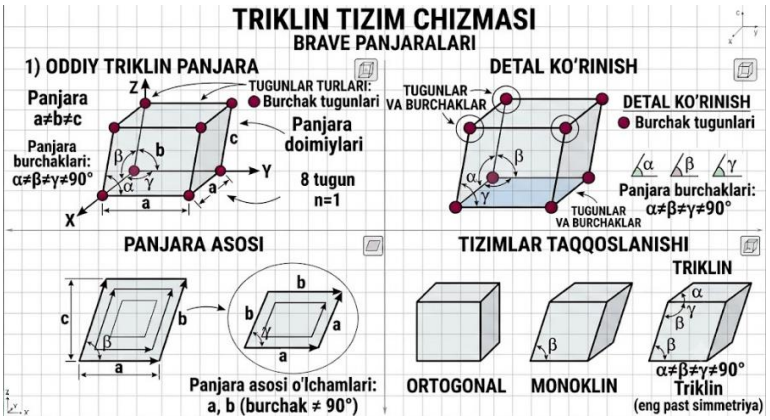
6- rasm

Monoklin tizim. Brave parallelipipedi-to‘g‘ri paralellipiped. Uning asosi parallelogrammdan iborat. Monoklin panjaraning 4 ta parametri bor: Brave parallelipipedi qirralarining a,b,c uzunliklari va ulardan ikkitasi orasidagi burchak. $a \neq b \neq c,\ \alpha = \gamma = 90^0,\ \beta \neq 90^0$



7- rasm

Triklin tizim. Bu tizimning panjaralari faqat sodda panjaralardir. Brave parallelipipedi qirralarining a,b,c uzunliklari va ular orasidagi α, β,γ burchaklar. $a \neq b \neq c,\ \alpha \neq \beta \neq \gamma\ \neq 90^0$



8- rasm

Kristall panjarada atomlarni vaziyatini aniqlashda kristallografik koordinatalar sistemasidan foydalaniladi. Koordinatalar boshi sifatida panjaraning bir tuguni, koordinatalar o‘qi sifatida elementar yacheyka qirralarining yo‘nalishlari olinadi. Brave parallelipipedining qirralari koordinata o‘qlari yo‘nalishida uzunlik birliklari deb olinadi. Shuning uchun, xar xil yo‘nalishda uzunlik birliklari xar xil bo‘ladi. Kristall atomlarining markazlaridan o‘tgan tekislik **kristall tekisligi** deyiladi. Bu tekislikning vaziyatini aniqlash uchun **Miller indekslari** deb ataladigan uchta raqamdan foydalaniladi. Ular quyidagicha aniqlanadi. [3]

Sodda kub panjaraning elementar yacheykasini qaraylik. Uning qirralari a_1, a_2, a_3 bo‘lsin. Kristalldagi biror tekislikni koordinata o‘qlarida s_1a_1, s_2a_2, s_3a_3 kesmalar kesgan bo‘lsin, bu yerda, s_1, s_2, s_3 butun sonlar. $\frac{1}{s_1}:\frac{1}{s_2}:\frac{1}{s_3}$ nisbatni yozib, umumiy maxrajga keltiramiz va maxrajni tashlab yuboramiz, suratlardan tashkil topgan butun sonlarning umumiy bo‘luvchisi bo‘lsa, shunga bo‘lib, uchta butun son nisbatini, ya’ni h:k:l Miller indekslarini xosil qilamiz.Ular kristallda tekislikni vaziyatini aniqlaydi. Har bir kristallni panjarasiga quyidagi yo‘l bilan xosil qilinadigan teskari panjara mos keladi. Teskari panjara vektorlari quyidagicha yoziladi.

$$b_1 = \frac{2\pi[a_2 \cdot a_3]}{V_0} \qquad b_2 = \frac{2\pi[a_3 \cdot a_1]}{V_0} \qquad b_3 = \frac{2\pi[a_1 \cdot a_2]}{V_0} \tag{3}$$

$V_0 = |\ (a_1[a_2 \cdot\ a_3])|$- a_1, a_2, a_3 vektorlar asosida yasalgan to‘g‘ri panjarani elementar yacheykasi hajmi. Oddiy kub panjara a_1=a_2=a_3, b_1=b_2= b_3 u xolda $b = \frac{2\pi}{a}\, b_1 b_2 b_3$ asosida yasalgan parallelepiped teskari panjara deyiladi.

$$b_m = m_1 b_1 + m_2 b_2 + m_3 b_3$$

vektor teskari panjarani tugunini aniqlaydi.

$$(b_1[b_2 \cdot\ b_3])| = \frac{(2\pi)^3}{V_0} \qquad (4)$$

$(b_1[b_2 \cdot\ b_3])|$ teskari panjarani xajmi..[4]

Teskari panjarani elementar yacheykasi quyidagicha topiladi. k to‘lqin vektorlar fazosida $2\pi b_1$, $2\pi b_2$, $2\pi b_3$ vektorlar asosida teskari panjara quriladi va teskari panjarani qandaydir tuguni koorditatalar boshi sifatida tanlanib, uning yaqinidagi boshqa tugunlar bilan to‘g‘ri chiziqlar vositasida birlashtiriladi. Bu chiziqlarni o‘rtasida perpendikular tekisliklar o‘tkaziladi. Teskari panjarani elementar yacheykasi sifatida tekisliklar bilan chegaralangan va ichida koordinatalar boshi joylashgan eng kichik, ko‘p qirrali figurani tanlash mumkin. Bu figura **Vigner-Zeytts yacheykasi** deyiladi. Vigner Zeytts yacheykasini xajmi $\frac{(2\pi)^3}{V_0}$ ga teng. (4)-ifodadan kelib chiqadiki $a_1 b_1$=$a_2 b_2$=$a_3 b_3 = 2\pi$

$a_n b_m$=$n_1 m_1 + n_2 m_2 + n_3 m_3$ a_n=$a_1 n_1 + a_2 n_2 + a_3 n_3$ b_m=$b_1 m_1 + b_2 m_2 + b_3 m_3$

Kvaziimpulsni fizik jihatdan ekvivalent bo‘lmagan qiymatlar to‘plamidan iborat soha **Brillyuen zonasi** deyiladi. Brillyuen zonasi sifatida

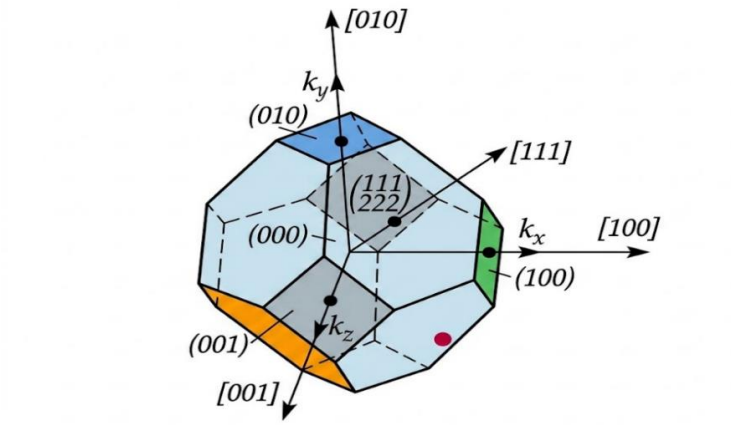
$$-\pi\hbar < Pa_1 \leq \pi\hbar$$
$$-\pi\hbar < Pa_2 \leq \pi\hbar \qquad (5)$$
$$-\pi\hbar < Pa_3 \leq \pi\hbar$$

tengsizliklar bilan aniqlanadigan sohani olish mumkin. Unga **birinchi Brillyuen zonasi** deyiladi. (4)-ifodadan quyidagi kelib chiqadi.

Birinchi Brillyuen zonasi xajmi kuyidagicha $\frac{(2\pi\hbar)^3}{V_0} = \frac{(2\pi\hbar)^3}{a^3}$

k -to‘lqin vektori fazosida birinchi Brillyuen zonasiga gorizont bo‘ylab $-\frac{\pi}{a}$ dan $\frac{\pi}{a}$ gacha bo‘lgan soha to‘g‘ri keladi. Abtsissa o‘qini bu soxasi uzunligi $\frac{2\pi}{a}$ ga tengdir. Ikkinchi Brillyuen zonasi ikkita sohadan tuzilgan: $\frac{\pi}{a}$ dan $\frac{2\pi}{a}$ gacha va $-\frac{2\pi}{a}$ dan $\frac{\pi}{a}$ gacha bo‘lgan sohalar. Shunday qilib, Brillyuen zonasi k o‘qini kesmalari bilan tasvirlanadi va bu kesma bo‘ylab E energiya k ni uzluksiz funktsiyasi hisoblanadi. .[5]

Almaz tipidagi panjara uchun k - fazosida Birinchi Brillyuen zonasi 14 qirrali figura hisoblanadi. Uni 6 qirrasi kvadrat, 8 qirrasi oltiburchakdir. (9-rasm)



9- rasm

Kremniy, germaniy almaz tipidagi panjaraga ega

XULOSA

Yarimo‘tkazgichlar va dielektrik materiallarning makroskopik fizik xossalari ularning ichki tuzilishi va kristallik simmetriyasiga bevosita bog‘liq hisoblanadi. Yarimo‘tkazgichlarda (masalan, olmos simmetriyasiga ega kremniy va germaniyda) atomlararo kovalent bog‘lanishlar qattiq jismda kuchli energetik barqarorlikni ta’minlaydi. Kristall panjaraning davriyligi zarrachalarning harakat qonuniyatlarini belgilab beruvchi asosiy omildir.

Real fazodagi murakkab kristallik strukturalarni to‘lqinlar va kvant mexanikasi nuqtai nazaridan o‘rganishda teskari panjara fazosiga o‘tish hisoblashlarni keskin soddalashtiradi. Birinchi Brillyuen zonasi o‘zida kristallning barcha

simmetriya xossalarini mujassamlashtirgan eng kichik va mukammal hajmga ega. Brillyuen zonalari doirasida elektron va teshiklarning energetik spektri E hamda ularning effektiv massasini m aniqlash zamonaviy yarimo‘tkazgichli asboblar, quyosh elementlari, lazerlar va nanoelektronika qurilmalarini loyihalashning nazariy poydevori hisoblanadi.

Kristallik struktura va Brillyuen zonalarini o‘rganish nafaqat qattiq jism fizikasining nazariy masalasi, balki bugungi kunda mikroelektronika va materialshunoslik sohalarida yangi xususiyatga ega bo‘lgan qurilmalarining ishlash prinsiplarini modellashtirish uchun asosiy matematik va fizik vosita bo‘lib xizmat qiladi.

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МОРФОЛОГИЧЕСКАЯ И ЭЛЕМЕНТНАЯ ХАРАКТЕРИСТИКА МИНЕРАЛЬНЫХ КОМПОНЕНТОВ ДЛЯ НИЗКОУГЛЕРОДНОГО КОМПОЗИЦИОННОГО ЦЕМЕНТА ПО ДАННЫМ SEM-EDS

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Аннотация. *Разработка низкоуглеродных композиционных цементов требует научно обоснованного выбора минеральных компонентов. Методом SEM-EDS исследованы морфология и элементный состав портландцементного клинкера, природного каолина, метакаолина, полученного при обжиге при 800 °C, и железосодержащего минерального компонента. Установлено, что исследуемые материалы имеют различные морфологические особенности и элементный состав. Полученные результаты подтверждают перспективность применения метакаолина в качестве активной минеральной добавки, а железосодержащего минерального*

компонента в качестве тонкодисперсного микронаполнителя при разработке низкоуглеродного композиционного цемента.

Ключевые слова: *низкоуглеродный композиционный цемент, SEM-EDS, каолин, метакаолин, железосодержащий минеральный компонент, микронаполнитель, морфология.*

Abstract. *The development of low-carbon composite cements requires the scientifically justified selection of mineral components. The morphology and elemental composition of Portland cement clinker, natural kaolin, metakaolin produced by calcination at 800 °C, and an iron-containing mineral component were investigated using SEM–EDS analysis. The results showed that the investigated materials differ in particle morphology and elemental composition. Metakaolin demonstrated the characteristics of an active supplementary cementitious material, while the iron-containing mineral component showed potential for use as a fine microfiller in low-carbon composite cement systems. The obtained results confirm the suitability of these materials for the development of low-carbon composite cements.*

Keywords: *low-carbon composite cement; Portland cement clinker; kaolin; metakaolin; iron-containing mineral component; SEM-EDS; microfiller.*

ВВЕДЕНИЕ

В условиях глобальной декарбонизации строительной отрасли снижение содержания портландцементного клинкера рассматривается как один из эффективных способов уменьшения выбросов CO_2 при производстве цемента [1-3]. Для этой цели широко применяются активные минеральные добавки, среди которых особый интерес представляет метакаолин, а также железосодержащие минеральные компоненты, способные выполнять функцию тонкодисперсного микронаполнителя [3-7].

Важным этапом разработки композиционных цементов является исследование морфологии и элементного состава исходных материалов. Одним из наиболее информативных методов является сканирующая электронная микроскопия в сочетании с энергодисперсионным рентгеновским анализом (SEM-EDS) [6, 8].

Цель работы - исследование морфологии и элементного состава портландцементного клинкера, природного каолина, метакаолина, полученного при обжиге при 800 °C, и железосодержащего минерального компонента методом SEM-EDS для обоснования выбора исходных материалов при разработке низкоуглеродного композиционного цемента.

МАТЕРИАЛЫ И МЕТОДЫ

Объектами исследования служили портландцементный клинкер, природный каолин, метакаолин, полученный обжигом при 800 °C, и железосодержащий минеральный компонент. Морфологию поверхности исследовали методом SEM, а элементный состав определяли методом EDS. Анализ включал оценку формы частиц, характера поверхности, степени агломерации и распределения основных химических элементов. [6, 8-10].

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Для оценки перспективности исследуемых материалов при разработке низкоуглеродного композиционного цемента выполнен SEM-EDS анализ портландцементного клинкера, природного каолина, метакаолина и железосодержащего минерального компонента. Полученные результаты позволили выявить особенности морфологии поверхности и элементного состава каждого материала, определить их отличительные характеристики и оценить их потенциальную роль в составе композиционного цемента.

SEM-анализ показал, что природный каолин представлен агломерированными частицами неправильной формы с шероховатой поверхностью (рис.1). EDS выявил преобладание кислорода, кремния и алюминия, что соответствует алюмосиликатному составу каолина.

После термической обработки при температуре 800 °C метакаолин сохраняет агломерированную структуру, однако поверхность частиц становится более развитой и шероховатой по сравнению с природным каолином. Такие изменения характерны для термической активации

каолина. По данным EDS основными элементами являются кислород, кремний и алюминий, что соответствует алюмосиликатному составу метакаолина (рис.2).

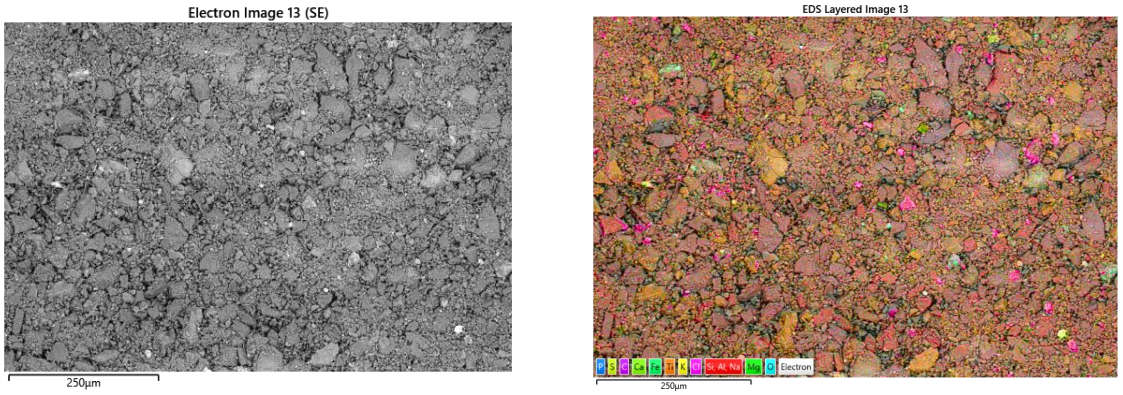

Рис.1. SEM анализ природного каолина**.**

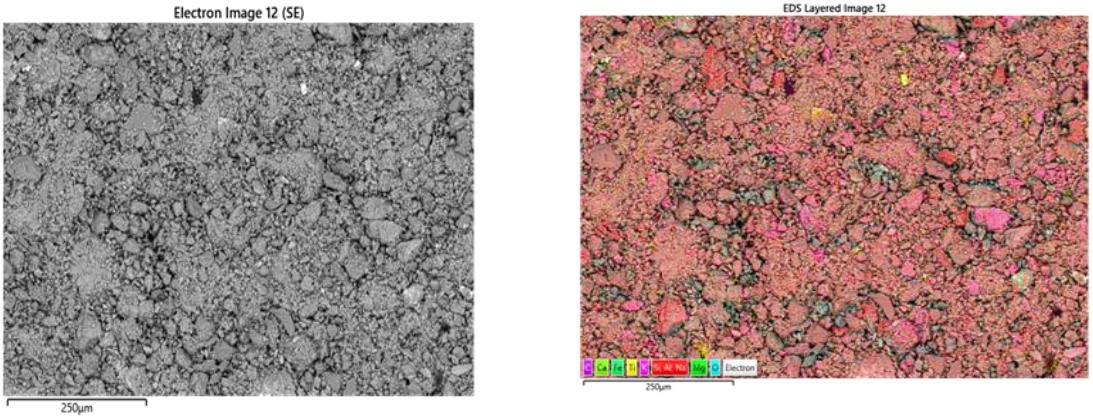

Рис. 2. SEM анализ метакаолина после термической обработки при 800 °C.

SEM-изображение портландцементного клинкера (рис.3) демонстрирует плотные угловатые зерна с компактной поверхностью, характерные для клинкерных минералов, сформированных в процессе высокотемпературного обжига. По данным EDS в составе материала преобладают кислород, кальций и кремний, что соответствует основным силикатным фазам портландцементного клинкера.

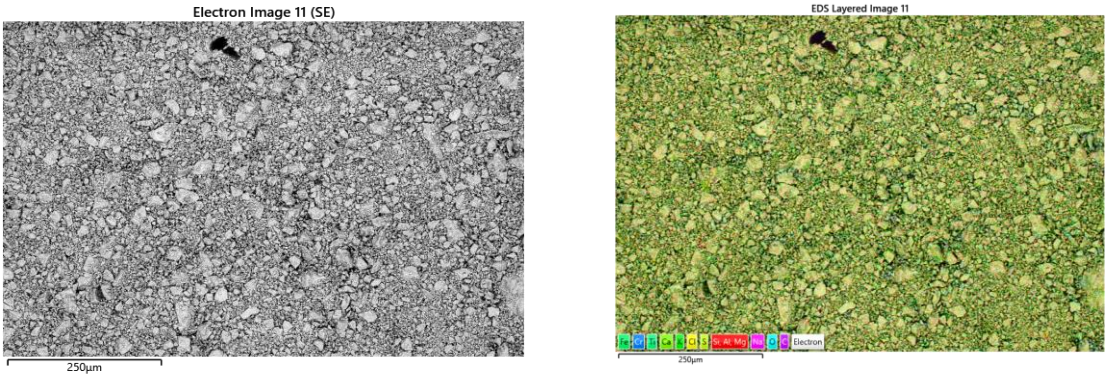

Рис. 3. SEM анализ портландцементного клинкера.

Для железосодержащего минерального компонента характерны угловатые частицы с выраженными гранями, формирующие неоднородную зернистую структуру (рис. 4). Такая морфология отличается от исследованных алюмосиликатных материалов и указывает на преимущественно кристаллический характер исследуемого компонента. По данным EDS в составе преобладают железо, кислород, кремний и титан, что соответствует его минеральному составу.

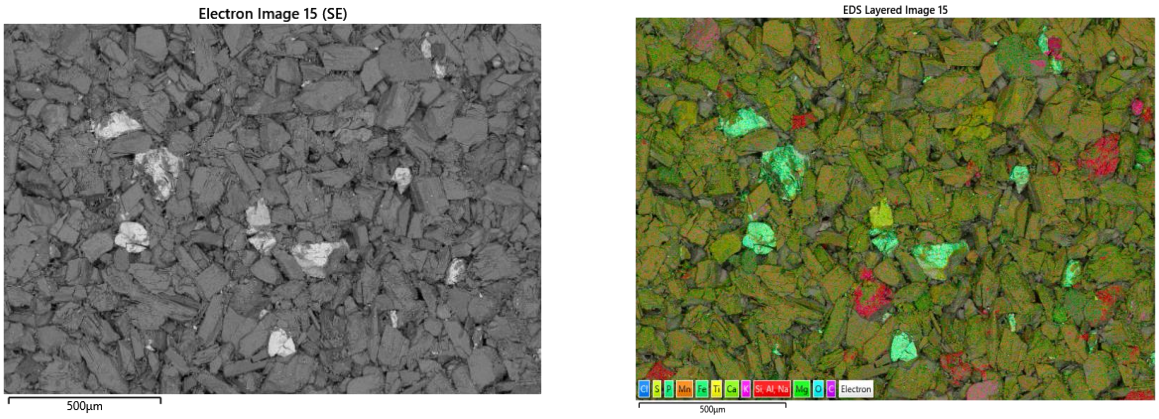

Рис. 4. SEM анализ железосодержащего минерального компонента.

Проведенный SEM–EDS-анализ выявил различия в морфологии и элементном составе исследуемых материалов, что позволило определить их функциональную роль при разработке низкоуглеродного композиционного цемента.

ЗАКЛЮЧЕНИЕ

Методом SEM-EDS исследованы морфология и элементный состав портландцементного клинкера, природного каолина, метакаолина и железосодержащего минерального компонента. Выявленные особенности подтверждают целесообразность использования исследуемых материалов при разработке низкоуглеродного композиционного цемента. Полученные результаты служат основой для дальнейших исследований композиционных цементных систем.

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«КОМПЛЕКСНАЯ ОЦЕНКА ХИМИЧЕСКОГО СОСТАВА АРТЕЗИАНСКИХ ВОД И ИХ ВЛИЯНИЯ НА ОРГАНИЗМ ЧЕЛОВЕКА, НА ПРИМЕРЕ КАРАУЗЯКСКОГО РАЙОНА РЕСПУБЛИКИ КАРАКАЛПАКСТАН»

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Аннотация: *В данном исследовании комплексно оценён химический состав артезианских вод. В пробах воды были проанализированы pH, минерализация, общая жёсткость, а также основные и отдельные микроэлементы. На основании полученных результатов были оценены гидрохимические характеристики воды, её качество, а также возможности использования для питьевых и хозяйственных целей. Исследование направлено на выявление геологических, гидрогеологических и антропогенных факторов, влияющих на формирование состава воды. Также были разработаны научно обоснованные выводы и практические рекомендации по охране водных ресурсов, их рациональному использованию, снижению экологических рисков и совершенствованию мониторинга качества воды. Результаты имеют важное значение для развития региональных гидрохимических исследований и оценки состояния подземных вод.*

Ключевые слова: *Артезианские воды, подземные воды, химический состав, гидрохимический анализ, комплексная оценка, минерализация, качество воды, гидрохимические характеристики.*

Abstract: *This study comprehensively evaluated the chemical composition of artesian water. The water samples were analyzed for pH, mineralization, total hardness, as well as major and selected trace elements. Based on the obtained results, the hydrochemical characteristics, quality, and suitability of the water for drinking and domestic purposes were*

evaluated. The study was aimed at identifying the geological, hydrogeological, and anthropogenic factors affecting the formation of the water composition. Furthermore, scientifically based conclusions and practical recommendations were developed for the protection of water resources, their rational use, the reduction of environmental risks, and the improvement of water quality monitoring. The results are of significant importance for the development of regional hydrochemical studies and the assessment of the condition of groundwater.

Keywords: *Artesian waters, groundwater, chemical composition, hydrochemical analysis, comprehensive assessment, mineralization, water quality, hydrochemical characteristics.*

ВВЕДЕНИЕ

Водные ресурсы являются одним из важнейших природных богатств, обеспечивающих жизнь человечества, отрасли экономики и устойчивость окружающей среды. В последние годы в связи с увеличением численности населения, интенсивным развитием промышленности и сельского хозяйства, а также влиянием изменения климата потребность в качественной питьевой воде всё больше возрастает. В таких условиях подземные воды, в частности артезианские воды, приобретают важное стратегическое значение в обеспечении населения чистой и устойчивой водой.

Артезианские воды характеризуются накоплением в напорных водоносных горизонтах, расположенных между водонепроницаемыми слоями. Хотя они относительно хорошо защищены от воздействия внешней среды, под влиянием длительных геохимических процессов, а также природных и антропогенных факторов в их химическом составе могут происходить значительные изменения. Поэтому всестороннее изучение и комплексная оценка химического состава артезианских вод имеют важное научное и практическое значение при рациональном использовании водных ресурсов, контроле их экологического состояния, а также определении соответствия требованиям к качеству питьевой воды.

Химический состав артезианских вод, в основном, формируется под влиянием минералогических свойств водоносных горных пород, пути и продолжительности движения воды под землёй, геохимических взаимодействий между водой и горной породой, а также воздействия внешних антропогенных факторов. Поэтому при оценке их гидрохимических свойств важным считается комплексный анализ основных катионов (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}), анионов (HCO_3^{-}, SO_4^{2-}, Cl^{-}), степени минерализации, жёсткости, pH, микроэлементов и содержания тяжёлых металлов.

В настоящее время при оценке артезианских вод наряду с результатами гидрохимического анализа широко используются статистические и геохимические методы, в том числе корреляционный анализ, анализ главных компонентов (PCA), кластерный анализ, а также диаграммы Piper, Gibbs и Durov. Эти методы позволяют определить механизмы формирования химического состава воды, взаимодействие вода–горная порода и возможные источники загрязнения.

ОСНОВНАЯ ЧАСТЬ

При анализе открытых данных Управления статистики Республики Каракалпакстан, за последние 4 года о обеспеченности населения Караузякского района питьевой водой в разрезе квартир и домов, на диаграмме на рисунке 1 ниже показана динамика ежегодного роста в

процентных показателях.

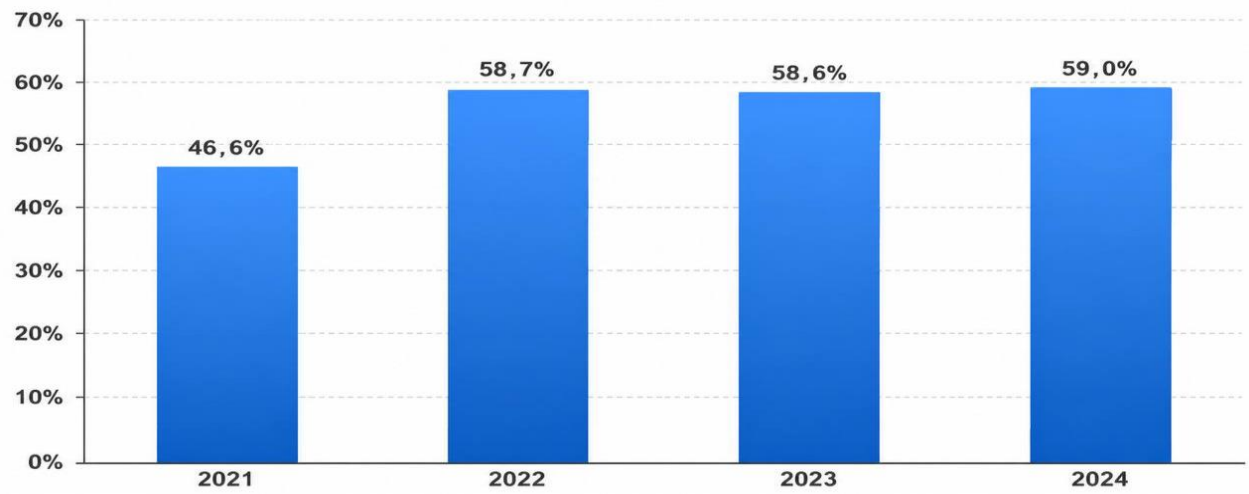

Рисунок 1. Динамика ежегодного роста обеспеченности Караузякского района питьевой водой.

Население Караузякского района в целом обеспечено централизованной питьевой водой на 59,6% через 26 водных сооружений, из них 23 являются сооружениями по опреснению воды, остальные 40,4% используют альтернативные источники питьевой воды.

Исходя из вышеизложенных факторов, жители территории Маденiятского ССХ, Кораузакского района Республики Каракалпакстан, на протяжении многих лет используют подземные (артезианские) воды в качестве источника питьевого водоснабжения. С целью оценки качества данной подземной воды нами были исследованы показатели пробы, отобранной из указанного источника, в лаборатории «Qoraqalpoq suv ta’minoti» Республики Каракалпакстан. Показатели, установленные по результатам проведённых исследований, на диаграмме на рисунке 2 ниже показана, результаты лабораторного анализа исследуемой пробы воды.

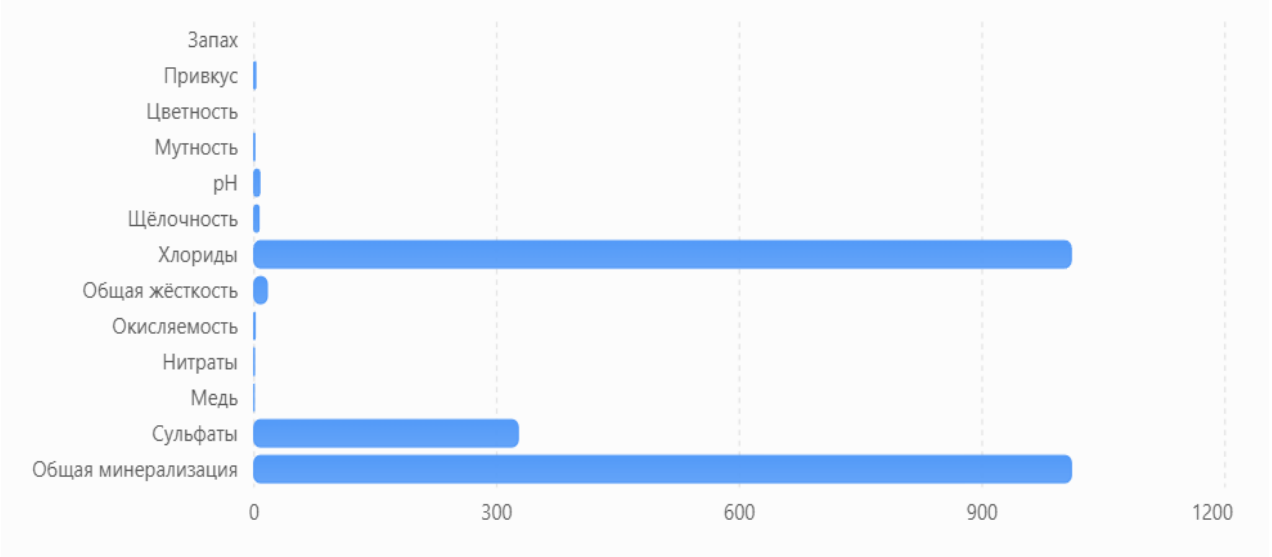

Рисунок 2. Качественные показатели подземной (артезианской) воды.

В отдалённых районах Каракалпакстана существуют актуальные проблемы, связанные с обеспечением качественным питьевым водоснабжением. Качество питьевой воды — важная проблема, имеющая большое значение для здоровья человека и экологии. В настоящее время, когда актуальность экологических проблем возрастает, качество воды является непосредственным фактором здоровья, и при ухудшении качества питьевой воды она приводит к различным заболеваниям, особенно заболеваниям пищеварения, печени, почек, сердечно-сосудистой и иммунной систем. Особенно важно изучение влияния качества питьевой воды на здоровье человека, поскольку наличие в воде тяжёлых металлов (например, свинца, кадмия, ртути), нитратов или микроорганизмов оказывает непосредственное экологическое и физиологическое воздействие на организм человека.

Что такое вода? Жизнь невозможно представить без воды. Вода — это дар Аллаха, данный для существования и жизни живых существ. Вода, которая является чрезвычайно необходимой в жизни человека, в его жизненной деятельности, для почти всех отраслей народного хозяйства, можно сказать, является своеобразной минеральной жидкостью. Наука,

развитие техники, деятельность промышленных предприятий, сельское хозяйство и другие сферы связаны с водой. Вода — это гидросфера, тесно связанная с другими оболочками Земли, то есть с атмосферой, литосферой и биосферой, и является их основным составом. Вода постоянно находится в движении в земной коре. Мировой обмен воды связывает гидросферу как одну замкнутую систему, то есть море — океан — атмосфера — суша. Эта замкнутая система обеспечивает мировой обмен воды. [1]

При проведении исследовательских работ применялся гидрохимический подход, направленный на комплексную оценку химического состава артезианских вод. В процессе анализа проб воды были определены их основные физико-химические и качественные показатели.

Определение содержания микроэлементов и потенциальных загрязняющих компонентов в составе воды является важной частью комплексной оценки. Содержание железа, марганца, фтора, нитратов и тяжёлых металлов определяет экологическое состояние воды. Их высокие концентрации могут быть обусловлены природными геохимическими процессами или антропогенным воздействием.

При комплексной оценке качества артезианских вод важным критерием является ионный баланс воды и её гидрохимическая классификация. Полученные данные могут быть проанализированы с помощью диаграммы Piper, диаграммы Stiff и других гидрохимических методов. Эти методы позволяют определить преобладающие ионы в составе воды и оценить различия между различными водоносными горизонтами.

Путём статистической обработки результатов исследований определяются основные переменные в составе воды и взаимосвязи между ними. Корреляционный анализ и анализ главных компонентов (PCA)

помогают определить основные факторы формирования химического состава воды.

Таким образом, комплексная оценка химического состава артезианских вод служит важной научной основой для определения качества водных ресурсов, установления возможностей их эффективного использования и совершенствования системы экологического мониторинга.

В составе данных вод содержатся различные минеральные вещества, соли и химические элементы, влияние которых на здоровье человека может быть различным. Если одни минералы считаются полезными для организма, то другие оказывают вредное воздействие на такие жизненно важные органы, как почки и печень. Особенно почки, поскольку они выполняют функцию фильтрации в организме человека, первыми воспринимают их вредное воздействие. Тяжёлые металлы, содержащиеся в воде, — алюминий, никель, медь и другие элементы, могут накапливаться в организме и вызывать различные заболевания. Поэтому в настоящее время анализ и изучение химического состава артезианских вод, а также исследование их влияния на здоровье организма человека являются актуальным вопросом, имеющим научное и практическое значение в области современной медицины и экологии.

Общее понятие об артезианских водах. Артезианские воды — это подземные воды, расположенные в водоносных слоях земной коры и с обеих сторон ограниченные водонепроницаемыми слоями (глина, мергель, соляные слои). Они находятся под гидростатическим давлением и при выходе на поверхность земли через пробурённую скважину могут самостоятельно подниматься в виде фонтана. Артезианские воды относятся к подземным водам, которые длительное время сохраняются между геологическими слоями. Эти воды, насыщаясь минералами в недрах земли, содержат в своём составе различные микро- и макроэлементы.

Артезианские воды оказывают ряд положительных и отрицательных воздействий на организм человека. В качестве примера данные воздействия представлены в таблице 1.

Химический элемент	Положительное влияние	Отрицательное влияние
Кальций (Ca^{2+})	Укрепляет кости и зубы, предотвращает развитие остеопороза.	-
Калий (K^{+})	Важен для ритмичной работы сердца и деятельности мышц.	-
Натрий (Na^{+})	Регулирует водно-солевой баланс.	-
Магний (Mg^{2+})	Поддерживает здоровье сердечно-сосудистой системы, оказывает успокаивающее воздействие на нервную систему.	-
Железо (Fe)	-	Риск образования камней в почках.
Стронций (Sr)	-	Риск образования камней в почках.
Никель (Ni)	-	Оказывает негативное воздействие на печень и нервную систему.
Медь (Cu)	-	Оказывает негативное воздействие на печень и нервную систему.

Таблица 1. Положительное и отрицательное влияние артезианских вод на организм человека.

ЗАКЛЮЧЕНИЕ

Таким образом, минеральные вещества и химические элементы, содержащиеся в составе артезианских вод, имеют важное значение для организма человека, а их воздействие определяется содержанием и свойствами данных компонентов. Такие минералы, как кальций и магний, участвуют в важных физиологических процессах организма, тогда как повышенное содержание отдельных элементов может оказывать неблагоприятное влияние на здоровье человека. В связи с этим изучение химического состава артезианских вод, оценка содержания в них микро- и макроэлементов, а также определение их воздействия на организм

человека имеют важное научное значение для контроля качества воды и её безопасного использования.

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2-SECTION

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SUN'IY INTELLEKT ASOSIDA PEDAGOGLARNI BAHOLASHNING INTEGRATSIYALASHGAN RAQAMLI MODELI: MAKTABLARDA INSON RESURSLARINI BOSHQARISHNI TAKOMILLASHTIRISHNING INNOVATSION YONDASHUVI

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Annotatsiya. *Mazkur maqolada umumiy o'rta ta'lim muassasalarida pedagoglarni baholash tizimini inson resurslarini boshqarishning strategik elementi sifatida takomillashtirish masalalari tadqiq etilgan. An'anaviy baholash tizimining afzallik va kamchiliklari tahlil qilinib, sun'iy intellekt, HR Analytics, KPI va 360 darajali baholashni integratsiyalashga asoslangan mualliflik konseptual modeli taklif etilgan. Tadqiqot natijalari pedagoglarning kasbiy faoliyatini uzluksiz monitoring qilish, kasbiy rivojlanish ehtiyojlarini aniqlash hamda ma'lumotlarga asoslangan boshqaruv qarorlarini qabul qilishda sun'iy intellekt texnologiyalarining imkoniyatlarini ochib beradi. Taklif etilgan model pedagoglarni baholashning shaffofligi va xolisligini ta'minlash, inson resurslarini boshqarish samaradorligini oshirish hamda ta'lim sifati ko'rsatkichlarini yaxshilashga xizmat qiladi.*

Kalit so'zlar: *sun'iy intellekt, pedagoglarni baholash, inson resurslarini boshqarish, HR Analytics, KPI, 360 darajali baholash, ta'lim menejmenti, raqamli transformatsiya.*

Аннотация. *В статье исследуются вопросы совершенствования системы оценки педагогов как стратегического элемента управления человеческими ресурсами в общеобразовательных школах. Проанализированы преимущества и ограничения традиционных методов оценки, предложена авторская концептуальная модель, основанная на интеграции искусственного интеллекта, HR-аналитики, KPI и оценки 360 градусов. Полученные результаты раскрывают возможности применения искусственного интеллекта для непрерывного мониторинга профессиональной*

деятельности педагогов, определения потребностей их профессионального развития и принятия управленческих решений на основе данных. Предлагаемая модель способствует повышению объективности оценки педагогов, эффективности управления человеческими ресурсами и качества образования.

Ключевые слова: *искусственный интеллект, оценка педагогов, управление человеческими ресурсами, HR Analytics, KPI, оценка 360 градусов, образовательный менеджмент.*

Abstract. *This study examines the improvement of teacher performance assessment as a strategic component of human resource management in secondary schools. The strengths and limitations of conventional evaluation approaches are analyzed, and a conceptual framework integrating Artificial Intelligence, HR Analytics, Key Performance Indicators (KPIs), and 360-degree feedback is proposed. The findings demonstrate that AI technologies can support continuous monitoring of teacher performance, identify professional development needs, and facilitate evidence-based managerial decision-making. The proposed framework enhances transparency and objectivity in teacher assessment while improving the effectiveness of school human resource management and contributing to educational quality.*

Keywords: *Artificial Intelligence, Teacher Performance Assessment, Human Resource Management, HR Analytics, KPI, 360-degree Feedback, Educational Management, Digital Transformation.*

KIRISH

Ta'lim tizimining raqamli transformatsiyasi inson resurslarini boshqarish mexanizmlariga yangicha yondashuvlarni joriy etishni taqozo etmoqda. Zamonaviy maktab rahbaridan nafaqat ta'lim jarayonini samarali tashkil etish, balki pedagog xodimlarning kasbiy salohiyatini muntazam rivojlantirish, ularning faoliyatini xolis baholash va boshqaruv qarorlarini ishonchli ma'lumotlar asosida qabul qilish talab etiladi. Shu nuqtai nazardan, pedagoglarni baholash tizimini takomillashtirish inson resurslarini boshqarishning ustuvor yo'nalishlaridan biriga aylanmoqda. Amaldagi baholash tizimlari asosan attestatsiya, dars kuzatuvi, metodik hujjatlar tahlili va ma'muriy nazorat kabi an'anaviy usullarga tayangan holda amalga oshiriladi. Mazkur yondashuvlar pedagog faoliyatining ayrim jihatlarini baholash imkonini bersa-da, ular kasbiy

rivojlanish dinamikasi, raqamli kompetensiyalar, innovatsion faoliyat va ta'lim natijalariga ta'sir etuvchi omillarni kompleks tahlil qilish imkoniyatini cheklaydi. Bundan tashqari, baholash jarayonida subyektivlikning mavjudligi hamda turli axborot tizimlarida shakllanayotgan ma'lumotlarning integratsiyalashmaganligi boshqaruv qarorlarining sifatiga salbiy ta'sir ko'rsatadi.

So'nggi yillarda sun'iy intellekt texnologiyalarining jadal rivojlanishi inson resurslarini boshqarish tizimida yangi imkoniyatlarni yuzaga keltirdi. Xususan, HR Analytics, mashinali o'qitish (Machine Learning), katta hajmdagi ma'lumotlarni tahlil qilish (Big Data Analytics) va bashoratli tahlil (Predictive Analytics) vositalari xodimlarning faoliyatini real vaqt rejimida kuzatish, samaradorlik ko'rsatkichlarini baholash va rivojlanish ehtiyojlarini aniqlash imkonini bermoqda. Mazkur texnologiyalar biznes tashkilotlarida keng qo'llanilayotgan bo'lsa-da, umumiy o'rta ta'lim muassasalarida ularni pedagoglarni baholash tizimiga integratsiyalash masalasi hali yetarli darajada o'rganilmagan. Xalqaro ilmiy tadqiqotlar shuni ko'rsatadiki, ta'lim tizimida sun'iy intellektdan foydalanish asosan o'quvchilar bilimini baholash, moslashtirilgan ta'lim muhitini yaratish va o'quv jarayonini optimallashtirishga qaratilgan. Pedagoglarni baholashni inson resurslarini boshqarishning strategik elementi sifatida sun'iy intellekt asosida tashkil etishga bag'ishlangan tadqiqotlar esa nisbatan kam uchraydi. Natijada maktablarda pedagog faoliyatini baholash, kasbiy rivojlanishni rejalashtirish va boshqaruv qarorlarini qabul qilishni yagona raqamli platformada birlashtiruvchi konseptual modelga ehtiyoj mavjud. Mazkur tadqiqotning maqsadi umumiy o'rta ta'lim muassasalarida pedagoglarni baholashning zamonaviy yondashuvlarini tahlil qilish hamda sun'iy intellekt texnologiyalari, HR Analytics, KPI va 360 darajali baholash mexanizmlarini integratsiyalash asosida pedagoglarni baholashning konseptual modelini ishlab chiqishdan iborat. Tadqiqot davomida qiyosiy tahlil, tizimli yondashuv, ilmiy umumlashtirish, kontent tahlili va konseptual modellashtirish usullaridan

foydalanildi. Shuningdek, inson resurslarini boshqarish, ta'lim menejmenti va sun'iy intellekt sohalaridagi zamonaviy ilmiy manbalar o'rganilib, ularning natijalari umumlashtirildi. Tadqiqotning asosiy ilmiy g'oyasi pedagoglarni baholashni nazorat mexanizmi sifatida emas, balki kasbiy rivojlanishni boshqarishga xizmat qiluvchi strategik boshqaruv vositasi sifatida talqin qilishdan iborat.

Bugungi kunda maktablarda pedagog faoliyatiga oid ma'lumotlar elektron jurnal, malaka oshirish platformalari, attestatsiya natijalari, metodik faoliyat ko'rsatkichlari va o'quvchilar ta'lim natijalari kabi turli axborot manbalarida shakllanmoqda. Mazkur ma'lumotlarni yagona analitik tizimda birlashtirish pedagog faoliyati to'g'risida kompleks tasavvur hosil qilish, individual rivojlanish yo'nalishlarini aniqlash va inson resurslarini boshqarish samaradorligini oshirish imkonini beradi. Shu sababli sun'iy intellekt texnologiyalarini pedagoglarni baholash jarayoniga tatbiq etish ta'lim menejmentining istiqbolli yo'nalishlaridan biri sifatida qaralmoqda. Pedagoglarni baholashning zamonaviy modeli faqatgina mavjud natijalarni qayd etishga emas, balki kelgusidagi rivojlanish ehtiyojlarini prognoz qilishga ham xizmat qilishi lozim. Aynan shu yondashuv ta'lim tashkilotlarida inson kapitalini rivojlantirish, pedagoglarning kasbiy salohiyatini to'liq ro'yobga chiqarish hamda ta'lim sifati va raqobatbardoshligini oshirishning muhim omillaridan biri hisoblanadi.

2. Tadqiqot natijalari va muhokama. Pedagoglarni baholash tizimining samaradorligi ta'lim muassasasida inson resurslarini boshqarish sifatini belgilovchi asosiy omillardan biridir. Olib borilgan ilmiy tahlillar shuni ko'rsatadiki, amaliyotda qo'llanilayotgan baholash mexanizmlari asosan attestatsiya, dars kuzatuvi, metodik faoliyatni ekspert baholash hamda hisobot hujjatlarini tahlil qilishga asoslangan. Ushbu yondashuvlar pedagog faoliyatining ayrim jihatlarini baholash imkonini bersa-da, ular o'qituvchining kasbiy rivojlanish dinamikasi, innovatsion faoliyati, raqamli kompetensiyalari

hamda ta'lim natijalariga qo'shayotgan hissasini kompleks baholash imkonini bermaydi.

Raqamli transformatsiya sharoitida pedagog faoliyati haqida katta hajmdagi ma'lumotlar shakllanmoqda. Elektron jurnal tizimlari, masofaviy ta'lim platformalari, malaka oshirish bazalari, attestatsiya natijalari, metodik ishlanmalar, o'quvchilarning o'zlashtirish ko'rsatkichlari va ota-onalar fikrlari pedagog faoliyatining turli jihatlarini tavsiflaydi. Ammo mazkur ma'lumotlarning alohida platformalarda saqlanishi ularni yagona tizim sifatida tahlil qilish imkoniyatini cheklaydi. Natijada boshqaruv qarorlari ko'pincha to'liq bo'lmagan axborot asosida qabul qilinadi.

Mazkur tadqiqotda pedagoglarni baholashni inson resurslarini boshqarishning strategik vositasi sifatida takomillashtirish maqsadida sun'iy intellekt, HR Analytics, KPI va 360 darajali baholashni integratsiyalovchi konseptual model ishlab chiqildi. Taklif etilayotgan model baholash jarayonini faqat nazorat vositasi emas, balki pedagogning kasbiy rivojlanishini qo'llab-quvvatlovchi uzluksiz boshqaruv tizimi sifatida tashkil etishga xizmat qiladi.

Muallif tomonidan ishlab chiqilgan konseptual model beshta o'zaro bog'liq bosqichdan iborat:

- pedagog faoliyatiga oid ma'lumotlarni yagona raqamli bazaga jamlash;
- asosiy samaradorlik ko'rsatkichlarini (KPI) avtomatik hisoblash;
- 360 darajali baholash natijalarini integratsiyalash;
- sun'iy intellekt algoritmlari yordamida analitik tahlilni amalga oshirish;
- boshqaruv qarorlari va individual kasbiy rivojlanish tavsiyalarini shakllantirish.

Mazkur yondashuvning afzalligi shundaki, u pedagog faoliyatini baholashning barcha bosqichlarini yagona boshqaruv sikliga birlashtiradi.

Natijada baholash jarayoni epizodik tadbir emas, balki doimiy monitoring tizimiga aylanadi.

1-jadval.

Pedagoglarni baholashning an'anaviy va sun'iy intellekt asosidagi yondashuvlarini qiyosiy tahlili

Mezoni	**An'anaviy baholash**	**AI asosidagi baholash**
Baholash davriyligi	Yiliga 1–2 marta	Uzluksiz monitoring
Axborot manbalari	Cheklangan	Ko'p manbali integratsiya
Qaror qabul qilish	Ekspert fikriga asoslangan	Ma'lumotlarga asoslangan
Tahlil tezligi	Qo'lda	Avtomatlashtirilgan
Prognozlash imkoniyati	Mavjud emas	Mavjud
Kasbiy rivojlanish tavsiyalari	Umumiy	Individuallashtirilgan

Manba: muallif ishlanmasi.

Jadval natijalari sun'iy intellekt asosidagi baholash tizimi an'anaviy baholash usullariga nisbatan bir qator ustunliklarga ega ekanligini ko'rsatadi. Avvalo, AI texnologiyalari turli axborot manbalaridan olingan ma'lumotlarni real vaqt rejimida qayta ishlash imkonini beradi. Bu esa pedagog faoliyatidagi o'zgarishlarni tezkor aniqlash hamda zarur boshqaruv choralarini o'z vaqtida qo'llashga xizmat qiladi.

Pedagoglarni baholashda KPI tizimidan foydalanish baholash mezonlarining aniqligi va shaffofligini oshiradi. Tadqiqot natijalariga ko'ra, pedagog faoliyatini baholashda faqat ta'lim natijalariga tayanish yetarli emas. Baholash pedagogning metodik faolligi, raqamli texnologiyalardan foydalanish darajasi, kasbiy rivojlanishdagi ishtiroki va ta'lim jarayoniga qo'shayotgan innovatsion hissasini ham qamrab olishi lozim.

2-jadval.

Pedagog faoliyatini kompleks baholash uchun tavsiya etilgan KPI tizimi

Ko'rsatkich	Ulushi (%)
O'quvchilar ta'lim natijalari	30
Darslarni tashkil etish sifati	20
Raqamli kompetensiyalar	15
Metodik faoliyat	15
Kasbiy rivojlanish	10
Innovatsion loyihalardagi ishtirok	10

Manba: muallif ishlanmasi.

Taklif etilgan KPI tizimi pedagog faoliyatini faqat yakuniy natijalar orqali emas, balki uning kasbiy rivojlanishiga ta'sir qiluvchi asosiy omillar asosida ham baholash imkonini beradi. Bu esa inson resurslarini boshqarishda rag'batlantirish, malaka oshirish va karyerani rejalashtirish bo'yicha qarorlar qabul qilishning ilmiy asoslanganligini oshiradi. Muhim jihatlardan biri 360 darajali baholash mexanizmini AI texnologiyalari bilan uyg'unlashtirish hisoblanadi. An'anaviy tizimlarda baholash asosan rahbar yoki attestatsiya komissiyasi tomonidan amalga oshiriladi. Taklif etilayotgan modelda esa baholash jarayonida maktab rahbari, metodik birlashma rahbari, hamkasblar, o'quvchilar va ota-onalar fikri ham hisobga olinadi. Sun'iy intellekt algoritmlari mazkur ma'lumotlarni umumlashtirib, subyektivlikni kamaytiradi va yakuniy natijaning ishonchliligini oshiradi. Shuningdek, AI texnologiyalari pedagoglarning kelgusidagi kasbiy rivojlanish ehtiyojlarini prognoz qilish imkonini ham yaratadi. Masalan, algoritmlar pedagogning faoliyat ko'rsatkichlari pasayish tendensiyasini aniqlasa, tizim avtomatik ravishda tegishli malaka oshirish kurslari, mentorlik dasturlari yoki metodik treninglarni tavsiya etishi mumkin. Mazkur yondashuv muammolarni yuzaga kelgandan

keyin bartaraf etishga emas, balki ularning oldini olishga xizmat qiladi. Taklif etilgan modelning yana bir afzalligi inson resurslarini boshqarishning strategik yo'nalishlarini qo'llab-quvvatlashidir. Sun'iy intellekt yordamida shakllantirilgan analitik hisobotlar asosida maktab rahbari pedagoglarning kuchli va rivojlantirilishi zarur bo'lgan kompetensiyalarini aniqlashi, kadrlar zaxirasini shakllantirishi, rag'batlantirish tizimini takomillashtirishi hamda ta'lim sifati bilan bog'liq xavflarni oldindan baholashi mumkin. Tadqiqot natijalari shuni ko'rsatadiki, sun'iy intellekt texnologiyalarini pedagoglarni baholash tizimiga joriy etish baholashning shaffofligi va xolisligini oshirish bilan birga, inson resurslarini boshqarish samaradorligini ham sezilarli darajada yaxshilaydi. Shu bilan birga, bunday tizimni joriy etishda ma'lumotlar xavfsizligini ta'minlash, algoritmlarning shaffofligini nazorat qilish hamda pedagoglarning raqamli kompetensiyalarini rivojlantirish muhim shartlardan biri hisoblanadi. Mazkur omillar hisobga olingan holda AI asosidagi baholash modeli umumiy o'rta ta'lim muassasalarida inson resurslarini boshqarishning zamonaviy va samarali mexanizmini shakllantirishga xizmat qiladi.

Tadqiqot natijalari umumiy o‘rta ta’lim muassasalarida pedagoglarni baholashning amaldagi tizimi zamonaviy inson resurslarini boshqarish talablariga to‘liq javob bermasligini ko‘rsatdi. An’anaviy baholash usullarining davriy xarakterga egaligi, baholash natijalarining turli axborot tizimlarida tarqoq holda saqlanishi hamda subyektiv omillarning mavjudligi pedagog faoliyatini kompleks tahlil qilish va samarali boshqaruv qarorlarini qabul qilish imkoniyatlarini cheklaydi. Bu esa pedagoglarning kasbiy salohiyatini rivojlantirish hamda ta’lim sifatini oshirish jarayoniga salbiy ta’sir ko‘rsatadi.

Tadqiqot davomida pedagoglarni baholashni inson resurslarini boshqarishning strategik elementi sifatida takomillashtirishga qaratilgan sun’iy intellektga asoslangan integratsiyalashgan konseptual model ishlab chiqildi. Taklif etilgan model HR Analytics, asosiy samaradorlik ko‘rsatkichlari (KPI), 360 darajali baholash hamda sun’iy intellekt algoritmlarini yagona boshqaruv

tizimiga birlashtirishi bilan mavjud yondashuvlardan farq qiladi. Mazkur model pedagog faoliyatini doimiy monitoring qilish, kasbiy rivojlanish ehtiyojlarini o‘z vaqtida aniqlash, baholashning shaffofligi va xolisligini ta’minlash hamda boshqaruv qarorlarini ishonchli ma’lumotlar asosida qabul qilish imkonini yaratadi.

Shuningdek, sun’iy intellekt texnologiyalaridan foydalanish pedagoglarning individual rivojlanish trayektoriyasini shakllantirish, malaka oshirish dasturlarini maqsadli rejalashtirish, kadrlar zaxirasini shakllantirish va rag‘batlantirish tizimini takomillashtirishga xizmat qilishi asoslandi. Bu esa inson resurslarini boshqarish samaradorligini oshirish bilan bir qatorda, ta’lim muassasasining institutsional rivojlanishi va ta’lim sifati ko‘rsatkichlarining yaxshilanishiga ham ijobiy ta’sir ko‘rsatadi.

Tadqiqot natijalariga tayangan holda quyidagi amaliy tavsiyalar ishlab chiqildi:

- pedagoglar faoliyatiga oid ma’lumotlarni yagona raqamli platformaga integratsiyalash;
- pedagoglarni baholashda KPI va 360 darajali baholash mexanizmlarini sun’iy intellekt texnologiyalari bilan uyg‘unlashtirish;
- HR Analytics vositalaridan foydalanish orqali pedagoglarning kasbiy rivojlanish ehtiyojlarini muntazam tahlil qilish;
- maktab rahbarlari va kadrlar bo‘yicha mas’ul xodimlarning sun’iy intellekt hamda raqamli analitika bo‘yicha kompetensiyalarini rivojlantirish;
- pedagoglarni baholash jarayonida shaxsiy ma’lumotlarni himoya qilish, algoritmlarning shaffofligi va etik tamoyillarga rioya etishni ta’minlash.

Xulosa qilib aytganda, sun’iy intellekt asosida pedagoglarni baholashning integratsiyalashgan modeli umumiy o‘rta ta’lim muassasalarida inson resurslarini boshqarish tizimini takomillashtirishning istiqbolli yo‘nalishlaridan biri hisoblanadi. Mazkur modelni amaliyotga joriy etish pedagoglarni baholashning xolisligi va samaradorligini oshirish, boshqaruv qarorlarini ilmiy

asoslash hamda ta’lim sifati va raqobatbardoshligini yuksaltirish uchun muhim ilmiy-amaliy ahamiyat kasb etadi.

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GENERATIV SUN'IY INTELLEKT ASOSIDA KORXONALARDA BOSHQARUV QARORLARINI QABUL QILISH SAMARADORLIGINI BAHOLASH

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Annotatsiya. *Ushbu maqolada generativ sun'iy intellektning korxonalarda boshqaruv qarorlarini qabul qilish samaradorligiga ta'siri iqtisodiy nuqtai nazardan baholangan. Xalqaro tajriba hamda 2025–2026-yillardagi McKinsey, Deloitte va OECD ma'lumotlari asosida AI texnologiyalarining mehnat unumdorligi, operatsion xarajatlar va strategik boshqaruvga ta'siri tahlil qilindi. Tadqiqot davomida AI-DSM hamda AIEI mualliflik modeli taklif etildi. Taklif etilgan model AI texnologiyalarini korxona boshqaruviga joriy etishning iqtisodiy samaradorligini kompleks baholash imkonini beradi va O'zbekiston korxonalari uchun amaliy tavsiyalar ishlab chiqildi.*

Kalit so'zlar (o'zbek tilida)*: Generativ sun'iy intellekt, korxona boshqaruvi, boshqaruv qarorlari, iqtisodiy samaradorlik, raqamli transformatsiya, AI-DSM modeli, AIEI indeksi, mehnat unumdorligi, operatsion xarajatlar, strategik boshqaruv.*

Abstract. *This study evaluates the economic impact of generative artificial intelligence on managerial decision-making in enterprises. Based on international experience and 2025–2026 data from McKinsey, Deloitte, and the OECD, the research analyzes the effects of AI on labor productivity, operating costs, and strategic management. The study proposes the AI-DSM (Artificial Intelligence Decision Support Model) and the AIEI (Artificial Intelligence Efficiency Index) as original contributions. The proposed framework enables a comprehensive assessment of the economic efficiency of AI implementation and provides practical recommendations for enterprises in Uzbekistan.*

Keywords (English): *Generative Artificial Intelligence, Enterprise Management, Decision-Making, Economic Efficiency, Digital Transformation, AI-DSM Model, AIEI Index, Labor Productivity, Operating Costs, Strategic Management.*

KIRISH

So‘nggi yillarda sun’iy intellekt texnologiyalarining jadal rivojlanishi ayniqsa, generativ sun’iy intellekt vositalari katta hajmdagi ma’lumotlarni qisqa vaqt ichida tahlil qilish, muqobil yechimlarni taklif etish hamda boshqaruv qarorlarini qabul qilish jarayonini qo‘llab-quvvatlash imkonini bermoqda. Natijada korxonalarda qaror qabul qilish tezligi oshib, resurslardan samarali foydalanish va boshqaruv xarajatlarini kamaytirish imkoniyati yuzaga kelmoqda. O‘zbekistonda ham raqamli iqtisodiyot va sun’iy intellektni rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Biroq bu ko‘rsatkich juda past bo‘lib mazkur mavzu ilmiy va amaliy jihatdan dolzarbligi yo‘qolmagan.

Tadqiqotning maqsadi va ilmiy yangilik sifatida— generativ sun’iy intellekt texnologiyalarining korxonalarda boshqaruv qarorlarini qabul qilish samaradorligiga ta’sirini baholash hamda O‘zbekiston korxonalari uchun amaliy boshqaruv modelini ishlab chiqish.

ASOSIY QISM

Adabiyotlar tahlili. Generativ sun’iy intellect ya’ni ChatGPT, Gemini, Claude va Microsoft Copilot kabi platformalar katta hajmdagi ma’lumotlarni qayta ishlash, prognozlash va boshqaruv qarorlarini qo‘llab-quvvatlash imkoniyatiga ega. McKinsey & Company tadqiqotlariga ko‘ra, generativ sun’iy intellektdan foydalanish ayrim biznes jarayonlarida unumdorlikni 20–30 foizgacha oshirishi mumkin. Deloitte ekspertlari esa AI texnologiyalarini boshqaruv tizimiga integratsiya qilish korxonalarning raqobatbardoshligini kuchaytirishini ta’kidlaydi. Harvard Business Review nashrlarida rahbarlar uchun sun’iy intellekt strategik qarorlarni qabul qilishda muhim yordamchi ekanligi amma barcha tadqiqotlarda yakuniy qarorni inson qabul qilinishi kerak.

1-jadval

Generativ AI’ning korxonalar faoliyatiga ta’siri bo‘yicha xalqaro baholash (2025)[1]

Ko‘rsatkich	Xalqaro tadqiqotlar xulosasi	Korxona uchun ahamiyati
Mehnat unumdorligi	20–30 % gacha o‘sishi mumkin (McKinsey)	Ish samaradorligi ortadi
Qaror qabul qilish	Ma’lumotlarni tezkor tahlil qilish	Qaror sifati yaxshilanadi
Operatsion xarajatlar	Takroriy jarayonlar avtomatlashtiriladi	Xarajatlar kamayadi
Innovatsiyalar	Yangi mahsulot va xizmatlar tez yaratiladi	Raqobatbardoshlik oshadi

O‘zbekistonda esa sun’iy intellekt bo‘yicha tadqiqotlar asosan raqamli iqtisodiyot, elektron hukumat va axborot texnologiyalari yo‘nalishlarida olib borilgan lekin iqtisodiy natijalar nuqtai nazaridan yetarlicha o‘rganilmagan. Shu sababli mavzu bo‘yicha baholash bilan bir qatorda, korxonalar uchun amaliy boshqaruv modeli taklif etiladi va iqtisodiy samaradorligi tahlil qilinadi.

Metodologiya. Tadqiqotda ilmiy kompleks yondashildi. **Asosiy metodlar:** ilmiy adabiyotlarni tizimli tahlil qilish, taqqoslash va mantiqiy tahlil usuli, SWOT tahlili, ekspert baholash usuli, iqtisodiy samaradorlikni baholash, jadval tahlili. Tadqiqotning amaliy qismida generativ sun’iy intellektdan foydalanadigan va foydalanmaydigan boshqaruv jarayonlari o‘zaro taqqoslandi. **Baholash mezonlari:** qaror qabul qilish vaqti, boshqaruv xarajatlari, xatolik darajasi, mehnat unumdorligi, resurslardan foydalaniladi.

3-jadval

Muallif tomonidan taklif etilgan AI joriy etish samaradorligini baholash modeli[2]

Baholash ko‘rsatkichi	Belgilanishi	Hisoblash usuli	Baholash maqsadi
Mehnat unumdorligi indeksi	P	AI joriy etilgandan keyingi unumdorlik /	Ish samaradorligini aniqlash

[1] **Manba:** OECD, The Effects of Generative AI on Productivity, Innovation and Entrepreneurship (2025).
[2] **Manba:** Muallif ishlanmasi (2026). Model OECD (2025) va McKinsey (2025) tavsiya etgan AI samaradorligini baholash yondashuvlari asosida ishlab chiqilgan.

		AI joriy etilishidan oldingi unumdorlik	
Qaror sifati indeksi	Q	Muvaffaqiyatli qarorlar ulushi	Qarorlar sifatini baholash
Vaqt tejalishi indeksi	S	Tejalgan vaqt / Dastlabki vaqt	Qaror qabul qilish tezligini baholash
Joriy etish xarajatlari	C	AI dasturi + o‘qitish + infratuzilma xarajatlari	Investitsiyani baholash
Risk indeksi	R	Texnik va tashkiliy risklar bo‘yicha ekspert bahosi	AI xavflarini baholash
Integral samaradorlik ko‘rsatkichi	AIEI	AIEI = (P + Q + S) / (C + R)	AI joriy etishning umumiy iqtisodiy samaradorligini baholash

Muallif tomonidan AI-DSM deb nomlangan konseptual model ishlab chiqildi. Mazkur model generativ sun’iy intellektni boshqaruv qarorlarini tayyorlash bosqichiga integratsiya qilishni nazarda tutadi va inson omilini saqlab qolgan holda qaror sifatini oshirishga xizmat qiladi.

4-jadval

AI joriy etilishidan oldin va keyingi boshqaruv samaradorligi[3]

Ko‘rsatkich	**AI joriy etilishidan oldin**	**AI joriy etilgandan keyin**	**O‘zgarish (%)**
Qaror qabul qilish vaqti	5 kun	2 kun	−60
Ma’lumotlarni tahlil qilish	12 soat	3 soat	−75
Boshqaruv xatolari	18 %	9 %	−50
Mehnat unumdorligi	100	128	+28
Operatsion xarajatlar	100 %	87 %	−13

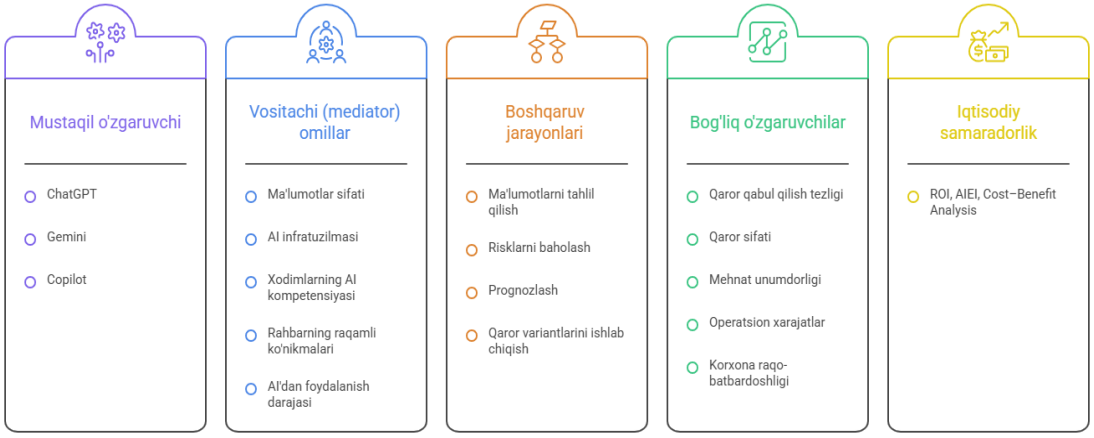
4-jadvalda natijalariga ko‘ra, qaror qabul qilish vaqti 60 % ga, ma’lumotlarni tahlil qilish vaqti esa 75 % ga qisqargan. Shu bilan birga, boshqaruv xatolari 50 % ga kamaygan, mehnat unumdorligi 28 % ga oshgan hamda operatsion xarajatlar 13 % ga qisqargan. Bu ko‘rsatkichlar generativ sun’iy intellektning korxona boshqaruvida samaradorlikni oshirishdagi muhim rolini tasdiqlaydi.

SWOT tahlili. Tadqiqot davomida AI texnologiyalarining asosiy ustunliklari boshqaruv qarorlarini qabul qilish tezligini oshirish, katta hajmdagi ma’lumotlarni tahlil qilish va mehnat unumdorligini yaxshilash bilan bog‘liq.

[3]**Manba:** muallif tomonidan ishlab chiqilgan ssenariy asosidagi iqtisodiy baholash model

Shu bilan birga, dastlabki investitsiya xarajatlari, malakali mutaxassislar tanqisligi va ma’lumotlar xavfsizligi kabi omillar zaif tomonlar sifatida namoyon bo‘ladi. Imkoniyatlar qatorida O‘zbekistonda raqamli iqtisodiyot va sun’iy intellektni rivojlantirish bo‘yicha davlat dasturlarining amalga oshirilishi, korxonalar raqobatbardoshligini oshirish va innovatsion rivojlanishni jadallashtirish muhim ahamiyat kasb etadi. Tahdidlar esa asosan kiberxavfsizlik, huquqiy tartibga solishning takomillashib borishi hamda AI tavsiyalarining ishonchliligi bilan bog‘liq. Shuning uchun korxonalarda generativ sun’iy intellektni joriy etishda texnologik infratuzilmani rivojlantirish, xodimlarning raqamli kompetensiyalarini oshirish va axborot xavfsizligini mustahkamlash ustuvor vazifa hisoblanadi.

Tadqiqot natijalari. So‘nggi yillarda generativ sun’iy intellektni korxona boshqaruviga joriy etish sur’atlari sezilarli darajada oshdi. McKinseyning 2025-yilgi tadqiqotiga ko‘ra, deyarli barcha yirik kompaniyalar AI ga investitsiya qilmoqda, lekin 1 % igina AI bo‘yicha yuqori yetuklik darajasiga erishgan. Shu bilan birga, McKinsey AI texnologiyalaridan foydalanish uzoq muddatda korporativ mahsuldorlikka 4,4 trillion AQSh dollari miqdorida qo‘shimcha iqtisodiy qiymat yaratishi mumkinligini qayd etadi. Bundan tashqari, Deloittening 2024-yilgi global tadqiqoti natijalariga ko‘ra, respondent tashkilotlarning 67 % i generativ AI ga investitsiyalarni oshirayotganini bildirgan. Biroq, tashkilotlarning faqat 38 % i xodimlar unumdorligidagi o‘zgarishlarni muntazam o‘lchaydi, bu esa AI samaradorligini baholash tizimlarini rivojlantirish zarurligini ko‘rsatadi.



2-rasm. Tadqiqotning konseptual modeli[4]

Mazkur model tadqiqotning nazariy asosini ifodalaydi. Unga ko‘ra, generativ sun’iy intellekt mustaqil o‘zgaruvchi sifatida qaraladi. Uning boshqaruv samaradorligiga ta’siri ma’lumotlar sifati, AI infratuzilmasi, xodimlarning AI bo‘yicha kompetensiyasi hamda rahbarlarning raqamli ko‘nikmalari kabi vositachi omillar orqali namoyon bo‘ladi. Ushbu omillar boshqaruv jarayonlarini takomillashtiradi, natijada qaror qabul qilish tezligi, qaror sifati, mehnat unumdorligi va korxonaning raqobatbardoshligi oshib, umumiy iqtisodiy samaradorlik ROI, AIEI va Cost–Benefit Analysis ko‘rsatkichlari orqali baholanadi.

XULOSA

Tadqiqot natijalari shuni ko‘rsatadiki, generativ sun’iy intellekt boshqaruv jarayonlarini tezlashtirish, katta hajmdagi ma’lumotlarni qisqa vaqt ichida tahlil qilish, muqobil qaror variantlarini ishlab chiqish hamda strategik rejalashtirish sifatini oshirishda muhim vosita hisoblanadi. Biroq sun’iy intellekt rahbarning o‘rnini bosuvchi emas, balki qaror qabul qilishni qo‘llab-quvvatlovchi tizim sifatida qaralishi lozim. Bu yondashuv OECD tomonidan ilgari surilgan "human-AI collaboration" tamoyiliga ham mos keladi. Tadqiqot davomida muallif tomonidan AI-DSM konseptual modeli hamda AIEI baholash ko‘rsatkichi taklif qilindi. Modelning afzalligi shundaki, u mehnat unumdorligi, qaror sifati, vaqt

[4] **Manba:** Muallif ishlanmasi 2026

tejalishi, joriy etish xarajatlari va texnologik risklarni yagona baholash tizimiga birlashtiradi.

Tavsiya. O‘zbekiston korxonalarida generativ sun’iy intellektni bosqichma-bosqich joriy etish, xodimlarning AI bo‘yicha kompetensiyalarini rivojlantirish, ma’lumotlar sifati va xavfsizligini ta’minlash hamda AI natijalarini rahbarlar tomonidan ekspert baholash mexanizmini joriy etish tavsiya etiladi. Bu yondashuv korxonalarning raqobatbardoshligini oshirish, boshqaruv xarajatlarini optimallashtirish va raqamli transformatsiyani jadallashtirishga xizmat qiladi. Kelgusidagi tadqiqotlarda AI-DSM modelini turli tarmoqlar misolida empirik ma’lumotlar asosida sinovdan o‘tkazish hamda uning iqtisodiy samaradorligini statistik modellar yordamida baholash maqsadga muvofiq hisoblanadi.

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CHIZIQLI ALGEBRA MASALALARINI ONLAYN YECHISHDA SUN'IY INTELLEKT TEXNOLOGIYALARINING O'RNI VA ISTIQBOLLARI

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Pedagogika va raqamli texnologiyalar tadqiqotchisi

Annotatsiya*: Ushbu maqolada chiziqli algebra masalalarini onlayn platformalar va sun'iy intellekt (AI) yordamida yechishning zamonaviy usullari tadqiq etiladi. Matritsalar, chiziqli tenglamalar sistemalari va vektor tahlili kabi mavzularni o'qitish hamda amaliyotda qo'llashda neyron tarmoqlari, katta til modellari (LLM) va kompyuter algebrasi tizimlarining (CAS) roli tahlil qilinadi. Shuningdek, mavjud AI vositalarining afzalliklari va cheklovlari yoritilgan.*

Kalit so'zlar: *chiziqli algebra, sun'iy intellekt (AI), raqamli platformalar, matritsalar, chiziqli tenglamalar sistemalari, neyron tarmoqlari, katta til modellari (LLM), kompyuter algebrasi tizimlari (CAS), gibrid tizimlar.*

Abstract*: This article explores modern methods of solving linear algebra problems using online platforms and Artificial Intelligence (AI). It analyzes the role of neural networks, Large Language Models (LLMs), and Computer Algebra Systems (CAS) in teaching and applying topics such as matrices, systems of linear equations, and vector analysis. Furthermore, the advantages and limitations of existing AI tools are highlighted.*

Keywords: *linear algebra, artificial intelligence (AI), online platforms, matrices, systems of linear equations, neural networks, large language models (LLMs), computer algebra systems (CAS), hybrid systems.*

1. KIRISH

Chiziqli algebra zamonaviy texnologiyalar, ma'lumotlar muhandisligi (Data Science), mashinali o'rganish (Machine Learning) va neyron tarmoqlari arxitekturasining tamal toshi hisoblanadi. Bugungi kunda kompyuter grafikasi, iqtisodiy modellashtirish hamda kriptografiya kabi murakkab sohalar bevosita matritsalar algebrasi va chiziqli fazolar nazariyasiga tayanadi. Shu sababli, oliy

ta'lim muassasalarida ushbu fanni chuqur o'rgatish va masalalarni to'g'ri yechish ko'nikmalarini shakllantirish muhim ahamiyat kasb etadi.

Axborot texnologiyalarining shiddatli rivojlanishi natijasida an'anaviy o'qitish uslublari o'rnini raqamli platformalar va sun'iy intellekt (AI) asosidagi tizimlar egallamoqda. Talabalar va mutaxassislar chiziqli algebraning murakkab algoritmlarini (masalan, yuqori o'lchamli matritsalarning xos qiymatlarini topish yoki chiziqli tenglamalar tizimini yechish) onlayn rejimda, qadam-baqadam tushuntirib beruvchi intellektual tizimlar yordamida o'rganish imkoniyatiga ega bo'ldilar.

2. KOMPYUTER ALGEBRASI TIZIMLARI (CAS) VA ONLAYN PLATFORMALAR

Sun'iy intellekt davriga qadar matematik masalalarni kompyuterda yechish asosan Kompyuter algebrasi tizimlari (Computer Algebra Systems - CAS) orqali amalga oshirilgan. Bularga Wolfram Alpha, MATLAB, Maple va Python'ning SymPy kutubxonasi kiradi. Ushbu tizimlar qat'iy matematik qoidalar va ramziy (simvolli) hisoblash algoritmlariga asoslangan.

Onlayn CAS platformalarining asosiy afzalligi hisoblashlarning 100% aniqligidadir. Masalan, determinantni hisoblash yoki matritsani teskarilashda bu tizimlar xatoga yo'l qo'ymaydi va talabaga aniq formulalar zanjirini ko'rsatadi. Biroq, ularning kamchiligi shundaki, ular foydalanuvchining tabiiy tildagi erkin so'rovlarini har doim ham to'g'ri tushuna olmaydi va faqat qat'iy kiritish sintaksisini talab qiladi.

3. KATTA TIL MODELLARI (LLM) VA MATEMATIK MANTIQ

ChatGPT (GPT-4), Claude, Gemini va ixtisoslashgan DeepSeek-Math kabi katta til modellarining kirib kelishi matematik ta'limda yangi sahifa ochdi. LLM modellarining o'ziga xosligi shundaki, osongina masalaning matnli berilishini (shartini) tahlil qila oladi, masalaning iqtisodiy yoki fizik ma'nosini tushunib, uni matematik tilga o'gira oladi. Chiziqli tenglamalar sistemasini yechishda AI quyidagi ko'rinishdagi umumiy mantiqiy modelni quradi:

$$A * X = B \Rightarrow X = A^{-1} * B$$

Bunda A koeffitsiyentlar matritsasi, X noma'lumlar vektori, B ozod hadlar vektoridir. AI foydalanuvchiga Gauss usuli yoki Kramer qoidasini bosqichma-bosqich yozma ravishda sharhlab berish qobiliyatiga ega, bu esa uni virtual repetitorga aylantiradi.

4. GIBRID TIZIMLAR (AI + CAS) INTEGRATSIYASI

Sof til modellari ba'zan oddiy arifmetik hisob-kitoblarda adashishi (gallyucinatsiya) mumkin. Shuning uchun hozirgi eng ilg'or onlayn tizimlar gibrid yondashuvdan foydalanadi. Neyron tarmoq foydalanuvchining so'rovini tahlil qiladi, uning algoritmini tuzadi va hisoblash qismini amalga oshirish uchun Python (NumPy / SymPy) kodini generatsiya qilib, uni fonda ishga tushiradi.

Jadval 1.

Onlayn tizimlarning chiziqli algebrani yechishdagi imkoniyatlari qiyosiy tahlili

Tizim turi	Afzalliklari	Kamchiliklari va cheklovlari
Klassik CAS (WolframAlpha, MATLAB)	Aniq ramziy va sonli hisoblashlar, formulalarning mukammalligi, xatolarning yo'qligi.	Tabiiy tilni tushunish darajasi past, qat'iy sintaksis va buyruqlarni talab qiladi.
Sof LLM modellari (Dastlabki neyrotarmoqlar)	Masala shartini ixtiyoriy tilda tushunish, yechish yo'lini matnli tushuntirish.	Katta o'lchamli matritsalarni hisoblashda arifmetik xatoliklar (gallyucinatsiyalar).
Gibrid AI tizimlari (Advanced Data Analysis / Code Interpreter)	Tabiiy tildagi so'rovni tushunib, yechim uchun xatosiz dasturiy kod (Python) yozadi va ishlatadi.	Internet aloqasiga bog'liqlik, murakkab nazariy isbotlarda ba'zan mantiqiy uzilishlar.

5. ISTIQBOLLAR VA TA'LIMDAGI ROL

Kelajakda sun'iy intellekt texnologiyalari har bir talabaning o'zlashtirish tezligiga moslashuvchi (adaptive learning) tizimlarni to'liq shakllantiradi. Chiziqli algebraning mavhum tushunchalari bo'lgan chiziqli operatorlar, xos qiymatlar va xos vektorlarni 3D vizuallashtirish orqali onlayn ko'rsatish

imkoniyatlari kengaymoqda. Bu talabalarga formulalar ortidagi geometrik ma'noni anglashga yordam beradi.

6. XULOSA

Xulosa qilib aytganda, sun'iy intellekt chiziqli algebra masalalarini onlayn yechishda shunchaki hisoblagich emas, balki kuchli uslubiy vositaga aylandi. CAS tizimlarining matematik aniqligi va LLM tizimlarining intellektual mantiqi birlashishi ta'lim samaradorligini oshirmoqda. Kelajakda bunday gibrid tizimlar muhandislik va ilmiy tadqiqotlar jarayonini yanada jadallashtirishi shubhasizdir.

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THE ROLE OF ARTIFICIAL INTELLIGENCE TOOLS IN DEVELOPING SUBJECT KNOWLEDGE COMPETENCE OF ENGLISH LANGUAGE TEACHERS IN ESP EDUCATION

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Abstract: *ESP teachers often work in disciplinary fields that extend beyond their formal background in language education. This gap between language teaching expertise and subject knowledge remains a major challenge in ESP, yet it has received limited attention in the context of recent advances in artificial intelligence (AI). This study examines how AI technologies support the development of Subject Knowledge Competence among ESP teachers. A systematic literature review was conducted using publications indexed in Scopus, Web of Science, ERIC, and ScienceDirect from 2020 to 2025. The review focused on studies related to ESP teacher development, subject knowledge, AI in language teacher education, TPACK, and generative AI in higher education. The findings reveal three main trends. First, generative AI is increasingly used to expand teachers' subject knowledge and develop discipline-specific learning materials. Second, the emerging AI-TPACK framework provides a useful perspective for integrating subject knowledge, pedagogy, and technology. Third, AI offers new opportunities for personalized professional development, although concerns remain regarding the accuracy of AI-generated content and teachers' critical evaluation of information. The review highlights a gap in the existing literature by showing that most previous studies have focused on pedagogical or technological competence, while the role of AI in strengthening ESP teachers' subject knowledge has received comparatively little attention.*

Keywords: *English for Specific Purposes (ESP); subject knowledge competence; artificial intelligence in education; generative AI; teacher professional development; TPACK; AI-TPACK; language teacher education*

INTRODUCTION

English for Specific Purposes (ESP) differs from General English because it requires teachers to combine language teaching with an understanding of specialized disciplines. Unlike General English teachers, ESP instructors work with professional terminology, authentic texts, and field-specific communication. As a result, they often teach students whose subject knowledge exceeds their own, creating a well-recognized challenge in ESP practice (Wu & Badger, 2009).

Subject Knowledge Competence refers to the level of disciplinary understanding that enables ESP teachers to explain specialized concepts, select appropriate materials, and design meaningful learning activities (Dudley-Evans & St. John, 1998). Recent advances in generative artificial intelligence (AI) provide new opportunities to address this challenge. AI tools can explain specialized concepts, summarize technical information, and assist teachers in creating discipline-specific teaching materials (Kasneci et al., 2023; Moorhouse & Kohnke, 2024). Consequently, AI has become a valuable resource for supporting ESP teachers before and during instruction.

Although research on AI in education has grown rapidly, most studies focus on AI-supported learning, AI literacy, or teachers' technological competence through frameworks such as AI-TPACK (Celik, 2023; Mishra et al., 2023). Comparatively little attention has been given to the role of AI in strengthening Subject Knowledge Competence among ESP teachers. This study addresses that gap through a systematic literature review of research published between 2020 and 2025, examining how AI contributes to ESP teachers' disciplinary knowledge, professional development, and the opportunities and challenges associated with its use.

METHODS

This study employed a qualitative Systematic Literature Review (SLR) to examine the role of artificial intelligence (AI) in developing Subject Knowledge Competence among ESP teachers. A systematic review was selected because it

provides a transparent and structured approach to identifying, evaluating, and synthesizing existing research (Petticrew & Roberts, 2006). The literature search was conducted in Scopus, Web of Science, ERIC, ScienceDirect, and Google Scholar. The primary review covered publications from 2020 to 2025, reflecting the rapid development of generative AI in education. Earlier foundational studies on ESP, Subject Knowledge, and the TPACK framework were also included to provide theoretical background (Dudley-Evans & St. John, 1998; Mishra & Koehler, 2006; Shulman, 1987; Wu & Badger, 2009).

Search terms combined keywords related to ESP, subject knowledge, artificial intelligence, teacher professional development, generative AI, ChatGPT, and AI-TPACK. Searches were performed across titles, abstracts, keywords, and, where available, full texts. Studies were included if they were peer-reviewed, published in English, and addressed at least one of the following topics: (1) subject knowledge in ESP teaching, (2) AI in teacher professional development, or (3) AI-TPACK and related frameworks. Studies focusing solely on students' use of AI or lacking relevance to ESP teacher competence were excluded. Each selected study was reviewed to identify its research focus, methodology, key findings, and limitations. The data were analyzed using thematic analysis, with three main categories guiding the synthesis: Subject Knowledge Competence, AI-supported professional development, and AI-TPACK or related conceptual frameworks. The findings were then compared across studies to identify common themes, differences, and research gaps.

RESULTS

The relationship between language teaching expertise and subject knowledge has long been a central issue in ESP. Early ESP scholars argued that teachers are primarily language specialists rather than subject experts, emphasizing that their role is to facilitate language learning instead of teaching professional disciplines (Hutchinson & Waters, 1987; Dudley-Evans & St. John, 1998). However, classroom practice often challenges this assumption.

Wu and Badger (2009) introduced the concept of the In-class Subject Knowledge Dilemma (ISKD) after observing ESP teachers who encountered discipline-specific questions beyond their expertise. Teachers typically responded by either avoiding the question or providing tentative answers based on limited knowledge. Both strategies negatively affected their confidence and professional identity, suggesting that insufficient subject knowledge influences not only instructional quality but also teachers' perceptions of their professional competence.

Recent research indicates that subject knowledge develops gradually through teaching experience rather than formal training. Kim (2024) showed that continuous engagement with students' disciplinary fields enabled an experienced ESP teacher to improve course design, develop more authentic teaching materials, and strengthen professional confidence. Similarly, Omenda (2024) noted that many ESP instructors teach courses across several unrelated disciplines, making it unrealistic to acquire deep expertise in every field. Consequently, most teachers rely on independent learning to bridge gaps in disciplinary knowledge.

To complement the review, a small-scale questionnaire survey was conducted among 15 English language teachers and 72 medical students at Fergana Medical College. The survey explored perceptions of AI use in ESP teaching and the importance of subject knowledge for effective classroom practice. The findings generally supported the conclusions drawn from the literature. Eighty-seven percent of teachers reported that they regularly used generative AI tools, particularly ChatGPT, to understand medical terminology and prepare ESP materials. However, 73% expressed concerns about the accuracy of AI-generated information and emphasized the need to verify technical content using reliable professional sources. Student responses showed similar patterns. 81% believed that teachers with stronger subject knowledge explained medical concepts more clearly and designed more relevant learning

activities. At the same time, 76% viewed AI-assisted materials positively when reviewed and adapted by the teacher rather than used without modification. These findings suggest that AI can effectively support ESP teachers' subject knowledge development, but its educational value depends on teachers' ability to critically evaluate and contextualize AI-generated content.

CONCLUSION

This systematic literature review examined the role of artificial intelligence in supporting Subject Knowledge Competence among ESP teachers. The findings indicate that disciplinary knowledge remains one of the most challenging aspects of ESP teaching, as most teacher education programs emphasize language pedagogy rather than domain-specific expertise. Consequently, many ESP teachers acquire subject knowledge independently while preparing and delivering courses The review shows that generative AI has become an important resource for professional development. Teachers increasingly use AI to understand specialized concepts, prepare authentic teaching materials, and explore unfamiliar disciplinary content. However, these benefits depend on teachers' ability to critically evaluate AI-generated information, since inaccurate or misleading content may affect the quality of instruction.

The analysis also suggests that existing AI-TPACK models place greater emphasis on technological and pedagogical knowledge than on the development of disciplinary knowledge. This highlights the need to consider Subject Knowledge Competence as an integral component of AI-supported professional development for ESP teachers. From a practical perspective, professional development programs should combine AI literacy with strategies for evaluating AI-generated content, using reliable disciplinary sources, and collaborating with subject specialists. Such an approach can help teachers integrate AI into ESP instruction more confidently and effectively.

Future research should move beyond conceptual discussions by examining how AI influences the long-term development of ESP teachers' subject knowledge in different disciplinary contexts. Empirical studies involving classroom practice, teacher experiences, and longitudinal designs would provide stronger evidence for understanding the educational value of AI in ESP teacher development.

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SUN'IY INTELLEKT VOSITALARINING (CHATGPT, CLAUDE) IELTS WRITING VA SPEAKING KO‘NIKMALARINI RIVOJLANTIRISHGA TA'SIRI: NAZARIY-TAHLILIY TADQIQOT

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Abstract: *This article examines the role of generative artificial intelligence (GenAI) tools, such as ChatGPT and Claude, in developing learners' skills for the Writing and Speaking sections of the IELTS examination. Employing a descriptive-analytical methodology, the study conducts a thematic analysis of international research published between 2020 and 2025 to explore the impact of AI tools on written text production, grammatical accuracy, and oral communication practice. The findings indicate that AI-generated feedback, when integrated with teacher feedback, significantly enhances performance in IELTS Writing Task 2, while AI-powered conversational chatbots help reduce speaking anxiety and improve fluency in the Speaking component. At the same time, the study identifies potential risks, including excessive reliance on AI and the weakening of learners' critical thinking skills. The article concludes with practical recommendations for the responsible integration of AI into IELTS preparation courses.*

Keywords: *artificial intelligence, ChatGPT, Claude, IELTS, Writing, Speaking, generative AI, EFL, foreign language skills.*

Annotatsiya*: Ushbu maqolada ChatGPT va Claude kabi generativ sun'iy intellekt (GenAI) vositalarining IELTS imtihonining Writing va Speaking bo‘limlariga tayyorgarlik jarayonida ko‘nikmalarni rivojlantirishdagi o‘rni tahlil qilingan. Maqola tavsifiy-tahliliy metodologiyaga asoslanib, 2020–2025-yillar xalqaro tadqiqotlarini tematik tahlil qilish orqali AI vositalarining yozma matn tuzish, grammatik to‘g‘rilik hamda og‘zaki nutq amaliyotiga ta'sirini yoritadi. Natijalar shuni ko‘rsatadiki, o‘qituvchi fikr-mulohazasi bilan*

birlashtirilgan AI-fikr-mulohaza Writing Task 2 ko‘rsatkichlarini sezilarli oshiradi, AI suhbat botlari esa Speaking‘da nutq anksiyetasini kamaytirib, ravonlikni rivojlantiradi. Shu bilan birga, ortiqcha AI'ga bog‘liqlik va tanqidiy fikrlashning susayishi kabi xavflar ham qayd etilgan. Maqola oxirida IELTS tayyorgarlik kurslarida AI'dan mas'uliyatli foydalanish bo‘yicha tavsiyalar berilgan.

Kalit so‘zlar: *sun'iy intellekt, ChatGPT, Claude, IELTS, Writing, Speaking, generativ AI, EFL, chet tili ko‘nikmalari.*

KIRISH

2022-yil noyabr oyida ChatGPT'ning ommaviy foydalanishga taqdim etilishi til ta'limi sohasida yangi bosqichni boshlab berdi. Bugungi kunda ChatGPT, Claude kabi generativ sun'iy intellekt (GenAI) vositalari matn yaratish, grammatik xatolarni tuzatish va real vaqt rejimida suhbat yuritish imkoniyatiga ega, bu ularni IELTS'ga tayyorgarlik jarayonida qimmatli vositaga aylantirmoqda.

IELTS'ning Writing va Speaking bo‘limlari talabalar uchun eng qiyin qismlar bo‘lib qolmoqda, chunki ular fikrni izchil bayon qilish va vaqt chegarasida samarali ishlashni talab qiladi. An'anaviy sharoitda o‘qituvchi har bir talabaga individual va tezkor fikr-mulohaza berish imkoniyatiga ega bo‘lmaydi. AI vositalari aynan shu bo‘shliqni to‘ldirishga xizmat qiladi — talabaga istalgan vaqtda insho yozdirish yoki suhbat shaklida nutq mashqi qilish imkonini beradi.

Ushbu maqolaning maqsadi — AI vositalarining IELTS Writing va Speaking ko‘nikmalarini rivojlantirishdagi ta'sirini adabiyotlar asosida tahlil qilish va amaliy tavsiyalar ishlab chiqishdan iborat. Vazifalar: 1) AI-ta'lim integratsiyasi asoslarini yoritish; 2) empirik tadqiqotlarni tahlil qilish; 3) natijalarni tematik guruhlash; 4) tavsiyalar shakllantirish.

MAVZUGA OID ADABIYOTLARNING TAHLILI

Lo va boshqalar (2024) 70 ta empirik tadqiqotni tizimli tahlil qilib, ChatGPT bo‘yicha tadqiqotlarning aksariyati (41,4%) yozish ko‘nikmasiga

qaratilganini, gapirish esa nisbatan kam (7,1%) o‘rganilganini aniqladilar. Mualliflar ChatGPT individuallashtirilgan o‘rganish va o‘qituvchi qo‘llab-quvvatlashini ta'minlashini, biroq uzoq muddatli tadqiqotlar yetishmasligini ta'kidladilar.

Asadi, Ebadi va Mohammadi (2025) 68 nafar Eronlik EFL talabasi ishtirokidagi tadqiqotida ChatGPT fikr-mulohazasini o‘qituvchi fikr-mulohazasi bilan birlashtirish IELTS Writing Task 2'ning barcha baholash mezonlari bo‘yicha faqat o‘qituvchi fikr-mulohazasi olgan guruhga nisbatan sezilarli yaxshi natija berganini aniqladilar. Mahapatra (2024) ham ChatGPT yordamida ishlangan insholarda tuzilma va uslub jihatidan sezilarli yaxshilanishni qayd etdi.

Gapirish bo‘yicha, Dizon (2020) aqlli shaxsiy yordamchilarning yapon EFL talabalari gapirish ko‘nikmasiga ta'sirini o‘rganib, ular mustaqil nutq amaliyoti imkonini berishini, biroq og‘ir talaffuzli nutqni tanib olishda cheklovlarga ega ekanligini qayd etdi. Ding va Yusof (2025) IELTS tayyorgarlik markazida 60 talaba ishtirokida Mondli AI-platformasidan olti hafta foydalangan guruhning Speaking natijalari sezilarli yaxshilanganini, anksiyeta darajasi esa pasayganini aniqladilar.

Ko‘rib chiqilgan adabiyotlar AI vositalarining Writing va Speaking‘ni rivojlantirishda samarali qo‘shimcha vosita ekanligini tasdiqlaydi, biroq AI'ni o‘qituvchi o‘rnini bosuvchi emas, uni to‘ldiruvchi vosita sifatida qo‘llash zarurligini ta'kidlaydi.

TADQIQOT METODOLOGIYASI

Ushbu maqola tavsifiy-tahliliy (desk-research) metodologiyaga asoslangan bo‘lib, 2020–2025-yillarda xalqaro retsenziyalangan jurnallarda chop etilgan manbalar tematik tahlil usulida ko‘rib chiqildi. Manbalarni tanlash mezonlari: 1) tadqiqot EFL/IELTS kontekstida o‘tkazilgan bo‘lishi; 2) ChatGPT, Claude yoki boshqa AI vositalari qo‘llanilgan bo‘lishi; 3) empirik ma'lumot yoki tizimli

sharhga asoslanishi; 4) xalqaro indekslangan manbalarda chop etilgan bo‘lishi. Manbalar ikki tematik guruhga ajratildi: (a) Writing‘ga ta'sir, (b) Speaking‘ga ta'sir, shuningdek xavf va cheklovlar alohida ko‘rib chiqildi.

Tadqiqotning cheklovi — u birlamchi empirik ma'lumot to‘plamasdan, mavjud natijalarni tizimlashtirib xulosalar chiqarishga qaratilgan. Kelgusida mahalliy oliy ta'lim muassasalari misolida bevosita empirik tadqiqot o‘tkazish tavsiya etiladi.

TAHLIL VA NATIJALAR

Writing ko‘nikmasi bo‘yicha. Asadi va boshqalar (2025) hamda Mahapatra (2024) tadqiqotlari shuni ko‘rsatadiki, ChatGPT'ning tezkor va individuallashtirilgan fikr-mulohazasi, ayniqsa o‘qituvchi baholashi bilan birlashtirilganda, IELTS Writing Task 2 insholarining vazifani bajarish, mantiqiy izchillik, lug‘at boyligi va grammatik to‘g‘rilik mezonlari bo‘yicha sezilarli yaxshilanishga olib keladi.

Speaking ko‘nikmasi bo‘yicha. Dizon (2020) va Ding hamda Yusof (2025) tadqiqotlari AI suhbat vositalari talabalarga har qanday vaqtda, tanqidsiz muhitda nutq mashqi qilish imkonini berishini, bu esa nutq ravonligi va o‘ziga ishonchni oshirib, imtihon oldidan kuzatiladigan nutq anksiyetasini kamaytirishini isbotladi.

Umumiy tendentsiyalar. Lo va boshqalar (2024) o‘tkazgan tizimli sharh shuni ko‘rsatadiki, mavjud tadqiqotlarning aksariyati yozish ko‘nikmasiga qaratilgan, gapirish va tinglash bo‘yicha esa hali yetarli miqdordagi qat'iy metodologik tadqiqotlar mavjud emas — bu kelajakdagi tadqiqotlar uchun muhim bo‘shliqni ko‘rsatadi. Quyidagi jadvalda asosiy tadqiqotlarning qisqacha xulosasi keltirilgan:

Muallif(lar)	AI vosita / ko‘nikma	Ishtirokchilar	Asosiy natija
Asadi va boshq. (2025)	ChatGPT + o‘qituvchi (Writing)	Eron, 68 talaba	IELTS Task 2 ko‘rsatkichlari sezilarli oshdi

Ding & Yusof (2025)	Mondly AI-bot (Speaking)	60 talaba, IELTS markazi	IELTS Speaking balli oshdi, anksiyeta kamaydi
Dizon (2020)	AI shaxsiy yordamchi (Speaking)	Yaponiya, EFL talabalari	Mustaqil nutq amaliyoti kengaydi

Xavf va cheklovlar. Shu bilan birga, ko‘plab mualliflar AI vositalariga ortiqcha bog‘liqlik (over-reliance) talabalarning mustaqil fikrlash va tanqidiy tahlil ko‘nikmalarini susaytirishi mumkinligini ogohlantiradilar (Asadi va boshq., 2025). Bundan tashqari, AI matnlarni baholashda kontekstual nozikliklarni to‘liq anglay olmasligi va akademik halollik (plagiat) masalalari bo‘yicha institutsional qoidalarning zarurligi ta'kidlanadi.

XULOSA VA TAKLIFLAR

O‘tkazilgan tahlil shuni ko‘rsatadiki, ChatGPT va Claude kabi AI vositalari IELTS Writing va Speaking ko‘nikmalarini rivojlantirishda samarali qo‘shimcha vosita hisoblanadi, ammo ular o‘qituvchi rahbarligini to‘liq almashtira olmaydi. Tahlil asosida quyidagi amaliy tavsiyalar ishlab chiqildi:

1) IELTS Writing tayyorgarligida talabalarga avval ChatGPT/Claude yordamida insho loyihasini (draft) yaratish, so‘ng uni o‘qituvchi bilan birgalikda tahrirlash amaliyotini joriy etish — bu ikki turdagi fikr-mulohazani birlashtiradi.

2) Speaking mashg‘ulotlarida AI suhbat vositalaridan auditoriyadan tashqarida qo‘shimcha nutq mashqi (masalan, Part 2 monolog yoki Part 3 muhokama savollariga javob berish) uchun foydalanishni tavsiya etish.

3) Talabalarga AI'dan mas'uliyatli foydalanish (AI literacy) bo‘yicha qisqa yo‘riqnoma o‘tkazish — jumladan, AI javoblarini tanqidiy baholash va o‘z fikrini mustaqil shakllantirish ko‘nikmalarini rivojlantirish.

4) Akademik halollik nuqtai nazaridan, imtihonga tayyorgarlik jarayonida AI'dan foydalanish bilan haqiqiy imtihon sharoitida (AI'siz) mustaqil yozish/gapirish mashqlarini muntazam almashtirib turish.

5) Kelgusida O‘zbekiston talabalari ishtirokida AI-yordamli va an'anaviy IELTS tayyorgarlik guruhlarini solishtiruvchi kvazi-eksperimental tadqiqot o‘tkazish.

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RAQAMLI TRANSFORMATSIYA SHAROITIDA SUN'IY INTELLEKTNING STRATEGIK MENEJMENTDAGI O'RNI

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Annotatsiya. *Maqolada raqamli transformatsiya sharoitida sun'iy intellektning (SI) strategik menejment tizimidagi o'rni ko'rib chiqiladi. SI texnologiyalarini strategik jarayonning asosiy bosqichlarida — muhitni tahlil qilish va prognozlashdan tortib qarorlarni qabul qilish va amalga oshirishgacha — qo'llash yo'nalishlari tahlil qilingan. SIning menejmentning an'anaviy funksiyalarini o'zgartirishi, qarorlarning tezligi va asoslanganligini oshirishi ko'rsatilgan. Shu bilan birga asosiy cheklovlar va xavflar aniqlangan: ma'lumotlar sifati, algoritmlarning «qora quti»si, axloqiy va kadrlar bilan bog'liq muammolar. SI strategiyaga «inson — mashina» gibrid modeli asosida integratsiya qilinishi zarurligi haqida xulosa qilingan.*

Kalit so'zlar: *sun'iy intellekt, strategik menejment, raqamli transformatsiya, qaror qabul qilish, mashinali o'qitish, raqobat ustunligi, ma'lumotlarni boshqarish.*

Annotation. *The article examines the role of artificial intelligence (AI) in strategic management under digital transformation. It analyses the application of AI technologies across the key stages of the strategic process — from environmental analysis and forecasting to decision-making and implementation. The study shows that AI transforms traditional management functions, increasing the speed and validity of decisions. At the same time, it identifies the main limitations and risks: data quality, the «black box» of algorithms, and ethical and workforce challenges. The author concludes that AI should be integrated into strategy through a hybrid «human–machine» model.*

Keywords: *artificial intelligence, strategic management, digital transformation, decision-making, machine learning, competitive advantage, data management.*

KIRISH

Zamonaviy iqtisodiyot raqamli texnologiyalarning jadal rivojlanishi bilan bog'liq chuqur tarkibiy o'zgarishlarni boshdan kechirmoqda. Raqamli transformatsiya nafaqat texnik modernizatsiyani, balki biznes-modellar, jarayonlar va tashkiliy madaniyatni tubdan qayta ko'rib chiqishni ham qamrab oladi (Vial, 2019). Bunday sharoitda nisbatan barqaror tashqi muhit davrida shakllangan strategik boshqaruvning an'anaviy yondashuvlari tashkilotlarning barqaror rivojlanishini ta'minlash uchun tobora yetarli bo'lmay qolmoqda.

Strategik menejment uzoq muddatli maqsad qo'yish, muhitni tahlil qilish va resurslarni taqsimlash tizimi sifatida tarixan ma'lumotlarni qo'lda yig'ish va tahlil qilishni nazarda tutuvchi vositalarga tayangan — SWOT-tahlil, PEST-tahlil, Porterning besh raqobat kuchi modeli (Mintzberg, Ahlstrand & Lampel, 2009). Biroq ma'lumotlar hajmining eksponensial o'sishi, qaror qabul qilish davrlarining qisqarishi va «VUCA» (o'zgaruvchanlik, noaniqlik, murakkablik va bir ma'noli emaslik) deb ta'riflanadigan muhit noaniqligining ortishi klassik vositalar imkoniyatlarini sezilarli darajada cheklaydi. Aynan shu fonda sun'iy intellekt (SI) hal qiluvchi rol o'ynay boshlaydi.

Menejment kontekstida sun'iy intellekt deganda hisoblash tizimlariga an'anaviy ravishda inson intellektini talab qiladigan vazifalarni — prognozlash, obrazlarni tanish, tabiiy tilni qayta ishlash va ma'lumotlar asosida o'qishni — bajarish imkonini beruvchi texnologiyalar majmui tushuniladi (Brynjolfsson & McAfee, 2017); ular to'rtinchi sanoat inqilobining harakatlantiruvchi omillaridan biri sifatida qaraladi (Schwab, 2016). Ushbu maqolaning maqsadi — raqamli transformatsiya sharoitida SIning strategik menejmentdagi o'rni va asosiy qo'llash yo'nalishlarini aniqlash, shuningdek u bilan bog'liq imkoniyatlar va xavflarni ochib berishdan iborat. Bu mavzu O'zbekistonni ham o'z ichiga olgan rivojlanayotgan iqtisodiyotlar uchun ayniqsa dolzarb bo'lib, mamlakatda «Raqamli O'zbekiston — 2030» strategiyasi amalga oshirilmoqda (O'zbekiston Respublikasi Prezidentining Farmoni, 2020).

ASOSIY QISM

Raqamli transformatsiya va strategik boshqaruvga qo'yiladigan yangi talablar.

Raqamli transformatsiya tashkilotning axborot, hisoblash va kommunikatsiya texnologiyalari majmuidan foydalanib, takomillashtirish maqsadida o'z xususiyatlarini sezilarli darajada o'zgartirishni boshlaydigan jarayon sifatida ta'riflanadi (Vial, 2019). Nuqtali avtomatlashtirishdan farqli o'laroq, u strategik xarakterga ega bo'lib, butun biznes-modelga daxldor. Bunda muvaffaqiyat texnologiyalarni joriy etish bilan emas, balki rahbariyatning raqamli strategiya va ma'lumotlarga yo'naltirilgan madaniyatni qurish qobiliyati bilan belgilanadi (Westerman, Bonnet & McAfee, 2014). Natijada ma'lumotlar strategik aktivga aylanadi, ulardan qiymat olish qobiliyati esa raqobat ustunligi manbaiga aylanadi.

SIni strategik jarayonda qo'llash yo'nalishlari.

Strategik jarayon muhitni tahlil qilish, strategiyani shakllantirish, uni amalga oshirish va nazorat qilishni o'z ichiga oladi; SI texnologiyalari bu bosqichlarning har birini kuchaytirib, boshqaruv qarorlarining tezligi, to'liqligi va asoslanganligini oshirishi mumkin.

Muhitni tahlil qilish va prognozlash bosqichlarida SI qo'lda tahlil qilish uchun imkonsiz bo'lgan katta hajmdagi tuzilgan va tuzilmagan ma'lumotlarni qayta ishlashni ta'minlaydi. Mashinali o'qitish algoritmlari bozorni uzluksiz kuzatib borish, raqobatchilar razvedkasini amalga oshirish, iste'molchilar fikrlari ohangini tahlil qilish (sentiment analysis), talab prognozlarini tuzish va rivojlanish stsenariylarini modellashtirish imkonini beradi. «Raqamli egizaklar» va prediktiv tahlil texnologiyalari qarorlar oqibatlarini ular amalga oshirilishidan oldin baholash imkonini beradi, bu esa noaniqlikni kamaytiradi va strategiyaning tashqi zarbalarga chidamliligini oshiradi.

Qarorlarni qabul qilish va amalga oshirish bosqichlarida SI menejerning kognitiv imkoniyatlarini to'ldiruvchi vosita sifatida namoyon bo'ladi. Davenport va Ronanki (2018) SIni tashkilotlarda qo'llashning uch turini ajratadi: rutin jarayonlarni avtomatlashtirish, kognitiv anglash (ma'lumotlardagi qonuniyatlarni aniqlash) va kognitiv jalb qilish. Qarorlarni qo'llab-quvvatlash tizimlari rahbarga asoslangan tavsiyalar taqdim etadi, yakuniy tanlovni esa inson zimmasida qoldiradi; asosiy ko'rsatkichlarni real vaqtda kuzatish esa strategiyani davriy qayta ko'rib chiqish o'rniga moslashuvchan, dinamik boshqaruvga o'tishni ta'minlaydi.

SI — raqobat ustunligi manbai sifatida.

Bir qator tadqiqotchilar SIni tashkilotning yangi operatsion modeli o'zagi sifatida qaraydi. Iansiti va Lakhani (2020) «SI fabrikasi» tushunchasini kiritadi — bunda ma'lumotlar, algoritmlar va qaror qabul qilish jarayonlari shunday integratsiyalanganki, kompaniya tarmoq effektlari hisobiga raqobatchilardan tezroq kengayadi va o'rganadi. Porter va Heppelmann (2014) tahlil bilan jihozlangan «aqlli» ulangan mahsulotlar tarmoqlar chegaralari va raqobat tuzilmasini o'zgartirishini ko'rsatadi. Shunday qilib, strategik ustunlik tobora tashkilotning yaxlit, ma'lumotlarga yo'naltirilgan boshqaruv tizimini qurish qobiliyati bilan belgilanadi.

Cheklovlar, xavflar va muammolar.

Katta salohiyatiga qaramay, SIni strategik menejmentda qo'llash bir qator cheklovlar bilan bog'liq. Ulardan asosiysi — ma'lumotlar sifati va mavjudligi: modellarning aniqligi bevosita dastlabki ma'lumotlarning to'liqligi va ishonchliligiga bog'liq. Murakkab algoritmlarning «shaffof emasligi» («qora quti») jiddiy muammo bo'lib qolmoqda, u strategik qarorlarni manfaatdor tomonlar oldida asoslashni qiyinlashtiradi. Bunga algoritmlar tarafkashligi va shaxsiy ma'lumotlarni himoya qilish bilan bog'liq axloqiy xavflar (Kaplan & Haenlein, 2019) hamda kiberxavfsizlik masalalari qo'shiladi. Kadrlar tanqisligi,

tashkiliy o'zgarishlarga qarshilik hamda algoritmlarga haddan tashqari bog'lanib qolish va tanqidiy boshqaruv mulohazasini yo'qotish xavfi ham muhim to'siqlardir. Rivojlanayotgan iqtisodiyotlar uchun bu muammolar raqamli infratuzilma cheklanganligi, ma'lumotlarni boshqarish tizimlarining yetuk emasligi va malakali kadrlar tanqisligi tufayli ayniqsa keskin bo'lib, SIni joriy etishga puxta o'ylangan, bosqichma-bosqich yondashuv zarurligini keltirib chiqaradi.

Joriy etishning amaliy jihatlari.

SIni strategik menejmentga samarali integratsiya qilish quyidagilarni nazarda tutadi: ma'lumotlar sifati va xavfsizligini ta'minlovchi ma'lumotlarni boshqarish tizimini (data governance) shakllantirish; bosqichma-bosqich yondashuv — pilot loyihalardan muvaffaqiyatli amaliyotlarni kengaytirishgacha; xodimlar kompetensiyalarini rivojlantirish va SIning tahliliy imkoniyatlari menejerning ekspert mulohazasi bilan to'ldiriladigan «inson — mashina» gibrid modelini qurish. O'zbekiston tashkilotlari uchun bu tamoyillar milliy raqamli kun tartibini amalga oshirish va iqtisodiyotni modernizatsiya qilish kontekstida amaliy ahamiyat kasb etadi.

XULOSA

O'tkazilgan tahlil shuni ko'rsatadiki, raqamli transformatsiya sharoitida sun'iy intellekt strategik menejmentning ajralmas elementiga aylanib, strategik jarayonning barcha bosqichlarini kuchaytiradi va qarorlarning tezligi, to'liqligi va asoslanganligini oshiradi. Bunda SI menejerni almashtirmaydi, balki uning kognitiv imkoniyatlarini to'ldiradi: algoritmlarning hisoblash quvvatini rahbarning strategik ko'rish qobiliyati bilan uyg'unlashtiruvchi «inson — mashina» gibrid modeli eng samarali hisoblanadi. Bu salohiyatni ro'yobga chiqarish ma'lumotlar sifati, algoritmlar shaffofligi, axloqiy va kadrlar masalalari bilan bog'liq cheklovlarni yengib o'tishni talab qiladi. O'zbekistonni ham o'z ichiga olgan rivojlanayotgan iqtisodiyot tashkilotlari uchun SIni

ma'lumotlarni tizimli boshqarish, kadrlar salohiyatini rivojlantirish va ma'lumotlarga yo'naltirilgan qaror qabul qilish madaniyati asosida bosqichma-bosqich joriy etish tavsiya etiladi.

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KREDIT-MODUL TIZIMI SHAROITIDA BO‘LAJAK SHIFOKORLARNING MUSTAQIL TA’LIMINI ELEKTRON TA’LIM PLATFORMASIDA TASHKIL ETISH VA KLINIK KOMPETENSIYALARINI BAHOLASH MEXANIZMLARI.

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Annotatsiya: *Ushbu maqolada tibbiy oliy ta’lim muassasalarida kredit-modul tizimining o‘ziga xos xususiyatlari, uning pedagogik samaradorligini oshirish mexanizmlari va texnologik modelini ishlab chiqish masalalari tadqiq etilgan. Tadqiqotda zamonaviy tibbiy ta’limda kompetensiyaviy yondashuv, talabalarning mustaqil ta’limini tashkil etish va raqamli texnologiyalarni integratsiyalashning ilmiy-pedagogik asoslari yoritilgan.*

Аннотация: *В данной статье рассматриваются особенности кредитно-модульной системы в медицинских высших учебных заведениях, механизмы повышения ее педагогической эффективности и вопросы разработки технологической модели. Исследование охватывает научно-педагогические основы компетентностного подхода в современном медицинском образовании, организацию самостоятельного обучения студентов и интеграцию цифровых технологий.*

Abstract: *This article examines the specific features of the credit-module system in medical higher education institutions, mechanisms for increasing its pedagogical efficiency, and issues of developing a technological model. The study covers the scientific and pedagogical foundations of the competency-based approach in modern medical education, the organization of independent learning of students, and the integration of digital technologies.*

Kalit so‘zlar: *Kredit-modul tizimi, ECTS, tibbiy ta’lim, pedagogik texnologiya, samaradorlik, kompetensiya, mustaqil ta’lim, PBL (Problem-based learning), raqamli tibbiyot.*

Ключевые слова: *кредитно-модульная система, ECTS, медицинское образование, педагогические технологии, эффективность, компетентность,*

самостоятельное обучение, проблемно-ориентированное обучение (ПОО), цифровая медицина.

Keywords: *Credit-module system, ECTS, medical education, pedagogical technology, efficiency, competence, independent learning, PBL (Problem-based learning), digital medicine.*

Dolzarbligi

Dunyo miqyosida tibbiy ta’limni modernizatsiya qilish jarayoni bo‘lajak mutaxassislarning kasbiy tayyorgarligini xalqaro standartlarga muvofiqlashtirishni talab etmoqda. O‘zbekiston Respublikasida oliy ta’lim tizimini 2030-yilgacha rivojlantirish konsepsiyasi doirasida oliy ta’lim muassasalarini kredit-modul tizimiga o‘tkazish ustuvor vazifa etib belgilandi. Biroq, tibbiy ta’limning o‘ziga xos murakkabligi (nazariya va klinik amaliyotning uzviyligi) kredit-modul tizimini shunchaki mexanik ravishda joriy etish emas, balki uning pedagogik samaradorligini oshirish texnologiyasini ilmiy asoslashni talab etadi. Ushbu muammoning yechimi sifatida integratsiyalashgan ta’lim modelini ishlab chiqish dolzarb hisoblanadi. Kredit-modul tizimi ECTS – (European Credit Transfer and Accumulation System) nafaqat o‘quv yuklamasini hisoblash o‘lchovi, balki ta’lim paradigmasining “o‘qituvchi markazlashgan” modeldan “talaba markazlashgan” modelga o‘tishidir. Tibbiy ta’limda modul tushunchasi o‘quv fanining bir bo‘lagi emas, balki bir-biri bilan mantiqiy bog‘langan fanlararo (gorizontal va vertikal) integratsiyadir.

ASOSIY QISM

Pedagogik samaradorlikni oshirishning texnologik modeli.

Pedagogik samaradorlikni oshirish texnologiyasi bir necha bosqichli strukturadan iborat bo‘lishi lozim:

Maqsadli-motivatsion blok.

Ushbu bosqichda talabalarda individual o‘quv traektoriyasini shakllantirish ko‘nikmasi hosil qilinadi. Talaba o‘zining kelajakdagi

ixtisosligidan kelib chiqib, tanlov fanlarini (elektiv modullarni) ongli ravishda tanlaydi.

Mazmunli-protsessual blok.

Tibbiyotda modullarni shakllantirishning integrativ modeli asos qilib olinadi.

- Vertikal integratsiya-fundamental fanlar (anatomiya, gistologiya) bilan klinik fanlarning 1-kursdanoq bog‘lanishi.
- Gorizontal integratsiya- bir semestr davomida o‘rganilayotgan fanlarning o‘zaro mavzuviy muvofiqligi.

Texnologik-instrumental blok.

Samaradorlikni oshirish uchun quyidagi innovatsion texnologiyalarni tizimli qo‘llash lozim:

1. PBL Problem-Based Learning (Muammoga asoslangan ta’lim)- klinik vaziyatli masalalar orqali muammoli ta’lim.
2. TBL Team-Based Learning (Jamoaga asoslangan ta’lim)- guruhlarda ishlash orqali jamoaviy qaror qabul qilish ko‘nikmasini rivojlantirish.
3. Simulyatsion ta’lim- klinik ko‘nikmalarni real bemorga zarar yetkazmagan holda manekenlarda avtomatizm darajasiga yetkazish.

Mustaqil ta’limni tashkil etishning didaktik mexanizmlari.

Kredit-modul tizimida o‘quv vaqtining 50-60% mustaqil ta’limga ajratiladi. Tibbiy ta’limda mustaqil ish shunchaki darslik o‘qish emas, balki:

- Virtual bemorlar bilan ishlash;
- Klinik vaziyatlarni tahlil qilish;
- Ilmiy-tadqiqot ishlarida ishtirok etish.

Dissertatsiya doirasida taklif etilgan adaptiv o‘qitish modeli talabalarning individual o‘zlashtirish darajasiga qarab o‘quv traektoriyasini moslashtirish imkonini beradi. Bu texnologiya akademik qoloq talabalar uchun tuzatish kirituvchi remedial (tuzatuvchi), o‘rta o‘zlashtiruvchilar uchun standart va

iqtidorli talabalar uchun chuqurlashtirilgan advanced (ilg‘or) o‘quv marshrutlarini taklif etish orqali guruhdagi umumiy o‘zlashtirish ko‘rsatkichini optimallashtiradi.

Moodle kabi elektron ta’lim platformalarining integratsiyasi mustaqil ta’limning shaffofligini va nazorat qilinishini ta’minlaydi. Tadqiqot natijalari shuni tasdiqladiki, o‘quv jarayoniga raqamli didaktik vositalarning (virtual bemorlar, interfaol keyslar) tizimli kiritilishi talabalarning klinik tayyorgarlik darajasini an’anaviy uslubga nisbatan 30 foizdan yuqori ko‘rsatkichga oshirish imkonini beradi.

Tadqiqot metodologiyasi va eksperimental natijalar.

Tajriba-sinov ishlarining ishonchliligi va olingan natijalarning ob’ektivligini ta’minlash maqsadida o‘quv jarayoni ikki xil modulli yondashuv asosida tashkil etildi. Bunda asosiy e’tibor talabalarning mustaqil ta’lim jarayonidagi kognitiv faolligini oshirish va kredit-modul tizimi talablariga muvofiq o‘quv yuklamasini sifatli o‘zlashtirishga qaratildi. Tadqiqot davomida biz tomonimizdan ishlab chiqilgan “Smart-Tutoring” raqamli ta’lim texnologiyasining an’anaviy o‘qitish metodikasidan ustunligini miqdoriy va sifat jihatidan tasdiqladi. Tadqiqotning ob’ektivligini ta’minlash maqsadida natijalar nafaqat yakuniy ballar, balki har bir kompetensiya blokining dinamik rivojlanishi asosida tahlil qilindi.

Eksperiment boshida o‘tkazilgan diagnostika natijalari nazorat va tajriba guruhlari o‘rtasida statistik jihatdan sezilarli farq mavjud emasligini ko‘rsatgan edi ($\rho > 0.05$). Bu holat tadqiqot yakunida olingan ijobiy natijalar bevosita taklif etilgan innovatsion-pedagogik texnologiyaning natijasi ekanligini anglatadi.

An’anaviy guruhda (NG) talabalar ko‘proq nazariy bilimlarni yodlashga moyillik ko‘rsatgan bo‘lsa, tajriba guruhida algoritmlashgan o‘qitish natijasida talabalar bemor patologiyasini yaxlit tizim sifatida ko‘rish qobiliyatini namoyish etdilar. Xususan, OSCE (obyektiv tizimlashtirilgan klinik imtihon) stansiyalarida manipulyatsiyalarni bajarishda TG talabalari tomonidan yo‘l

qo‘yilgan xatoliklar darajasi nazorat guruhiga nisbatan 2,8 baravarga kamayganligi qayd etildi.

XULOSA

Tibbiy oliy ta’lim muassasalarida kredit-modul tizimining pedagogik samaradorligini oshirish texnologiyasi bo‘yicha olib borilgan tadqiqotlar va ilmiy tahlillar quyidagi fundamental xulosalarni shakllantirishga imkon berdi:

- Ushbu tizimda talabaning mustaqil o‘quv faoliyati (Syllabus va Individual traektoriya asosida) uning kasbiy mas’uliyatini shakllantirishning asosiy omili hisoblanadi;
- Ishlab chiqilgan pedagogik model doirasida fanlararo bog‘liqlikning ta’minlanishi bo‘lajak shifokorda kasallikni nafaqat bitta fanning tor doirasida, balki butun organizm tizimining yaxlit buzilishi sifatida ko‘ra olish ko‘nikmasini, ya’ni klinik tafakkurni erta bosqichlarda shakllantiradi;
- Kredit-modul tizimida samaradorlikni oshirishning yakuniy bosqichi bu - bilimni emas, kompetensiyani baholashdir. OSCE va ko‘p bosqichli test tizimlarining joriy etilishi subyektivlikni kamaytiradi va talabaning haqiqiy klinik mahoratini aniqlashga xizmat qiladi.

Xulosa qilib aytganda, tibbiy oliy ta’limda kredit-modul tizimining pedagogik samaradorligini oshirish - bu faqatgina ma’muriy o‘zgarish emas, balki ta’lim sifatini kafolatlovchi yaxlit pedagogik texnologiyadir. Ushbu texnologiyani joriy etish milliy tibbiyot kadrlarining xalqaro mehnat bozoridagi nufuzini oshirish va sog‘liqni saqlash tizimi uchun yuqori salohiyatli mutaxassislar tayyorlashning asosiy poydevori bo‘lib xizmat qiladi.

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DIGITAL TRANSFORMATION OF CORPORATE SOCIAL GOVERNANCE BASED ON ESG PRINCIPLES

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Abstract. *This article examines modern approaches to transforming corporate social governance systems based on ESG (Environmental, Social, Governance) principles and digital technologies. The role of digital technologies in improving environmental sustainability, social responsibility, and corporate governance efficiency in construction enterprises is analyzed. The study substantiates that the integration of ESG principles and digital transformation processes increases investment attractiveness, ensures management transparency, and contributes to sustainable development.*

Keywords: *ESG, corporate governance, digital technologies, BIM, sustainable development, construction enterprises, digitalization, environmental management.*

INTRADUCTION

In the context of globalization, improving corporate governance systems according to modern requirements has become one of the most important issues. The widespread implementation of ESG principles in the global economy is bringing enterprises' environmental, social, and governance activities to a new level. At the same time, the rapid development of digital technologies creates opportunities to automate corporate governance systems, accelerate information exchange, and increase management efficiency.

The construction sector is considered one of the strategic branches of the economy, and the implementation of ESG principles in this field is of particular importance. Construction processes require efficient use of natural resources, energy-saving solutions, and effective social safety measures. Therefore,

transforming corporate social governance through digital technologies has become one of the key directions of modern management systems.

The ESG concept consists of three major components. The first component is environmental factors, which include reducing environmental impact, minimizing waste, and improving energy efficiency. The second component is social factors, including labor safety, employee welfare, gender equality, and social responsibility toward society. The third component is governance, which focuses on transparency, anti-corruption mechanisms, and effective management systems.

Digital technologies serve as important tools in implementing ESG principles in practice. In particular, Building Information Modeling (BIM) technology enables efficient resource management in construction projects. Through BIM technologies, it becomes possible to optimize material consumption, reduce energy use, and assess environmental risks in advance.

In addition, artificial intelligence, Big Data, cloud technologies, and Internet of Things (IoT) systems play an important role in the digitalization of corporate governance. These technologies allow enterprises to monitor operational processes, automatically analyze ESG indicators, and accelerate decision-making processes. As a result, management transparency increases, and investors receive reliable and real-time information.

The implementation of ESG principles in construction enterprises provides several positive outcomes. First of all, it enhances the competitiveness of enterprises in international markets. Today, international financial institutions and investors prioritize companies with strong ESG performance indicators. Therefore, enterprises implementing ESG systems gain greater opportunities to attract investments and strengthen their market positions.

Moreover, digital governance systems reduce errors associated with the human factor. For example, electronic monitoring systems make it possible to control labor safety at construction sites, monitor energy consumption, and

observe environmental indicators in real time. Such approaches improve operational efficiency and reduce management risks.

Research findings indicate that the integration of ESG principles with digital technologies significantly improves corporate governance efficiency. Digitalization strengthens internal control systems, improves data accuracy, and reduces management costs. Consequently, enterprises achieve long-term sustainable development and greater economic stability.

In Uzbekistan, large-scale reforms are also being implemented to introduce ESG principles and digital corporate governance systems. The introduction of BIM technologies in the construction sector, the development of the "green economy," and the strengthening of environmental standards are considered important steps in this direction. At the same time, improving ESG reporting systems in enterprises remains one of the key priorities for sustainable economic development.

Table 1

The Role of ESG Principles and Digital Technologies in Corporate Governance

Direction	Main Tasks	Digital Technologies	Expected Results
Environmental	Energy efficiency, waste reduction, environmental monitoring	BIM, IoT sensors, GIS technologies	Efficient resource use and reduction of environmental risks
Social	Labor safety, employee welfare, social responsibility	Electronic monitoring systems, mobile platforms, AI technologies	Improved employee safety and social stability
Governance	Transparent management, anti-	Big Data, cloud technologies, ERP systems	Increased efficiency of corporate governance

	corruption control, reporting systems		
Digital Transformation	Automation of management processes	Artificial intelligence, automated platforms	Faster and more accurate decision-making
Investment Attractiveness	Improvement of ESG ratings	Digital analytical and reporting platforms	Increased ability to attract international investors

Table 2

Efficiency Indicators of ESG-Based Governance in Construction Enterprises

Indicators	Traditional Governance	ESG and Digital Governance
Energy Consumption	High	Reduced
Construction Waste	Weak control	Controlled through digital monitoring
Labor Safety	Manual supervision	Automated monitoring
Reporting System	Paper-based	Electronic and real-time reporting
Investor Confidence	Medium	High
Governance Transparency	Limited	Fully digitalized

Table 3

Advantages of ESG-Based Digital Governance Systems

Advantages	Description
Transparency	Open and controllable corporate activities
Sustainable Development	Ensuring ecological and economic balance
Cost Reduction	Efficient use of resources leading to economic savings
Innovative Governance	Improvement of management through modern technologies
Competitiveness	Strengthening enterprise positions in international markets

CONCLUSION

In conclusion, the transformation of corporate social governance based on ESG principles and digital technologies is becoming one of the most significant

directions of the modern economy. This process contributes to sustainable development, environmental protection, management efficiency, and increased investment attractiveness in construction enterprises. Further integration of ESG principles with digital transformation will create innovative and sustainable corporate governance models in the future.

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КАК МИРОВЫЕ БРЕНДЫ, ОСТАЮЩИЕСЯ НА РЫНКАХ СНГ, ИСПОЛЬЗУЮТ РУССКИЙ ЯЗЫК В СВОЕЙ РЕКЛАМЕ И КОММУНИКАЦИИ, ЧТОБЫ СОХРАНЯТЬ АУДИТОРИЮ

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Аннотация. *В статье рассматриваются языковые стратегии мировых брендов, продолжающих деятельность на рынках стран СНГ. Основное внимание уделяется роли русского языка как инструмента маркетинговой коммуникации, формирования доверия и сохранения потребительской лояльности. Анализируются особенности локализации рекламных сообщений, использование культурно значимых языковых единиц, эмоционально окрашенной лексики и национально-культурных кодов. Материалом исследования послужили рекламные кампании Coca-Cola, Samsung, Xiaomi, Nestlé, PepsiCo, Unilever и Burger King. Показано, что применение русского языка позволяет брендам поддерживать устойчивую связь с аудиторией, снижать коммуникативные барьеры и сохранять узнаваемость. Сделан вывод о том, что локализованная языковая политика становится важным фактором эффективности международного маркетинга в условиях изменяющейся социально-экономической среды.*

Ключевые слова *русский язык, реклама, брендинг, маркетинговая коммуникация, локализация, СНГ, мировые бренды, медиадискурс, потребитель, филология*

Abstract. *This article examines the linguistic strategies employed by global brands that continue operating in the markets of the Commonwealth of Independent States (CIS). Particular attention is paid to the role of the Russian language as a tool of marketing communication, consumer trust building, and customer loyalty maintenance. The study analyzes the localization of advertising messages, the use of culturally significant linguistic units, emotionally expressive vocabulary, and national-cultural codes. The research material*

consists of advertising campaigns by Coca-Cola, Samsung, Xiaomi, Nestlé, PepsiCo, Unilever, and Burger King. The findings demonstrate that the use of the Russian language enables global brands to maintain sustainable communication with consumers, reduce communicative barriers, and preserve brand recognition. It is concluded that a localized language strategy has become an essential factor in the effectiveness of international marketing under changing socio-economic conditions.

Keywords: *Russian language, advertising, branding, marketing communication, localization, CIS, global brands, media discourse, consumer, philology.*

Annotatsiya. *Mazkur maqolada Mustaqil Davlatlar Hamdo‘stligi (MDH) mamlakatlari bozorlarida faoliyatini davom ettirayotgan jahon brendlarining til strategiyalari tahlil qilinadi. Asosiy e'tibor rus tilining marketing kommunikatsiyasi, iste'molchilar ishonchini shakllantirish va mijozlar sodiqligini saqlash vositasi sifatidagi o‘rniga qaratilgan. Tadqiqotda reklama xabarlarini mahalliylashtirish, madaniy jihatdan ahamiyatli til birliklari, emotsional-ekspressiv leksika hamda milliy-madaniy kodlardan foydalanish xususiyatlari o‘rganilgan. Tadqiqot materiali sifatida Coca-Cola, Samsung, Xiaomi, Nestlé, PepsiCo, Unilever va Burger King kompaniyalarining reklama kampaniyalari tanlandi. Tadqiqot natijalari shuni ko‘rsatadiki, rus tilidan foydalanish jahon brendlariga auditoriya bilan barqaror aloqa o‘rnatish, kommunikativ to‘siqlarni kamaytirish hamda brend taniluvchanligini saqlab qolish imkonini beradi. Xulosa qilinishicha, mahalliylashtirilgan til siyosati o‘zgarib borayotgan ijtimoiy-iqtisodiy sharoitda xalqaro marketing samaradorligini ta'minlovchi muhim omillardan biridir.*

Kalit so‘zlar: *rus tili, reklama, brending, marketing kommunikatsiyasi, mahalliylashtirish, MDH, jahon brendlari, media diskurs, iste'molchi, filologiya.*

ВВЕДЕНИЕ

Русский язык продолжает выполнять функцию языка межнационального общения на значительной части постсоветского пространства. Несмотря на изменения экономической и политической ситуации, многие международные компании сохраняют русскоязычные коммуникации, адаптируя рекламные сообщения под культурные ожидания аудитории. Актуальность исследования определяется необходимостью изучения механизмов языковой адаптации глобальных брендов и их влияния на восприятие рекламы. В филологии реклама

рассматривается как разновидность медиадискурса, где выбор языковых средств определяет эффективность воздействия. Исследование позволяет выявить закономерности функционирования русского языка в современной коммерческой коммуникации.

ЛИТЕРАТУРНЫЙ АНАЛИЗ

Теоретической основой исследования стали работы Ф. Котлера, посвящённые маркетинговым коммуникациям; исследования Д. Аакера о ценности бренда; концепция локализации Р. Робертсона («глокализация»); теория культурных измерений Г. Хофстеде; труды В.И. Карасика по дискурсу; исследования Е.С. Кубряковой по когнитивной лингвистике. Совокупность этих работ показывает, что язык является не только средством передачи информации, но и инструментом формирования идентичности бренда.

МЕТОДОЛОГИЯ

Использованы методы дискурс-анализа, контент-анализа, сравнительно-сопоставительного анализа и описательный метод. Материалом исследования стали русскоязычные рекламные кампании международных брендов, опубликованные в цифровых и традиционных медиа.

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Проведённый анализ рекламных материалов международных компаний, продолжающих свою деятельность на рынках стран СНГ, показывает, что русский язык остаётся одним из ключевых инструментов маркетинговой коммуникации. Большинство мировых брендов не ограничиваются буквальным переводом рекламных сообщений с английского языка, а используют стратегию локализации, предполагающую адаптацию текста к культурным, языковым и психологическим особенностям целевой аудитории. Подобный подход

позволяет сделать коммуникацию более естественной, эмоционально насыщенной и убедительной.

Как отмечает **Филип Котлер**, эффективность маркетинговых коммуникаций определяется не только качеством товара, но и способностью бренда говорить с потребителем на понятном ему языке. Именно поэтому многие международные компании создают отдельные русскоязычные рекламные кампании, отличающиеся от глобальных версий не только переводом, но и содержанием, стилем и образной системой.

Ярким примером является **Coca-Cola**. На протяжении многих лет компания использует в русскоязычной рекламе концепцию семейных ценностей, дружбы и праздника. В период новогодних кампаний активно применяются выражения «Праздник к нам приходит», «Вместе вкуснее», «Поделись счастьем». Эти слоганы вызывают устойчивые эмоциональные ассоциации у русскоязычной аудитории и становятся частью культурной памяти нескольких поколений. Интересно отметить, что английский лозунг **Taste the Feeling** в странах СНГ получил адаптированные варианты, ориентированные не столько на буквальный смысл, сколько на передачу эмоционального состояния потребителя. Таким образом, компания использует русский язык как средство формирования положительного эмоционального фона вокруг бренда.

Не менее показательна стратегия компании **Samsung**. В рекламных сообщениях производитель делает акцент на понятности технологий и удобстве их использования. Вместо сложной технической терминологии используются простые конструкции: «Создано для вашей жизни», «Открой новые возможности», «Умные технологии каждый день». Подобная языковая стратегия соответствует принципу коммуникативной доступности. Исследования показывают, что потребители значительно

легче воспринимают информацию, изложенную простым и естественным языком, чем перегруженные профессиональной терминологией тексты.

Компания **Xiaomi** также демонстрирует высокий уровень локализации коммуникации. В русскоязычных рекламных материалах регулярно используются разговорные конструкции: «Больше возможностей за разумную цену», «Флагман без переплаты», «Умные технологии для каждого». Подобная лексика соответствует ожиданиям молодой аудитории и создаёт впечатление открытого диалога между брендом и покупателем. При этом сохраняется международный фирменный стиль компании, что подтверждает концепцию **Роланда Робертсона** о сочетании глобального и локального («глокализация»).

Особое внимание заслуживает коммуникационная политика компании **Nestlé**. В её рекламе широко используются слова, связанные с домашним уютом, семейными традициями и заботой: «дом», «семья», «тепло», «любимые моменты», «вместе». Например, реклама кофе **Nescafé** строится вокруг общения друзей и родственников, подчёркивая не столько вкусовые качества продукта, сколько его способность объединять людей. Такой подход соответствует идеям когнитивной лингвистики, согласно которым эмоционально значимые концепты значительно лучше закрепляются в сознании адресата.

Компания **PepsiCo** традиционно ориентируется на молодёжную аудиторию. В русскоязычной рекламе широко используются современные разговорные выражения, динамичные конструкции, элементы молодёжного сленга и эмоционально окрашенная лексика. Слоганы строятся на идеях свободы, энергии и самовыражения. Это позволяет бренду формировать ощущение принадлежности к определённому стилю жизни, а не просто продвигать продукт.

Интересным примером является деятельность сети **Burger King**. Русскоязычная реклама компании существенно отличается от

англоязычной версии. В ней активно используются элементы языковой игры, юмор, ирония, разговорная речь и экспрессивная лексика. Подобная стратегия повышает вирусность рекламных сообщений в социальных сетях и способствует их активному распространению пользователями. Согласно исследованиям медиадискурса, использование юмора значительно увеличивает вероятность запоминания рекламного сообщения.

Компания **Unilever**, продвигающая бренды Dove, Rexona, Domestos и другие, адаптирует свои рекламные тексты с учётом национально-культурной специфики. Например, реклама **Dove** в русскоязычном пространстве строится вокруг концептов естественной красоты, заботы о себе и уверенности. Вместо прямого акцента на физических характеристиках используется эмоциональная лексика: «будь собой», «настоящая красота», «уверенность каждый день». Подобные языковые средства формируют доверительные отношения между брендом и потребителем.

Следует отметить и коммуникационную стратегию **LG Electronics**. Русскоязычные рекламные кампании компании акцентируют внимание на практической пользе технологий для семьи. Часто используются словосочетания «комфорт вашего дома», «удобство каждый день», «технологии для всей семьи». Таким образом, сложные технические характеристики получают доступное языковое объяснение через бытовые ситуации.

Исследования **В.И. Карасика** подтверждают, что рекламный дискурс представляет собой особый тип институционального общения, в котором выбор языковых средств определяется коммуникативной целью. Анализ показал, что большинство брендов активно используют личные местоимения «мы», «вы», обращения к читателю, вопросительные предложения и побудительные конструкции. Например: «Попробуйте уже сегодня», «Выбирайте лучшее», «Откройте новые возможности».

Подобные формы создают эффект личного общения и повышают степень вовлечённости аудитории.

С позиции когнитивной лингвистики **Е.С. Кубряковой**, успешная реклама должна активизировать существующие когнитивные модели потребителя. Именно поэтому международные бренды используют хорошо знакомые русскоязычной аудитории концепты: семья, дом, забота, праздник, традиции, качество, доверие, успех, комфорт. Эти понятия обладают высокой культурной значимостью и легко вызывают необходимые ассоциации.

Анализ языковых особенностей рекламных сообщений позволил выделить наиболее распространённые приёмы локализации:

- использование эмоционально окрашенной лексики;
- адаптация международных слоганов вместо буквального перевода;
- применение разговорной речи и элементов повседневного общения;
- использование национально-культурных символов и ценностей;
- обращение к семейной тематике;
- создание эффекта диалога посредством местоимений «мы» и «вы»;
- активное использование оценочной лексики («лучший», «надёжный», «любимый», «проверенный»);
- включение фразеологизмов и общеизвестных выражений русского языка.

Таким образом, результаты исследования свидетельствуют, что русский язык продолжает выполнять не только информационную, но и важную культурно-коммуникативную функцию в деятельности международных брендов на рынках СНГ. Использование локализованных рекламных текстов способствует формированию доверия к бренду, укреплению эмоциональной связи с потребителем, повышению

узнаваемости продукции и сохранению устойчивых рыночных позиций. Практика крупнейших мировых компаний показывает, что успешная маркетинговая стратегия невозможна без глубокого учёта языковых и культурных особенностей целевой аудитории. Именно поэтому локализация рекламного дискурса остаётся одним из наиболее эффективных инструментов современной международной коммуникации.

ЗАКЛЮЧЕНИЕ

Русский язык продолжает играть стратегическую роль в коммуникации мировых брендов на рынках СНГ. Локализация рекламных сообщений позволяет учитывать культурные ожидания аудитории, укреплять доверие и поддерживать конкурентоспособность компаний. Проведённый анализ подтверждает, что сочетание глобальной идентичности бренда с адаптированной языковой стратегией является одним из ключевых факторов успешной маркетинговой деятельности.

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3-SECTION

УДК: 658.5:519.816

САНОАТ КОРХОНАЛАРИ УЧУН ЮҚОРИ ТЕХНОЛОГИК УСКУНАЛАРНИ ТАНЛАШДА КЎП МЕЗОНЛИ ТАҲЛИЛ УСУЛЛАРИДАН ФОЙДАЛАНИШ

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Аннотация. *Мақолада саноат корхоналарида юқори технологик ускуналарни танлаш вазифаси кўп мезонли қарор қабул қилиш муаммоси сифатида қараб чиқилган. Тадқиқотнинг долзарблиги шундаки, ускунага йўналтирилган инвестициянинг узоқ муддатли ва қайтарилмас табиати бир вақтнинг ўзида техник, иқтисодий ва ресурс жиҳатидан зид бўлган мезонларни мувозанатлаштиришни талаб қилади, бироқ амалиётда қарор кўпинча бир мезон - нарх асосида қабул қилинади. Ушбу зиддиятни бартараф этиш мақсадида ишда кўп мезонли таҳлил (MCDM) методологияси таклиф этилиб, аналитик иерархия жараёни (AHP) ва TOPSIS усулларининг интеграциялашган моделини қўллаш асосланган. Металл кесиш дастгоҳини танлаш бўйича амалий ҳисоб-китоб орқали кўрсатилдики, энг арзон муқобил интеграл баҳолашда охирги ўринни эгаллаши мумкин; бу нарх устуворлигига таянувчи анъанавий ёндашувнинг чекланганлигини тасдиқлайди. Олинган натижалар кўп мезонли таҳлил қарорларнинг асослилигини оширишини ва субъективликни камайтиришини кўрсатади.*

Калит сўзлар: *кўп мезонли таҳлил (MCDM), ускуна танлаш, саноат корхонаси, аналитик иерархия жараёни (AHP), TOPSIS, мезонлар оғирлиги, интеграл баҳолаш, инвестиция қарори, сезгирлик таҳлили.*

Аннотация (рус.). *В статье задача выбора высокотехнологичного оборудования на промышленном предприятии рассмотрена как проблема многокритериального принятия решений. Обоснована интегрированная модель на основе методов AHP и TOPSIS; на примере выбора металлорежущего станка показано, что наиболее дешёвый вариант при интегральной оценке может занять последнее место, что подтверждает ограниченность подхода, опирающегося исключительно на цену.*

Ключевые слова: *многокритериальный анализ (MCDM), выбор оборудования, промышленное предприятие, метод анализа иерархий (AHP), TOPSIS, весовые коэффициенты критериев, интегральная оценка, инвестиционное решение, анализ чувствительности.*

Abstract (eng.). *The article treats the selection of high-tech equipment at an industrial enterprise as a multi-criteria decision-making problem. An integrated AHP–TOPSIS model is substantiated; a metal-cutting machine case shows that the cheapest alternative may rank last in the integral assessment, confirming the limitations of a price-only approach.*

Keywords: *Multi-Criteria Decision Making (MCDM), equipment selection, industrial enterprise, Analytic Hierarchy Process (AHP), TOPSIS, criteria weighting, integrated assessment, investment decision, sensitivity analysis.*

КИРИШ

Саноатнинг рақамли трансформацияси ва “Индустрия 4.0” тамойилларининг жорий этилиши шароитида корхонанинг рақобатбардошлиги унинг ишлаб чиқариш базасини қай даражада тўғри шакллантира олишига боғлиқ бўлиб қолмоқда. Шу маънода юқори технологик ускунани танлаш оддий харид эмас, балки корхонанинг келгуси ўн йилликдаги технологик салоҳиятини белгилайдиган стратегик инвестиция қарори сифатида намоён бўлади. Ушбу қарорнинг оқибатлари узоқ муддатли ва амалда қайтарилмас бўлганлиги сабабли, унинг илмий асосланиши масаласи алоҳида аҳамият касб этади.

Муаммонинг моҳияти ускуна танлашда бир-бирига боғлиқ, аммо кўпинча ўзаро зид бўлган кўплаб омилларни бир вақтда ҳисобга олиш зарурлигидадир. Амалиётда корхоналар мазкур мураккабликни соддалаштириш йўлидан бориб, қарорни асосан нарх ёки унумдорлик каби якка кўрсаткичга таяниб қабул қиладилар. Бироқ бундай редукционистик ёндашув оптимал бўлмаган натижаларга олиб келади: арзон ускуна юқори эксплуатация харажатлари ёки паст аниқлик ҳисобига дастлабки тежамни бир неча йил ичида йўққа чиқариши мумкин. Демак, муаммо айрим

мезоннинг қийматини эмас, балки барча мезонларнинг ўзаро мувозанатини топишни талаб қилади.

Айнан шу эҳтиёж XX асрнинг иккинчи ярмида кўп мезонли қарор қабул қилиш (Multi-Criteria Decision Making, MCDM) назариясининг шаклланишига туртки берди. Т. Саати томонидан ишлаб чиқилган аналитик иерархия жараёни [1] мутахассис баҳоларини изчил математик тизимга солиш имконини берса, Ч. Хванг ва К. Юн таклиф этган TOPSIS усули [2] муқобилларни идеал ечимга нисбий яқинлиги бўйича тартиблашга асос яратди. Кейинчалик С. Оприкович ва Г. Тзенг ушбу усулларни қиёсий таҳлил қилиб, VIKOR методининг муросали ечим бериш борасидаги устунлигини кўрсатдилар [3], Б. Рой [4] ва Ж. Бранс [5] эса устунлик муносабатларига асосланган ELECTRE ҳамда PROMETHEE оилаларини ривожлантирдилар. Э. Завадскас ва З. Турскис [6] ушбу усулларнинг иқтисодиёт ва ишлаб чиқаришдаги қўлланилишини умумлаштириб, уларнинг амалий самарадорлигини таъкидлаганлар. Шунга қарамай, адабиётларда усулларни назарий баён этиш кўп учрасада, уларни ускуна танлашнинг аниқ вазифасига интеграциялашган ҳолда қўллаш ва натижаларни таҳлилий талқин қилиш масаласи етарлича ёритилмаган.

Шу боис ушбу тадқиқотнинг мақсади - юқори технологик ускунани танлаш вазифасини кўп мезонли таҳлил доирасида расмийлаштириш ва AHP ҳамда TOPSIS усулларининг интеграциялашган моделини аниқ мисолда синаб кўриш орқали унинг амалий самарадорлигини асослашдир. Мақсадга эришиш учун қуйидаги вазифалар белгиланди: ускуна танлаш мезонлари тизимини шакллантириш; мезонлар оғирлигини AHP орқали аниқлаш; муқобилларни TOPSIS ёрдамида тартиблаш; ҳамда натижаларнинг барқарорлигини сезгирлик таҳлили билан текшириш.

ТАДҚИҚОТ МЕТОДОЛОГИЯСИ

Тадқиқот методологияси кўп мезонли таҳлилнинг умумий мантиғига таянади, унга кўра қарор қабул қилиш чекланган сондаги муқобилни бир нечта мезон бўйича изчил баҳолашга келтирилади. Бироқ якка усулнинг ўзи бу вазифани тўлиқ қамраб ололмайди: усулларнинг ҳар бири турли босқичда кучли. Шу сабабли тадқиқотда икки усулни бирлаштирувчи ёндашув танланди, унда ҳар бир усул ўзи энг самарали бўлган босқичда қўлланилади.

Биринчидан, мезонларнинг нисбий аҳамиятини аниқлаш вазифаси AHP усулига юкланди. Танловнинг сабаби шундаки, ускуна танлашда мезонлар оғирлиги кўпинча объектив статистикадан эмас, балки мутахассис муҳокамасидан келиб чиқади; AHP эса жуфт-жуфт таққослаш орқали бундай субъектив баҳоларни тизимлаштиради ва, энг муҳими, мувофиқлик коэффициенти (Consistency Ratio, CR) орқали уларнинг изчиллигини текшириш имконини беради. CR ≤ 0,1 шарти бажарилгандагина баҳолар етарлича асосли деб қабул қилинади.

Иккинчидан, муқобилларни жамлаб тартиблаш вазифаси TOPSIS усулига юкланди. Бу усул муқобилни идеал ечимга (барча мезонлар бўйича энг яхши қийматлар) яқинлиги ва салбий-идеал ечимдан (энг ёмон қийматлар) узоқлиги орқали баҳолайди. TOPSIS нинг афзаллиги - кўп сонли муқобил ва мезон билан ишлашдаги ҳисоблаш соддалиги ҳамда натижанинг интуитив изоҳланувчанлигидадир.

Шундай қилиб, интеграциялашган AHP–TOPSIS модели қуйидаги кетма-кет босқичларда амалга оширилади: (1) мезонлар тизимини шакллантириш ва уларни фойда ҳамда харажат турларига ажратиш; (2) AHP орқали мезонлар оғирлигини аниқлаш ва изчилликни текшириш; (3) қарор матрицасини тузиш ва уни нормаллаштириш; (4) TOPSIS бўйича идеал ва салбий-идеал ечимларгача бўлган масофаларни ҳисоблаш; (5) нисбий яқинлик коэффициенти бўйича муқобилларни тартиблаш; (6) натижаларнинг барқарорлигини сезгирлик таҳлили орқали баҳолаш. Ушбу

кетма-кетлик кейинги бўлимда аниқ мисол мисолида тўлиқ ишлаб чиқилади.

НАТИЖАЛАР ВА УЛАРНИНГ ТАҲЛИЛИ

Таклиф этилган моделнинг амалий имкониятларини намойиш этиш мақсадида машинасозлик корхонаси учун рақамли дастурий бошқарувли (CNC) металл кесиш дастгоҳини танлаш вазифаси кўриб чиқилди. Бозорда мавжуд тўртта реал муқобил модел - шартли равишда А1, А2, А3 ва А4 - беш мезон бўйича баҳоланди. Мезонлар корхонанинг ишлаб чиқариш устуворликларидан келиб чиқиб шакллантирилди: К1 - сотиб олиш нархи (минг долл., харажат мезони), К2 - унумдорлик (деталь/соат, фойда мезони), К3 - ишлов бериш аниқлиги (микрон, харажат мезони, чунки кичик оғиш яхшироқ), К4 - соатлик энергия сарфи (кВт·соат, харажат мезони) ва К5 - ишончлилик, яъни носозликсиз хизмат муддати (йил, фойда мезони). Муқобилларнинг ушбу мезонлар бўйича дастлабки кўрсаткичлари 1-жадвалда келтирилган.

1-жадвал. Муқобилларнинг мезонлар бўйича дастлабки қарор матрицаси

Муқобил	К1, нарх	К2, унум.	К3, аниқлик	К4, энергия	К5, ишонч.
А1	120	45	8	15	10
А2	150	60	5	18	12
А3	95	38	10	12	8
А4	135	55	6	16	11

Изоҳ: К1, К3, К4 - харажат мезонлари (кичик қиймат афзал); К2, К5 - фойда мезонлари (катта қиймат афзал).

Жадвал маълумотлари муаммонинг зиддиятли табиатини яққол очиб беради. Жумладан, энг арзон А3 модели (95 минг долл.) айни пайтда энг

паст унумдорлик (38 деталь/соат), энг ёмон аниқлик (10 микрон) ва энг қисқа хизмат муддатига (8 йил) эга. Аксинча, энг қиммат А2 модели (150 минг долл.) техник кўрсаткичлар бўйича етакчилик қилади. Бу ҳолат бирор муқобилнинг барча мезонлар бўйича мутлақ устун бўлмаслигини, демак қарорни фақат бир устунни кузатиб қабул қилиб бўлмаслигини кўрсатади - айнан шу ерда кўп мезонли таҳлилга эҳтиёж туғилади.

Модельнинг биринчи босқичида мезонлар оғирлиги AHP усули орқали аниқланди. Корхона мутахассислари мезонларни жуфт-жуфт таққослаб, 1–9 шкаласи бўйича баҳолашди; ҳосил бўлган таққослаш матрицаси асосида хусусий вектор усулида оғирликлар ҳисобланди. Баҳолар изчиллиги мувофиқлик коэффициенти билан текширилиб, CR = 0,04 қиймати олинди; бу 0,1 остонасидан паст бўлганлиги учун мутахассис баҳолари асосли деб қабул қилинди. Ҳисоблаш натижалари 2-жадвалда берилган.

2-жадвал. AHP усули бўйича мезонлар оғирлиги (CR = 0,04)

Мезон	Тавсифи	Оғирлик (w)
К1	Сотиб олиш нархи	0,30
К2	Унумдорлик	0,25
К3	Ишлов бериш аниқлиги	0,20
К4	Энергия сарфи	0,10
К5	Ишончлилик	0,15

Олинган оғирликлар корхонанинг устуворлик тизимини акс эттиради: нарх (0,30) ва унумдорлик (0,25) энг муҳим омиллар сифатида ажралиб турса-да, уларнинг йиғиндиси (0,55) техник ва ишончлилик мезонлари билан мувозанатланган. Бу ҳол моделнинг нарх ва техник сифат ўртасидаги мувозанатни сақлаб қолганини кўрсатади - якка мезонли

ёндашувдан фарқли равишда, нарх бу ерда ҳал қилувчи эмас, балки устувор омиллардан бири сифатида иштирок этади.

Иккинчи босқичда TOPSIS усули қўлланилди. Дастлаб қарор матрицаси векторли усулда нормаллаштирилиб, ҳар бир нормаллашган қиймат тегишли мезон оғирлигига кўпайтирилди ва оғирликли нормаллашган матрица ҳосил қилинди. Сўнгра ҳар бир мезон бўйича идеал ечим A* (фойда мезонларида максимум, харажат мезонларида минимум) ва салбий-идеал ечим A^- аниқланди. Ҳар бир муқобил учун идеал ечимгача бўлган евклид масофаси S* ва салбий-идеал ечимгача бўлган масофа S^- ҳисобланиб, пировардида нисбий яқинлик коэффициенти $C_i = S^- / (S^* + S^-)$ формуласи бўйича топилди. Коэффициент 1 га қанча яқин бўлса, муқобил идеалга шунча яқин ҳисобланади. Якуний натижалар 3-жадвалда келтирилган.

3-жадвал. TOPSIS усули бўйича интеграл баҳолаш натижалари

Муқобил	S* (идеал)	S^- (салбий)	C_i	Ўрин
A1	0,072	0,061	0,459	3
A2	**0,041**	**0,089**	**0,685**	**1**
A3	0,081	0,048	0,372	4
A4	0,053	0,076	0,589	2

Интеграл баҳолаш натижалари муҳим хулосага олиб келади. Энг юқори яқинлик коэффициентига эга A2 модели (C_i = 0,685) биринчи ўринни эгаллади: гарчи у энг қиммат бўлса-да, унумдорлик, аниқлик ва ишончлилик бўйича устунлиги бу камчиликни қоплади. Иккинчи ўринда мутаносиб кўрсаткичларга эга A4 (0,589), учинчи ўринда ўртача A1 (0,459) жойлашди. Диққатга сазовор жиҳат шундаки, дастлабки босқичда энг жозибадор кўринган, яъни энг арзон A3 модели интеграл баҳолашда охирги, тўртинчи ўринни эгаллади (0,372). Бу натижа бевосита 1-

жадвалдаги маълумотлардан келиб чиқади: А3 нинг нарх бўйича устунлиги қолган тўрт мезон бўйича орқада қолиши билан бекор бўлган.

Ушбу натижа тадқиқотнинг марказий тезисини эмпирик тасдиқлайди: ускуна танлашда энг арзон вариант кўп ҳолларда энг мақбул эмас. Агар қарор фақат нарх мезонига таянган бўлса, корхона А3 ни танлаган ва оқибатда паст унумдорлик ҳамда юқори брак даражаси кўринишидаги яширин харажатларга дуч келган бўлар эди; бу дастлабки 25 минг долларлик тежам узоқ муддатда бир неча баробар зарарга айланиши мумкинлигини англатади. Кўп мезонли ёндашув эса ушбу яширин харажатларни ошкор қилиб, объектив равишда асослантирилган танловни таъминлади.

Олинган тартибнинг ишончлилигини баҳолаш учун сезгирлик таҳлили ўтказилди. Бунда энг оғир мезон - нарх (К1) оғирлиги ±0,10 диапазонда ўзгартирилиб, бошқа мезонлар оғирлиги мутаносиб равишда қайта тақсимланди ва TOPSIS ҳисоби такрорланди. Таҳлил кўрсатдики, нарх оғирлигини 0,40 гача ошириш ҳам А2 нинг етакчилигини ўзгартирмади, фақат А1 ва А4 ўртасидаги фарқни бироз камайтирди. Бу А2 нинг ғолиблиги мезонлар оғирлигидаги эҳтимолий хатоларга нисбатан барқарор эканлигини ва шу боис якуний қарорнинг ишончли эканлигини тасдиқлайди.

Тадқиқот натижалари адабиётлардаги умумий хулосалар билан уйғунлашади: Оприкович ва Тзенг [3] ҳамда Завадскас ва Турскис [6] таъкидлаганидек, кўп мезонли усуллар зид мезонлар шароитида якка кўрсаткичли баҳолашга нисбатан ишончлироқ натижа беради. Айни пайтда ушбу иш мавжуд тадқиқотларни аниқ бир амалий контекстда - юқори технологик ускуна танлашда - усулларнинг интеграциялашган қўлланилишини кўрсатиш ва натижаларни таҳлилий талқин қилиш орқали тўлдиради.

Шу билан бирга, натижаларни талқин қилишда моделнинг айрим чекловларини эътиборга олиш зарур. Биринчидан, мезонлар оғирлиги мутахассис баҳосига таянади, шунинг учун баҳоловчилар таркиби натижага таъсир қилиши мумкин; бу таъсирни камайтириш учун баҳолашга кенгроқ эксперт гуруҳини жалб этиш ва Дельфи усулини қўллаш мақсадга мувофиқ. Иккинчидан, дастлабки кўрсаткичлар аниқ сонлар сифатида берилган, аммо амалда улар (масалан, келгуси эксплуатация харажатлари) ноаниқлик билан боғлиқ; бу ноаниқликни ҳисобга олиш учун усулларнинг булутли (fuzzy) кенгайтмаларини қўллаш истиқболли йўналишдир.

ХУЛОСА

Ўтказилган тадқиқот юқори технологик ускунани танлашни кўп мезонли қарор қабул қилиш муаммоси сифатида расмийлаштириш ва уни AHP ҳамда TOPSIS усулларининг интеграциялашган модели орқали ҳал этиш имконини берди. Модель доирасида AHP мезонлар оғирлигини изчил аниқлаш вазифасини, TOPSIS эса муқобилларни объектив тартиблаш вазифасини бажарди; сезгирлик таҳлили эса олинган қарорнинг барқарорлигини тасдиқлади.

Тадқиқотнинг асосий илмий-амалий натижаси шундан иборатки, металл кесиш дастгоҳини танлаш мисолида энг арзон муқобилнинг интеграл баҳолашда охирги ўринни эгаллаши эмпирик тарзда кўрсатилди. Бу нарх устуворлигига таянувчи анъанавий ёндашувнинг чекланганлигини далиллайди ва техник, иқтисодий ҳамда ресурс мезонларини яхлит ҳисобга олувчи ёндашувнинг устунлигини асослайди.

Умуман олганда, кўп мезонли таҳлил усулларини корхоналарнинг техник қайта жиҳозлаш ва инвестиция қарорлари амалиётига жорий этиш субъективликни камайтиради, яширин харажатларни олдиндан аниқлаш имконини беради ва ишлаб чиқаришнинг рақобатбардошлигини оширишга хизмат қилади. Тадқиқотнинг келгусидаги истиқболли йўналишлари

сифатида моделни ноаниқлик шароитидаги булутли кенгайтмалар ва рақамли иккиланиш (digital twin) технологиялари билан интеграциялаш белгиланди.

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MATHEMATICAL MODELING OF MULTI-FACTOR MONITORING PARAMETERS FOR QUALITY PRESERVATION IN COTTON STACKS

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Abstract. *The article presents a compact mathematical model for multi-factor monitoring of cotton stacks during storage. Raw cotton is considered a porous and hygroscopic mass where temperature, moisture, density, air exchange and ambient conditions interact. Normalized indicators and an integrated risk index are proposed to convert sensor data into an early warning and preventive control decision. The approach helps detect self-heating and moisture accumulation before visible quality degradation occurs.*

Keywords: *cotton stack, monitoring, mathematical model, risk index, mechatronic system, temperature, moisture.*

INTRODUCTION

Long-term storage of raw cotton in stacks is a responsible technological process because the quality of fibre and seed depends on the internal microclimate of the stored mass. Cotton is not an inert material; it is a fibrous, porous, hygroscopic and biologically active medium. During storage, moisture migration, heat release, compaction and restricted air exchange occur at the same time. Their combined influence may produce local self-heating zones that are difficult to detect by surface inspection.

Existing control methods, based mainly on periodic temperature measurement or visual checking, give useful information but often react after a

hazardous process has already developed. Therefore, the storage object should be evaluated as a multi-parameter mechatronic system in which sensor information is transformed into a quantitative risk assessment and then into a preventive technological action.

MATERIALS AND METHODS

The cotton stack is represented as a spatially distributed object with internal parameters, external influences and possible control actions. The quality preservation state is written in operator form:

$$Y(t) = \Phi(X(t), Z(t), U(t), \Theta, t) \quad (1)$$

where Y(t) is the quality state, X(t) is the vector of internal parameters, Z(t) is the ambient influence vector, U(t) is the control vector, Θ denotes structural-technological parameters and t is the storage time. The basic internal vector includes temperature T, moisture W, bulk density ρ, air velocity v_a and pressure difference ΔP.

$$\rho = m / Vg, \quad Vg = kf \cdot L \cdot B \cdot H \quad (2)$$

Here ρ is bulk density, m is cotton mass, Vg is the corrected stack volume, kf is the shape coefficient, and L, B, H are stack dimensions. Density is essential because high compaction reduces porosity and increases aerodynamic resistance.

Table 1. Factors included in the monitoring model

Factor	Symbol	Physical meaning	Diagnostic role
Temperature	T	Thermal condition of internal layers	Indicator of self-heating
Moisture	W	Water content of cotton and air	Risk of biological activity and condensation

Density / pressure	ρ, ΔP	Compaction and airflow resistance	Explains weak ventilation
Ambient air	T_a, RH_a	External boundary conditions	Shows whether aeration is useful

To combine heterogeneous measurements, every parameter is converted into a dimensionless indicator between the normal and critical values:

$$ri = min\{1, max[0, (xi - xi, norm)/(xi, crit - xi, norm)]\} \quad (3)$$

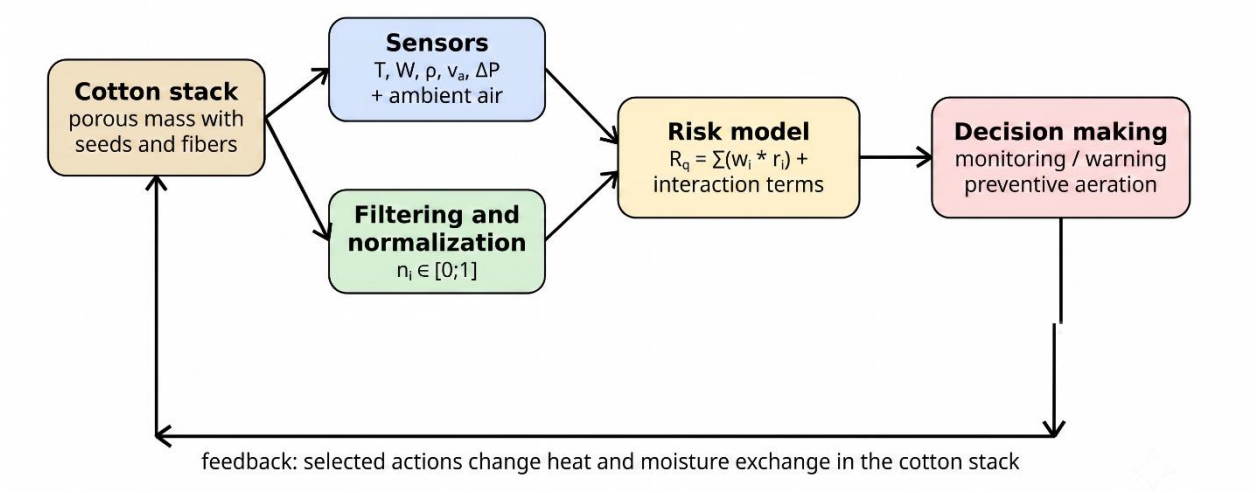

Figure 1. Mechatronic decision loop for multi-factor cotton stack monitoring.

RESULTS AND DISCUSSION

The proposed model changes monitoring from separate observation to risk-oriented diagnosis. Temperature sensors reveal local heating, moisture sensors show wetting and condensation tendency, pressure and air velocity indicate the quality of ventilation, and external sensors describe the usefulness of ambient air. The integrated risk index is defined as:

$$Rq = wT\,rT + wW\,rW + w\rho\,r\rho + wv\,rv + we\,re + kTW\,rT\,rW \quad (4)$$

where Rq is the quality degradation risk, rT, rW, rρ, rv and re are normalized components, w are weighting coefficients and kTW accounts for the

joint influence of temperature and moisture. This interaction term is important because moderate heating becomes more dangerous when it is accompanied by high moisture.

Sensor readings are related to the real state by a measurement model:

$$y(k) = C\,x(k) + \varepsilon(k) \quad (5)$$

where y(k) is the measured vector, x(k) is the real state, C is the selection matrix and ε(k) is measurement error. The expression shows that sensor placement is as important as sensor accuracy. Surface-only measurements may miss central hot spots or lower-layer compaction.

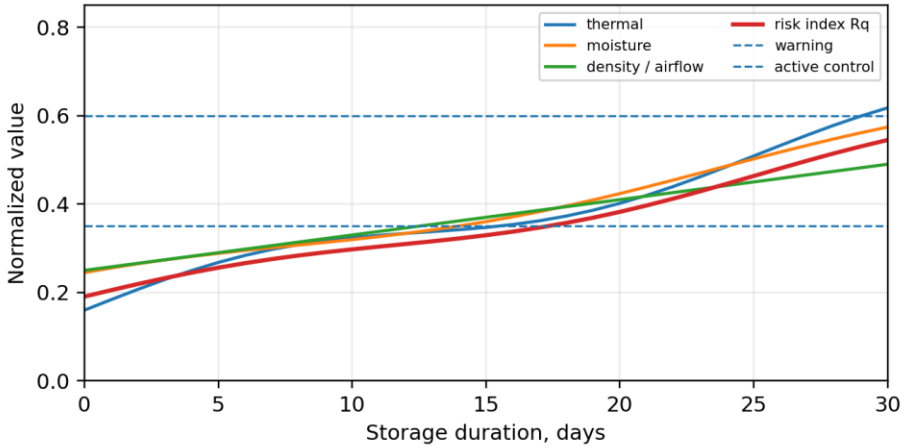

Figure 2. Example of normalized indicators and integrated risk index during storage.

Table 2. Risk intervals and recommended system response

Risk interval	State	System response	Operator message
Rq < 0.35	Stable	Periodic measurement and archiving	Normal condition
0.35 ≤ Rq < 0.60	Warning	Increase measurement frequency	Preventive inspection

$0.60 \le Rq < 0.80$	Active risk	Start controlled aeration	Risk zone detected
$Rq \ge 0.80$	Critical	Alarm and manual inspection	Immediate action

Figure 2 and Table 2 demonstrate that the integrated index may enter the warning zone before any single parameter reaches a critical value. This is the main advantage of multi-factor diagnosis. It allows staged prevention: normal monitoring, warning, active aeration and critical inspection. The boundaries can be calibrated for a particular cotton variety, initial moisture and storage yard.

CONCLUSION

Cotton stack quality preservation depends on the interaction of temperature, moisture, density, air exchange and environmental conditions. A single-temperature control approach is not sufficient for early diagnosis. The proposed model describes the stack as a multi-parameter object and converts sensor readings into normalized indicators and the integrated risk index Rq. This index can become the mathematical basis of a mechatronic monitoring system for early warning, sensor placement planning and preventive aeration control.

From an engineering point of view, the model is convenient for step-by-step implementation. In a minimal configuration it can use temperature and moisture sensors; in a full configuration it can include pressure difference, airflow and ambient-air sensors. This makes the proposed approach applicable both to experimental stacks and to industrial cotton storage yards.

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YOLOV8 NEYRON TARMOG‘I VA CHEGARAVIY INTERVALLLAR ALGORITMI ASOSIDA ADAPTIVE SVETAFOR BOSHQARUV TIZIMINI LABARATORIYA SHAROITIDA LOYIHALASH

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Abstract. *This paper proposes an intelligent traffic light control system that detects vehicles in real time using the YOLOv8 object detection model and dynamically adjusts traffic signal timing based on the detected traffic flow. The system estimates traffic density through cameras and automatically adapts traffic light phases, thereby reducing traffic congestion and average waiting time. Experimental tests were conducted using a Python-based YOLO model and an Arduino-controlled LED indicator system, demonstrating the feasibility and effectiveness of the proposed approach.*

Keywords: *intelligent traffic light, YOLOv8, computer vision, traffic flow, artificial intelligence.*

Annotatsiya. *Ushbu maqolada YOLOv8 yordamida real vaqtda transport vositalarini aniqlab, aniqlangan oqim asosida svetafor signalining vaqtini dinamik boshqaruvchi aqlli tizim taklif etilgan. Tizim kameralar yordamida oqim zichligini baholab, svetafor fazalarini avtomatik moslashtiradi va natijada tirbandlik hamda o‘rtacha kutish vaqtini kamaytiradi. Tajriba sinovlarida Python YOLO modeli va Arduino orqali LED indikatorlari yordamida dastlabki natija olingan.*

Kalit so‘zlar: *aqlli svetafor, YOLOv8, kompyuter ko‘rish, transport oqimi, sun’iy intellekt*

KIRISH

Urbanizatsiya jarayonining tezlashishi va aholi turmush darajasining yuksalishi natijasida shahar transport tizimlariga tushayotgan yuklama geometrik progressiya bilan ortib bormoqda. Xususan, O‘zbekiston Respublikasida avtomobil transporti xizmatlari umumiy transport sohasining

50% dan ortig‘ini tashkil etadi. Respublika poytaxti Toshkent shahrida har kuni 900 mingdan ortiq avtotransport harakatlanmoqda (shundan 736 mingdan ziyodi doimiy ro‘yxatda bo‘lsa, 175 mingdan ortig‘i viloyat hududlaridan kirib keladi) [1].

Shahar aholisining 74 foizi tirbandlikni eng dolzarb muammolaridan biri sifatida qayd etgan. Avtotransport vositalarining chorrahalarda uzoq vaqt to‘xtab turishi natijasida yoqilg‘i sarfi ortib, atmosferaga zararli gazlar ajralishi keskin kuchaymoqda [2]. Toshkent shahridan tashqari O‘zbekistonning boshqa yirik shaharlarida ham gavjum ko‘chalarda tirbandlik muammosi mavjud. Mavjud muammolarni bartaraf etish an’anaviy statik (qat’iy taymerli) svetofor tizimlari orqali imkonsiz bo‘lib, transport oqimini real vaqt rejimida kompyuterli ko‘rish (Computer Vision) va sun’iy intellekt (AI) algoritmlari asosida dinamik boshqaruvchi intellektual transport tizimlarini (ITS) joriy etishni taqozo etmoqda.

YOLO algoritmi obyektlarni aniqlashda keng qo‘llaniladi. YOLOv8 modeli yuqori tezlik va aniqlik bilan ajralib turadi. Intellektual transport tizimlarida adaptive svetafor boshqaruvini yo‘lga qo‘yish maqsadida ko‘plab tadqiqotlar amalga oshirilgan. Avtomobillarni aniqlashda neyron tarmoqlarini qo‘llash bo‘yicha dastlabki muvafaqqiyatli qadamlar Mingxiu Lin va boshqalar tomonidan YOLOv3 va Kalman filtri kombinatsiyasi yordamida amalga oshirilgan bo‘lib, ular tirbandlikni boshqarishda 30% lik samaradorlikka erishgan [3] . Biroq, YOLOv3 modelining arxitekturaviy cheklovlari real vaqt rejimidagi yuqori chastotali tasvirlarga tezkor ishlov berish imkonini bermagan. Keyinchalik, Sharma va boshqa mualliflar Edge AI va YOLOv4 modelini integratsiya qilish orqali tizim kechikishini kamaytirishga muvaffaq bo‘lishdi [4], ammo model kam yoritilgan(tungi yoki soyali) sharoitlarda obyektlarni aniqlashda past ko‘rsatkich namoyish etgan.

IEEE Xplore platformasida chop etilgan tadqiqotda real vaqt rejimida transport vositalarini aniqlash uchun YOLOv9 algoritmi hamda moslashuvchan

svetofor signallarini nazorat qilish uchun Chuqur mustahkamlovchi ta’lim (Deep Reinforcement Learning - DRL) modeli muvaffaqiyatli integratsiya qilingan. DRL va YOLOv9 kabi murakkab neyron tarmoqlarining kombinatsiyasi amaliyotda juda yuqori hisoblash resurslarini talab qiladi hamda qaror qabul qilish tezligida ma'lum uzilishlar (latency) keltirib chiqarishi mumkin [5].

Aynan mana shu cheklovni bartaraf etish maqsadida, ushbu tadqiqot ishida hisoblash resurslariga bo‘lgan talabni kamaytiruvchi YOLOv8 modeli hamda tezkor qaror qabul qiluvchi diskret chegaraviy intervallar algoritmi kombinatsiyasi taklif etildi.

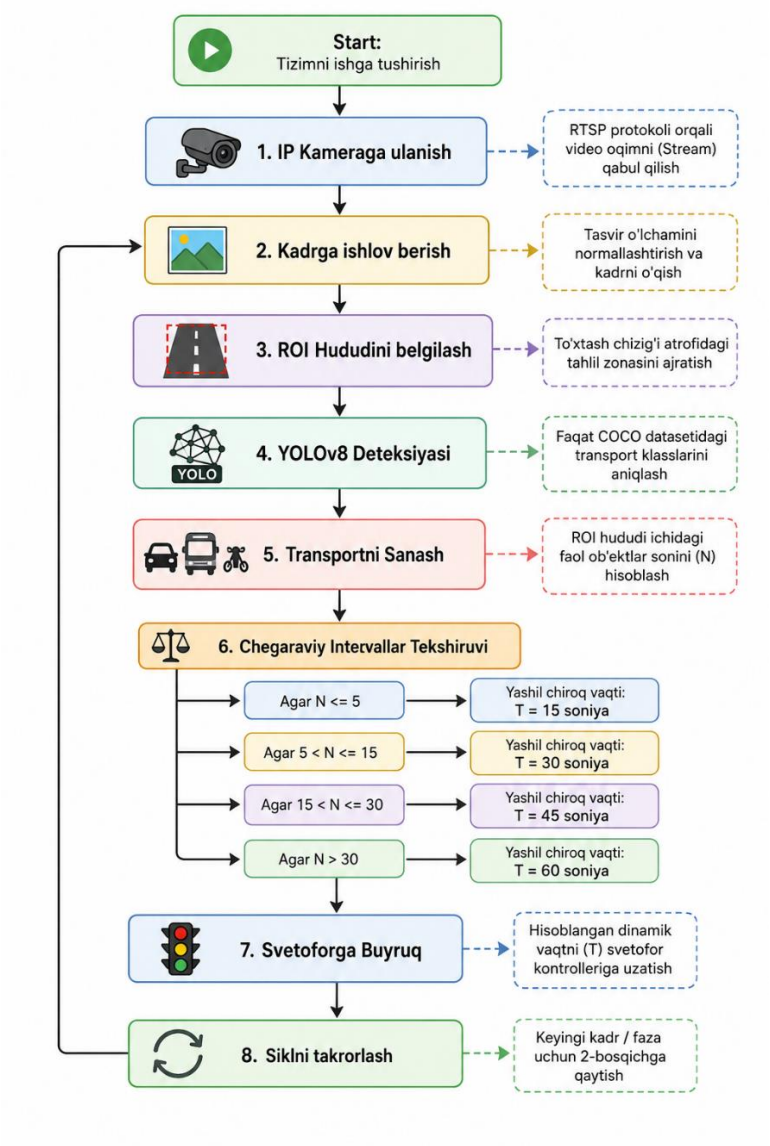
Tizim kamera, YOLOv8 modeli, Python dasturi va Arduino qurilmasidan iborat. Transport vositalari aniqlanadi va ularning soniga qarab svetafor vaqti belgilanadi.

YOLOv8 tarmog‘i aniqlagan obyekt chegaralovchi qutilarining (bounding box) geometric markazini hisoblash [Redmon va boshqalar, 2016] modeliga tayanadi. Aniqlangan koordinatalarning belgilangan ROI maydoniga tegishli ekanligini tekshirish va transport vositalarini diskret sanash mantiqi indicator funksiyalari orqali amalga oshirildi [6].

Chorrahadagi transport oqimi o‘zgaruvchan bo‘lganligi sababli, yashil chiroq davomiyligini hisoblashda uzluksiz chiziqli funksiyalar o‘rniga disket chegaraviy intervallar modeli ishlab chiqildi. Ushbu model svetafor kontrollerlarining kommunikatsiya tezligini oshiradi. Tizim aniqlangan transport soni (N) ga qarab, yashil chiroq vaqtini (T_{green}) quyidagi qat’iy mantiqiy shart asosida belgilaydi:

$$T_{green} = \begin{cases} 15\ sek, agar\ 0 \leq N \leq 5, \\ 30\ sek, agar\ 5 < N \leq 15, \\ 45\ sek, agar\ 15 < N \leq 30, \\ 60\ sek, agar\ N > 30. \end{cases} \quad (6)$$

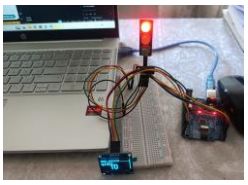
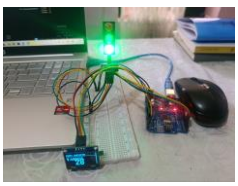
Svetoforning bir fazasi tugagach, algoritm keyingi sikl uchun IP kameradan yangi ma’lumotni oladi va jarayon uzluksiz takrorlanadi.



1-rasm. YOLOv8 va chegaraviy intervallar asosidagi adaptiv svetofor tizimining ishlash algoritmik sxemasi.

Tizim real vaqt rejimida sinovdan o‘tkazildi. Natijada transport mavjud bo‘lganda yashil vaqt uzaytirildi.



a) b) c) d)

2-rasm. YOLOv8 va chegaraviy intervallar algoritmining video oqimidagi sinov natijalari skrinshotlari:a) transport vositalari soni kam(N=3, T=10 sek); b) o‘rtacha oqim zichligi (N=10, T=20 sek); c) va d) Arduino orqali ledlarning boshqarilish holati

Ishlab chiqilgan tizimning amaliy samaradorligini baholash maqsadida shahar chorrahalarining birida olingan kunduzgi video materiallar yordamida eksperiment o‘tkazildi. 2-rasmda ko‘rsatilganidek, IP kameradan olingan kadrda maxsus ajratilgan ROI hududi ichiga kirgan transport vositalari YOLOv8 modeli tomonidan aniqlanib, ustiga cheralovchi qutilar (bounding boxes) chizilgan.

Tungi va noqulay ob-havo tasvirlari bo‘lmagani, faqat kunduzgi ochiq videodan foydalanilgani sababli modelning umumiy aniqlik ko‘rsatkichi (mAP50) 92.2% ni tashkil etdi, bu esa real vaqt rejimida svetoforni boshqarish uchun to‘liq yetarli hisoblanadi.

Taklif etilgan tizim transport boshqaruvini yaxshilaydi va kelajakda kengaytirish mumkin. Ushbu tadqiqot ishi doirasida zamonaviy intellektual transport tizimlarining eng dolzarb muammolaridan biri − shahar chorrahalarida transport oqimi zichligiga qarab svetofor chiroqlarini dinamik boshqarish modeli ishlab chiqildi va amaliyotda sinab ko‘rildi. An’anaviy qat’iy taymerli svetofor tizimlarining kamchiliklarini bartaraf etish maqsadida taklif etilgan YOLOv8 neyron tarmog‘i va diskret chegaraviy intervallar algoritmi kombinatsiyasi yuqori samaradorlik namoyish etdi. Tadqiqotning keyingi bosqichlarida tizimni yanada takomillashtirish maqsadida tungi va noqulay ob-havo (yomg‘ir, tuman, qor) sharoitlarida ishlay oladigan ma’lumotlar to‘plamini (dataset) shakllantirish, chorrahaning barcha 4 ta yo‘nalishini o‘zaro integratsiya qilish hamda tez yordam, o‘t o‘chirish va boshqa maxsus transport vositalariga ustunlik (prioritet) beruvchi intellektual algoritmlarni qo‘shish rejalashtirilgan.

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UDC: 539.3, 624.131.439.

RESEARCH ON STRESS-STRAIN STATES OF EARTH-FILL DAMS UNDER THE INFLUENCE OF PROPER WEIGHT AND WATER PRESSURE

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Annotation: This research abstract presents a computational scheme, algorithm, and mathematical model for evaluating the stress-strain state of the Rezaksoy earth-fill dam, which has complex geometric parameters. The evaluation is based on the variational principle and considers the effects of self-weight and hydrostatic pressure using a plane model. Numerical results were obtained using Plaxis 2D software, taking into account the actual geometric structure and design features of the dam. Based on an analysis of the results, new scientific conclusions have been drawn and recommendations have been developed.

Keywords: Earth-fill dam, self-weight, stress-strain state, hydrostatic pressure, stress and strain isolines.

1. INTRODUCTION

Large hydraulic structures designed and operated in high-seismic zones must be robust, reliable, and safe against various types of static and intensive dynamic loads, as well as seismic loads. Furthermore, to create strong and reliably functioning structures for hydraulic structures interacting with the water environment, it is necessary to conduct comprehensive research to assess their structural characteristics and static state, taking into account the actual geometry of the structure.

Currently, the study of scientific works conducted worldwide on the study of stress-strain states under the influence of static forces in earth dams using numerical methods, the justification of the relevance of this topic, and the generalization of existing scientific approaches are of great importance in modern science.

On general theoretical grounds, numerous scientific sources [1-3] have studied the structural characteristics of earth dams, their strength, and stress states. Similar works [4-8] cover soils and their types, physical and mechanical properties of soils, stress states under external loads, deformation, water permeability (filtration process), solving problems using numerical methods, as well as issues related to their rheological and seismic strength. In works [9, 10], the general theoretical foundations of hydraulic structures, as well as issues regarding the strength of earth dams, are comprehensively analyzed.

In recent years, research conducted using computer programs has paid special attention to studying the stress-strain state of earth dams under the influence of water pressure and self-weight. In particular, international scientific articles [11-14] have modeled the deformation processes of earth dams under the influence of water flow and pressure.

An analysis of the studied literature shows that although scientific works have been conducted on the stress-strain state and strength of earth dams, the issue of an in-depth study of the influence of specific gravity and water pressure using numerical methods remains relevant. This research work aims to improve the existing mathematical model and develop a calculation method for studying the stress-strain state of earth dams under the influence of specific gravity and hydrostatic water pressure using the Plaxis 2D program.

This article presents the results of a study on the stress-strain state of the Rezaksoy earth dam under the influence of specific gravity and water pressure, taking into account the actual structural aspects of the earth dam, which, unlike previous known works, provides scientific conclusions based on their analysis.

2. METHODOLOGY

Let us consider the model of uniform deformation of the Rezaksay earth dam with a volume $V = V_1 + V_2 + V_3$, which has a complex geometric shape (Fig. 1). Here: V_1, V_3 are the upper and lower support prisms, and V_2 is the volume of the nucleus. The dam is rigidly fixed to the foundation along the surface Σ_u and it is free from loading along the upper and lower slopes Σ_2, Σ_4 and the upper surface Σ_3, and water pressure acts on the surface S_p of the upper slope of the dam. On the surface Σ_1, it is fixed using a hinged support. The efficiency of the Rezaksay earth dam under the influence of specific gravity and hydrostatic water pressure is investigated.

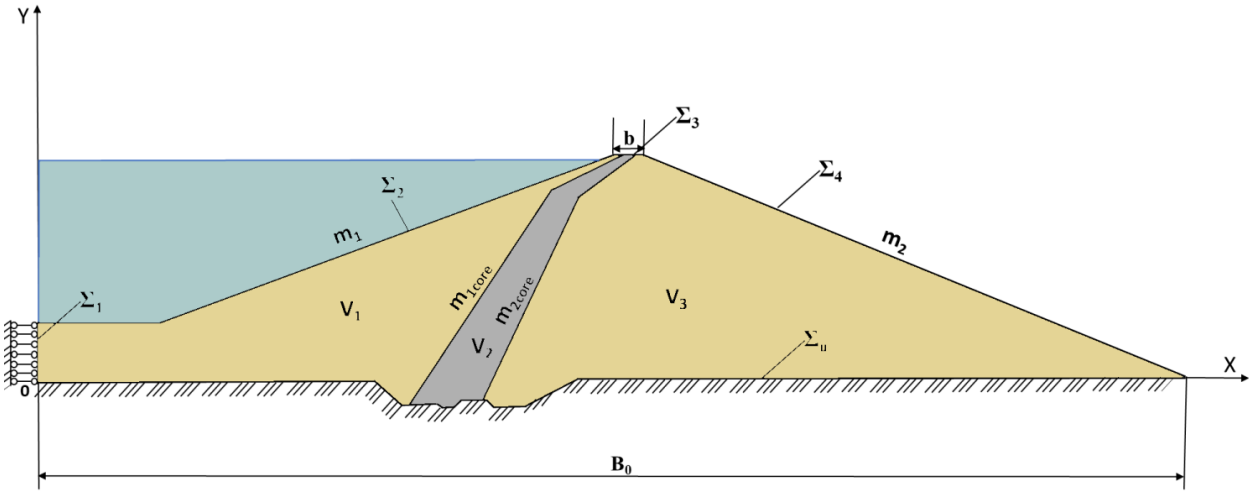

Figure 1. Planar calculation model of the Rezaksay earth dam under the influence of specific gravity and water pressure

Here: *b* is the width of the dam along the crest; B_0 is the width of the dam base in the transverse direction; m_1 and m_2 are the slope coefficients of the upper and lower slopes, and m_{1core} and m_{2cor} are the slope coefficients of the dam core.

For this case, the variational equation based on Lagrange's principle of possible displacements is written as follows[1]:

$$\delta A = -\int_{V_1} \sigma_{ij}\delta\varepsilon_{ij}dV_1 - \int_{V_2} \sigma_{ij}\delta\varepsilon_{ij}dV_2 - \int_{V_3} \sigma_{ij}\delta\varepsilon_{ij}dV_3 +$$

$$+\int_{V_1}\vec{f}\delta\vec{u}dV_1+\int_{V_2}\vec{f}\delta\vec{u}dV_2+\int_{V_3}\vec{f}\delta\vec{u}dV_3+\int_{S_P}\vec{p}\delta\vec{u}dS=0 \qquad i,j=1,2 \tag{1}$$

and along the base of the dam, the following boundary conditions are imposed:

$$\vec{x}\in\sum\nolimits_u : y=0;\quad \delta\vec{u}=0;$$

$$\vec{x}\in\sum\nolimits_1 : x=0;\quad \delta u_1=0. \tag{2}$$

The following generalized Hooke's law is used [15], which expresses the relationship between stress and strain tensors reflecting the physical and mechanical properties of the material in each part of the system under consideration, namely:

$$\left.\begin{aligned}\sigma_{11}&=\frac{E_n(1-\nu_n)}{(1+\nu_n)(1-2\nu_n)}\varepsilon_{11}+\frac{\nu_nE_n}{(1+\nu_n)(1-2\nu_n)}\varepsilon_{22}\\ \sigma_{22}&=\frac{E_n(1-\nu_n)}{(1+\nu_n)(1-2\nu_n)}\varepsilon_{22}+\frac{\nu_nE_n}{(1+\nu_n)(1-2\nu_n)}\varepsilon_{11}\\ \sigma_{12}&=\frac{E}{2(1+\nu_n)}\varepsilon_{12}\end{aligned}\right\} \tag{3}$$

The relationship between strain tensors and displacement vectors is expressed by the following Cauchy relations:

$$\varepsilon_{ij}=\frac{1}{2}\left(\frac{\partial u_i}{\partial x_j}+\frac{\partial u_j}{\partial x_i}\right). \tag{4}$$

In calculations, the hydrostatic pressure of water on the pressure surface of the dam is determined by the following formula:

$$p=\rho_0 g(h-y) \tag{5}$$

Here: $\vec{u}$, ε_{ij}, σ_{ij} are the components of displacement vectors, strain tensors, and stress tensors; $\delta\vec{u}$, $\delta\varepsilon_{ij}$ are the explanatory variations of the components of the possible displacement vector and strain tensors; $\vec{f}$ is the mass force vector; E_n and ν_n are the elastic parameters for the n-th dam element; ρ_0 is the water density, g is the acceleration of gravity, and *(h-y)* is the depth of the dam's head surface point above the water level; indices *i,j* are equal to *i,j = 1, 2*.

For any possible displacement $\delta\vec{u}$, it is necessary to determine the unknown displacement and stress components formed in the dam body under loads $\vec{f}$ and $\vec{p}$, which satisfy equations (1) - (4).

As a result of applying the finite element method (FEM) procedure, the variational equation (1) - (4), boundary conditions (2), and relations (3), (4) for the domains occupied by the system are reduced to a system of non-homogeneous algebraic equations equivalent to the above mathematical model:

$$[K]\{u\} = \{F\}. \qquad (6)$$

Here, *[K]* is the stiffness matrix; *{u}* – unknown displacements to be determined; *{F}* - external forces (mass forces, hydrostatic pressure, etc.). The universal Plaxis 2D program was used to solve the problem.

3. RESULTS AND DISCUSSIONS

The foundation of the Rezaksay earth dam, where the research is being conducted, consists of sandy-gravel soil and is laid by filling and tamping (Fig. 1). The upper slope of the dam is covered with large boulders. The core of the dam is constructed from soil with a supes-suglonic mixture, the height is H = 90 m. The width of the dam crest is b = 12 m. The width of the base is B_0 = 427 m.

From the analysis of the obtained results, it can be seen that the values of the horizontal displacements u_1 arising in the body of the dam differ sharply from each other, taking into account the specific gravity and hydrostatic water pressure in the cross-section of the Rezaksoy earth dam. In this case, as the dam

height increases, the values of the vertical displacements u_2 increase accordingly (Figs. 2.a-2.b).

a) u_2, [*10^{-3}m] b) u_2, [*10^{-3}m]

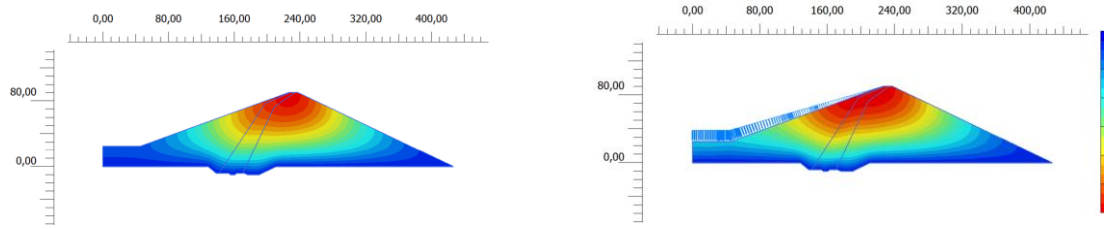

Figure 2. Isolines of equal distribution of vertical displacements u_2, formed in the cross-section of the Rezaksay earth dam under the influence of self-weight (a) and self-weight and hydrostatic pressure (b).

Analysis of the isolines shown in Fig. 2a shows that the largest displacement occurs above the dam, and its value decreases as it approaches the base of the dam. If the dam base is uniform, the displacement isolines will also have an almost symmetrical appearance. Figure 2b shows that hydrostatic water pressure leads to a 1.4-fold increase in displacement values in the upper support prism.

At the next stage of the study, the stress state of the dam was studied under the influence of specific gravity and water pressure, and isoline equations for the equal distribution of σ_{ij} stress components were constructed (Figs. 3.a–3.b).

When studying the stress state, it was found that the stress components σ_{11} approach zero at their maximum points near the base and at points close to the surface under the influence of self-weight. Under the influence of water pressure, a 1.5-fold increase in stress values was observed in the upper support prism.

a) σ_{22}, kN/m^2 b) σ_{22}, kN/m^2

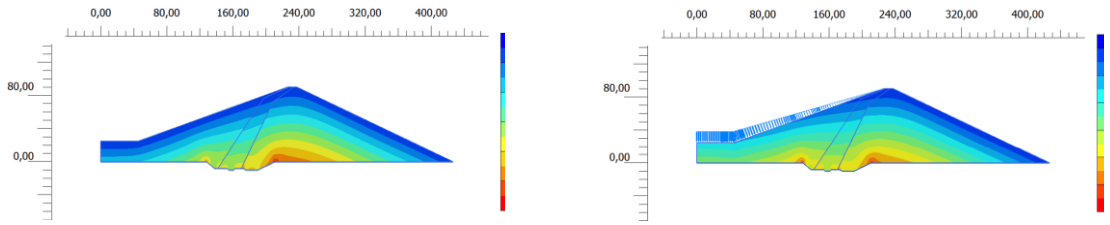

Figure 3. Isolines of equal distribution of σ_{22} - vertical normal stresses generated in the cross-section of the Rezaksay earth dam under the influence of self-weight (a) and hydrostatic pressure (b).

The results obtained from the analysis of the dam's self-weight (Fig. 3.a) show that the values of the vertical stresses σ_{22} arising at the cross-section points depend on the height of the dam and the structural characteristics of the structure. In this case, the value of these stresses increases from the top of the dam to the base and reaches its maximum value at the base. Based on the analysis of the results obtained, it was established that water pressure increases the voltage values of the reservoir in the empty state by up to 1.5 times.

In addition to normal stresses, tangential stress σ_{12} is also generated in the dam body. σ_{12} - tangential stress values reach zero at the center of symmetry of the dam body, and at the points of contact of the support prisms with the base, their value decreases as they move away from the center.

CONCLUSION

1. Based on Lagrange's variational principle and taking into account the real properties and performance of an earth dam, a general mathematical formulation and a method for solving problems regarding the stress-strain state of structures using the finite element method are presented.

2. Regarding the distribution of displacement components occurring in the body of earth dams under conditions of uniform deformation, the following has been established:

- under the influence of self-weight, the values of horizontal displacements u_1 reach their maximum value at the centers of the upper and lower support

prisms of the dam, while as they approach the slope surface, their values decrease and become zero at the center of symmetry;

It was established that the values of the vertical displacements u_2 increase from the base of the dam upward and are greatest above the dam, while the core structure significantly affects the deformation state of the dam. Under the influence of water pressure, an increase in the values of vertical displacements was observed above the dam and in the areas of the upper support prism near the crest. It has been shown that hydrostatic water pressure has a significant impact on the values of horizontal and vertical displacements occurring in the dam body, increasing their values by 1.15–1.3 times.

3. Based on the stress state analysis:

- under the influence of self-weight, it was established that the values of horizontal stresses σ_11 in the dam body are greatest near the base and close to zero at points close to the surface. Water pressure leads to a 1.4-fold increase in σ_{11} stress values in the upper support prism of the dam;

- it was found that the inclination of the core in the dam structure, the presence of a tooth, and water pressure significantly affect the character of the uniform distribution of vertical stresses σ_{22} across the section of the dam body, creating a complex stress state in the upper support prism. Under the influence of water pressure, the stress values σ_{22} in the upper support prism increase by 1.5 times;

- σ_{12}- the values of the shear stresses reach zero at the center of symmetry of the dam body, and at the points of contact of the support prisms with the base, it was found that its value decreases as it moves away from the center. It has been shown that the hydrostatic pressure of water reduces the values of the shear stresses in the upper support prism.

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РАЗРАБОТКА МЕХАТРОННОЙ СИСТЕМЫ МОНИТОРИНГА И АДАПТИВНОГО УПРАВЛЕНИЯ ВЕНТИЛЯЦИЕЙ ХЛОПКОВОГО БУНТА

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Аннотация. *В статье предложена мехатронная система многофакторного мониторинга хлопкового бунта и адаптивного управления вентиляцией. Контролируемыми параметрами являются температура, влажность, перепад давления, скорость воздушного потока и косвенно оцениваемая плотность. Разработаны структурная схема, вектор измерений, индекс риска и логика управления вентилятором через частотный преобразователь. Показано, что учет пригодности наружного воздуха и аэродинамического сопротивления позволяет перейти от простого порогового контроля к профилактическому энергосберегающему режиму.*

Ключевые слова: *хлопковый бунт, мехатронная система, мониторинг, индекс риска, адаптивная вентиляция, частотный преобразователь.*

Abstract. *The paper proposes a mechatronic system for multi-factor monitoring of a cotton stack and adaptive ventilation control. Temperature, humidity, pressure drop, air-flow velocity and indirectly estimated density are used as informative parameters. The study presents the system structure, measurement vector, risk index and fan-control logic through a variable frequency drive. Considering outdoor-air suitability and aerodynamic resistance makes it possible to move from threshold-based monitoring to preventive and energy-efficient control.*

Keywords: *cotton stack, mechatronic system, monitoring, risk index, adaptive ventilation, variable frequency drive.*

ВВЕДЕНИЕ

При хранении хлопкового сырья в бунтах качество продукции зависит не только от исходной влажности, но и от внутреннего тепло- и влагообмена. Локальное самосогревание, уплотнение нижних слоев и рост сопротивления воздушному потоку развиваются совместно, поэтому контроль одной температуры не отражает фактическое состояние объекта. Более надежным является подход, при котором несколько физических параметров оцениваются одновременно и преобразуются в технологическое решение.

Цель работы — сформировать на основе материалов 3-й и 4-й глав научно обоснованную модель мехатронной системы, которая выполняет измерение, фильтрацию, расчет интегрального риска и адаптивное управление вентиляцией хлопкового бунта.

МАТЕРИАЛЫ И МЕТОДЫ

Хлопковый бунт рассматривается как распределенная пористая среда. В дискретный момент времени состояние объекта задается вектором информативных параметров:

$$x(k) = [T_{\text{i}}(k), W_{\text{i}}(k), v_{\text{a}}(k)\,]^{\text{T}},\ \ i = 1 \ldots n \qquad (1)$$

где T_{i} и W_{i} — температура и влажность в -й точке; v_{a} — скорость воздушного потока. Измерительная модель учитывает неполное размещение датчиков и помехи:

$$y(k) = H \cdot x(k) + \varepsilon(k) \qquad (2)$$

После калибровки и фильтрации каждый параметр переводится в частный безразмерный риск $r_j(k$. Интегральный показатель риска записывается в виде:

$$R\Sigma(k) = \Sigma\, w_j \cdot r_j(k),\ \ \Sigma w_j = 1,\ \ 0 \le R\Sigma(k) \le 1 \qquad (3)$$

Таблица 1. Основные блоки мехатронной системы

Блок	Вход	Функция	Результат

Датчики и фильтр	T, W, v_a	измерение, калибровка	достоверный вектор
Контроллер	данные и пороги	расчет RΣ(k), выбор режима	сигнал $U_m(k)$
Исполнительный и HMI блок	$U_m(k)$, тренды	VFD, вентилятор, архив	воздухообмен и отчет

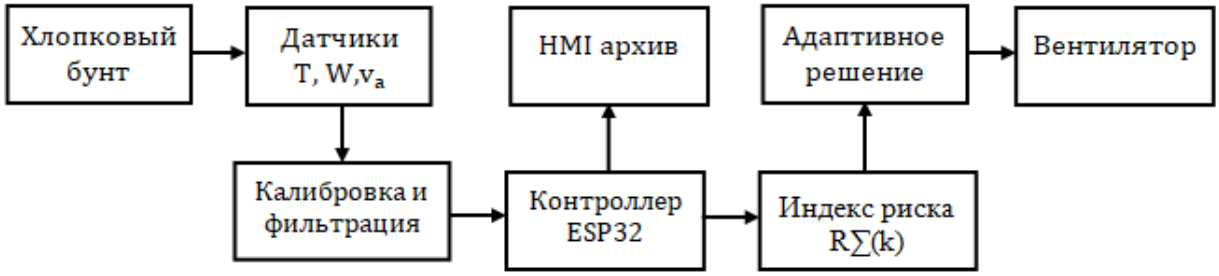

Рисунок 1. Структура замкнутого информационно-управляющего контура

АДАПТИВНОЕ УПРАВЛЕНИЕ ВЕНТИЛЯЦИЕЙ

Базовая логика «температура выше порога - включить вентилятор» не учитывает влажность наружного воздуха и сопротивление хлопковой массы. Поэтому управляющий сигнал формируется как функция текущего риска, пригодности наружного воздуха ψ_a, перепада давления и накопленной энергии:

$$U_m(k) = F(R\Sigma(k), \psi_a(k), E(k)) \quad (4)$$

Таблица 2. Режимы вентиляции по индексу риска

Условие	Режим	Воздействие	Эффект
RΣ<R1	наблюдение	вентилятор выключен	минимум энергии
R1≤RΣ<R2	профилактика	низкая скорость/импульсы	сдерживание роста риска

R2≤RΣ<R3	активный	средняя скорость вентилятор	вывод тепла и влаги
RΣ≥R3	предаварийный	максимум и сигнал	операторское вмешательство

Энергетическое преимущество частотного управления связано с законами подобия вентиляторов: снижение скорости резко уменьшает потребляемую мощность. В расчетах используется зависимость:

$$P_{\text{e}}l(k) = P_0 \cdot n^{\text{f3}}(k)/(\eta_m \cdot \eta_{\text{v}} fd) + P_{\text{a}}ux \quad (5)$$

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Сравнение порогового и адаптивного подходов показывает, что предложенная система реагирует не на единичный скачок температуры, а на устойчивое сочетание факторов. При росте RΣ(k) контроллер сначала увеличивает частоту измерений и включает профилактическую аэрацию. Если риск продолжает расти, повышается скорость вентилятора и формируется предупреждение оператору. После стабилизации бунта система возвращается к экономичному режиму наблюдения.

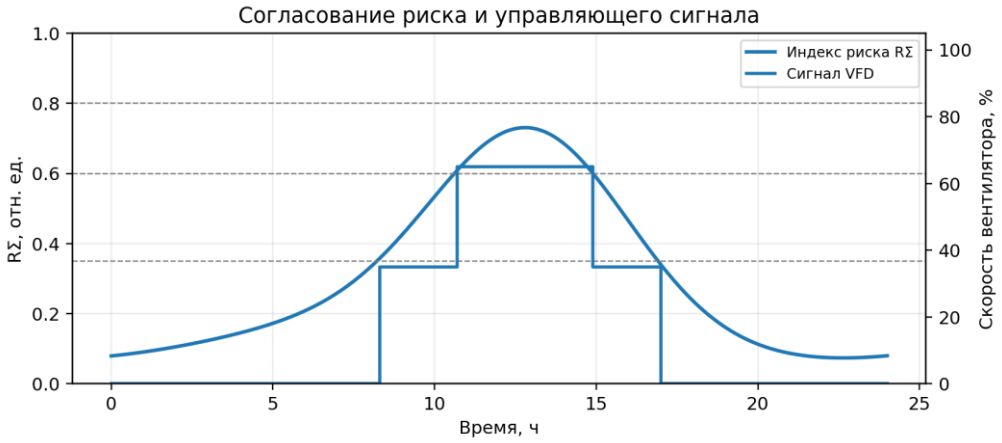

Рисунок 2. Пример согласования индекса риска и сигнала вентилятор

Практическое значение схемы состоит в том, что один и тот же аппаратно-программный комплекс может применяться в разных конфигурациях: минимальный мониторинг T/W для малого бунта,

профилактическая система с ΔP и вентилятором для среднего объекта, а также расширенная конфигурация с HMI, архивом и удаленной передачей данных для крупной площадки хранения.

ЗАКЛЮЧЕНИЕ

Разработана структура мехатронной системы, объединяющая датчики, фильтрацию, edge-контроллер, расчет индекса риска, частотное управление вентилятором, HMI и архивирование. Предложенный подход переводит контроль хлопкового бунта из пассивного наблюдения в активное профилактическое управление. Основной результат заключается в совместном использовании параметров T, W и v_{a} для выбора технологически безопасного и энергосберегающего режима вентиляции.

Для внедрения рекомендуется начать с пилотного бунта: откалибровать датчики, уточнить веса w_j и пороги R1 - R3, проверить журнал данных и только после этого масштабировать систему на несколько зон хранения.

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INDUSTRIAL-ECONOMIC RESULTS OF IMPROVING THE SAW-GIN WORKING CHAMBER THROUGH CONTROLLED HEATING

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Abstract. *This paper presents the results of production trials of an industrial saw-gin machine model 5DP-130 fitted with an improved working chamber, together with an evaluation of its economic efficiency. Under the optimal regime (front apron 80 °C, front beam 70 °C, raw-cotton moisture 12 %), the drive-motor current load decreased by 8.03 %, productivity increased by 0.58 kg/saw-hour, while fiber-quality indicators remained unchanged. The annual economic effect of introducing the new working chamber amounted to 103,145.6 thousand soums for a three-gin battery.*

Keywords: *saw-gin machine, 5DP-130, industrial testing, working chamber, controlled heating, electric load, productivity, fiber quality, HVI, economic efficiency.*

INTRODUCTION

The idea of reducing friction forces between the seed-cotton roller and the working-chamber walls by controlled heating of the inner surfaces (front apron and front beams) was extensively studied under laboratory conditions on a 30-saw experimental gin machine. Theoretical and experimental studies carried out

at earlier stages scientifically established that heating the working-chamber surfaces reduces the friction coefficient, decreases the electric drive-motor load, and increases process productivity. However, whether the results obtained on a small-scale laboratory setup translate into practical benefits under real industrial production conditions is an important question requiring separate verification. The purpose of this thesis is to test the laboratory results under industrial conditions, specifically on a 130-saw industrial gin machine of the 5DP-130 type, to evaluate the effect on electric load, productivity and fiber quality under real production loads, and to calculate the economic efficiency of introducing the new working-chamber design.

Industrial testing methodology. Building on the results obtained on the 30-saw experimental gin machine under laboratory conditions, the improved heating system was adapted to a 5DP-130 industrial gin machine (130 saws) installed at the "To'raqo'rg'on cotton cleaning" enterprise of "Namangan to'qimachi cluster" LLC, and tested in practice on Andijan-35 variety, grade 3, class 2 raw cotton. Since the dimensions, saw-cylinder mass and working-chamber geometry of the 5DP-130 are nearly identical to those of the 30-saw experimental gin, only the power, placement and temperature control of the heating elements were re-optimized. Separate temperature circuits were formed for the front apron and front beams, and test regimes were carried out across the 60–70–80 °C range.

Control instruments and test procedure. Temperature sensors mounted on the inner surfaces of the front apron and front beams, thermal controllers, and ammeters were used throughout the trials; the tests fully captured the machine's operation under real production loads. Each test cycle followed the sequence: 1) start the heating system and stabilize the chamber-surface temperature; 2) continuously feed raw cotton into the machine; 3) take precise measurements of motor load, temperature and process performance; 4) evaluate the overall efficiency of each regime. Fiber quality was assessed at a modern HVI (High

Volume Instrument) laboratory, using automated, human-error-free measurement.

Results of the fiber-quality impact assessment. The quality of fiber obtained during cotton cleaning and ginning is one of the key factors determining the technological value of the final product. It was therefore necessary to assess, precisely and in accordance with international standards, the impact of the working-chamber surface-heating technology on fiber quality. The HVI analysis results for fiber produced by the baseline and improved working-chamber gin machines are presented in Table 1.

Comparative fiber-quality results for the existing and improved working-chamber designs *Table*

No.	Indicator	Existing (baseline) gin	Improved gin
1	Raw-cotton moisture, %	8.92	12
2	Micronaire (Mic)	4.5	4.5
3	Specific strength (Str), g/tex	31.8	31.8
4	Upper Half Mean Length (Len), mm	12.4	12.4
5	Length Uniformity Index (Unf), %	83.7	83.7
6	Short Fiber Index (SFI), %	7.6	7.6
7	Reflectance (Rd), %	78.1	78.1
8	Yellowness (+b)	8.5	8.55
9	Trash and impurity mass share, %	3.7	3.64

The Table 1 results show that the fiber's main physical indicators — micronaire, specific strength, upper half mean length, uniformity index and short fiber index — remained completely unchanged in the improved working-chamber machine, indicating that the heating process causes no thermal damage to the fiber. Stability was likewise observed in color indicators: reflectance remained unchanged, while yellowness increased by only 0.05 units — within the margin of measurement error. The mass share of trash and impurities in the fiber decreased from 3.70 % to 3.64 % (a 1.62 % relative reduction). Although

this reduction is not statistically significant, it fully confirms that the heating process has no adverse effect on fiber quality; accordingly, this indicator was not separately included in the subsequent economic calculation. The test results showed that heating the working-chamber inner surfaces (front apron and front beams) to 60–70–80 °C reduces the friction forces between the seed-cotton roller and the working chamber, leading to a steady decrease in the electric-drive load and an easing of the gin's operating regime. Comprehensive experimental and mathematical-statistical analysis identified 80 °C for the front apron, 70 °C for the front beams, and 12 % raw-cotton moisture as the optimal operating regime.

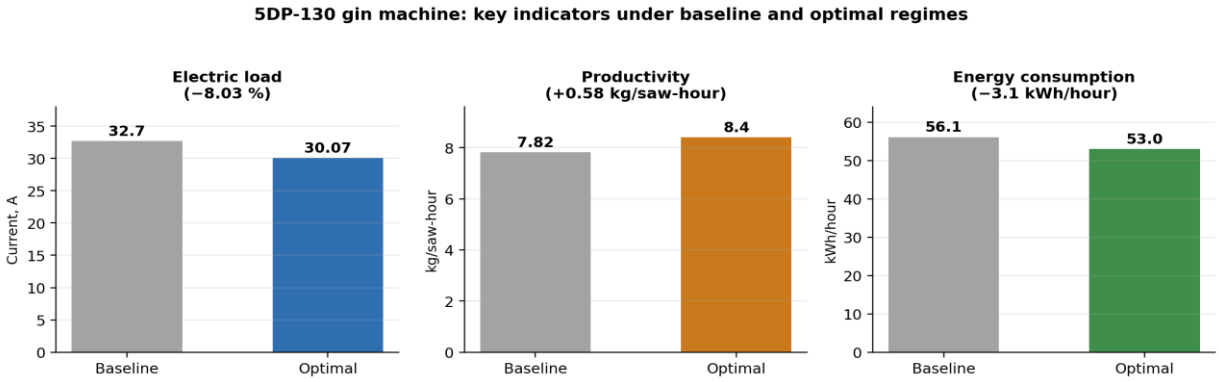

Figure 1. Key technical and energy indicators of the 5DP-130 gin machine under baseline and optimal regimes.

Under the optimal regime, the drive-motor current load decreased from 32.7 A to 30.07 A, a reduction of 8.03 %. Machine productivity increased from 7.82 to 8.40 kg/saw-hour, a gain of 0.58 kg/saw-hour (or 73 kg/machine-hour). A decrease in the machine's overall electricity consumption under production conditions was also observed: despite an additional 1.4 kWh/hour of heating power, average hourly energy consumption fell from 56.1 to 53.0 kWh/hour, yielding a net saving of 3.1 kWh/hour; on a seasonal basis, energy savings amounted to 15,035 kWh. Although the trials showed that the load reduction could continue at temperatures above 80 °C, thermal damage and increased defects were observed in the fiber at such temperatures. The 60–80 °C range was therefore established as the optimal technological range.

Economic efficiency of introducing the new working chamber. Determining the annual economic effect is based on comparing costs between the baseline and new working-chamber designs of the saw-gin machine. The economic efficiency obtained from developing, testing and using a new means of labor — including the new working-chamber design of the saw gin — is determined by the following formula:

$$E = [(C_1 + E_n \cdot K_1) - (C_2 + E_n \cdot K_2)] \cdot A$$

where: E — annual economic effect, thousand soums; C_1 and C_2 — current costs of variable items when producing output with the baseline and new technology, thousand soums; E_n — normative coefficient of capital-investment effectiveness (0.15); K_1 and K_2 — specific capital investments for the baseline and proposed variants, thousand soums; A — annual output volume in natural units.

Input data for the economic calculation *Table 2*

Indicator	Unit	Baseline	New
Number of gins at the plant	units	3	3
Gin productivity (average)	kg/mach.-hour	2886	3105
Plant operating time (3 shifts, 40 h/week)	hours	5336	4959
Demand coefficient	—	0.7	0.64
Annual fiber output	tonnes	5133	5133
Price of 1 kWh electricity	soums	900	900
Machine mass	kg	3396	3456
Gin power consumption (per unit / three units)	kW	79.4 / 238.2	80.8 / 242.4
Equipment price (per unit / three units)	thousand soums	31130 / 93390	35650 / 106950
Fiber trash and impurity share	%	3.7	3.64

Capital and operating cost calculation. Manufacturing the new working chamber costs 4,520 thousand soums. Equipment price (for three units) is 93,390

and 106,950 thousand soums for the baseline and new variants respectively; additional capital costs (transport and installation, 10 %) amount to 9,339 and 10,695 thousand soums, giving total capital investments K_1 = 102,729 and K_2 = 117,645 thousand soums. Depreciation allowances (15 % of equipment price) amount to 15,409 thousand soums for the baseline variant and 17,645 thousand soums for the new variant; current repair costs (5 %) amount to 5,136 and 5,882 thousand soums respectively.

Electricity costs. For the baseline variant, the electricity cost for three gins is W = 238.2·0.7·5336·900 = 800,752 thousand soums. For the new variant, thanks to the reduced electric-drive load, the demand coefficient is K = 0.64, giving an electricity cost of W = 242.4·0.64·4959·900 = 692,387 thousand soums.

Comparative cost table (for three gins, thousand soums) ***Table 3***

Cost item	Baseline variant	New variant
Depreciation costs	15 409	17 645
Current repair costs	5 136	5 882
Electricity costs	800 752	692 387
Total	821 297	715 914

Substituting the obtained data into the economic-effect formula gives the following result:

$$E = [(821297 + 0.15 \cdot 102729) - (715914 + 0.15 \cdot 117645)] \cdot 1 =$$

$$836706.35 - 733560.75 = 103\ 145.6 \text{ thousand soums}$$

That is, introducing the new working chamber for a three-gin battery yields an annual economic effect of 103,145.6 thousand soums, or 34,381.8 thousand soums per gin, or 22,422.9 thousand soums per tonne of fiber produced.

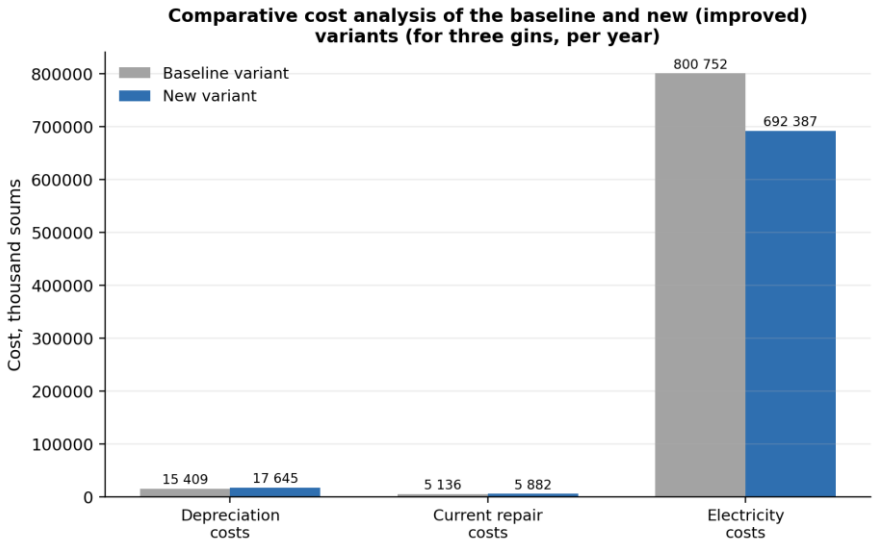

Figure 2. Comparative diagram of annual costs for the baseline and new variants.

DISCUSSION

The industrial trials fully confirmed the practical validity of the scientific results obtained on the 30-saw experimental gin machine under laboratory conditions: even under real production loads, controlled heating of the working-chamber inner surfaces resulted in a steady decrease in the electric-drive load and an increase in the gin machine's productivity. A particularly significant finding is that fiber-quality indicators remained essentially unchanged, as objectively confirmed by the HVI analyses — an important precondition for industrial adoption.

At the same time, it was found that at temperatures above 80 °C the risk of thermal damage to the fiber increases, and the 60–80 °C range was therefore established as the optimal technological range — indicating that process optimization must account for product quality alongside energy indicators. The economic calculations confirmed that the economic efficiency of the proposed solution is provided mainly by the reduction in electricity consumption (108,365 thousand soums per year for three gins), which substantially outweighs the modest increase in depreciation and current repair costs.

CONCLUSION

Production trials were carried out on a 5DP-130 (130-saw) gin machine with an improved working chamber, in order to verify under industrial conditions the results obtained on the 30-saw experimental gin machine in the laboratory. The trials were conducted under real production loads, and the results confirmed the practical validity of the laboratory findings. Under the optimal regime (front apron 80 °C, front beam 70 °C, raw-cotton moisture 12 %), the drive-motor current load decreased from 32.7 A to 30.07 A (by 8.03 %), while machine productivity increased from 7.82 to 8.40 kg/saw-hour (by 0.58 kg/saw-hour).

HVI laboratory analyses confirmed that heating the working-chamber surfaces has no adverse effect on the fiber's main physical-mechanical and optical properties; the share of trash and impurities in the fiber decreased from 3.70 % to 3.64 %. The machine's overall electricity consumption also decreased under production conditions: despite an additional 1.4 kWh/hour of heating power, hourly energy consumption fell from 56.1 to 53.0 kWh/hour (a net saving of 3.1 kWh/hour, or 15,035 kWh on a seasonal basis). According to the economic calculations, introducing the new working chamber for a three-gin battery yields an annual economic effect of 103,145.6 thousand soums, or 34,381.8 thousand soums per gin, or 22,422.9 thousand soums per tonne of fiber produced. The significant reduction in energy consumption was the main source of economic efficiency. The results confirm that the idea of controlled heating of the saw-gin working-chamber inner surfaces is a technically and economically sound solution, ready for practical implementation not only at the laboratory scale but also at industrial scale.

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PAXTACHILIKDA SUV TEJOVCHI TEXNOLOGIYALAR SAMARADORLIGINI BAHOLASHNING INSTITUTSIONAL-IQTISODIY YONDASHUVI

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Annotatsiya. *Tezisda paxtachilikda suv tejovchi texnologiyalar samaradorligini baholashning nazariy-uslubiy jihatlari tadqiq etilgan. Mavjud yondashuvlar tahlili asosida texnologiyalarning resurs tejamkorlik, iqtisodiy va institutsional samaradorligi baholangan. Farg‘ona vodiysida o‘tkazilgan monografik va eksperimental tadqiqotlar natijalariga tayangan holda suv tejovchi texnologiyalarni keng joriy etishning ustuvor yo‘nalishlari asoslab berilgan.*

Tayanch so‘zlar: *paxtachilik, suv tejovchi texnologiyalar, tomchilatib sug‘orish, suv mahsuldorligi, resurs tejamkorlik, iqtisodiy samaradorlik, institutsional yondashuv.*

Abstract. *The thesis examines the theoretical and methodological aspects of evaluating the effectiveness of water-saving technologies in cotton growing. Based on the analysis of existing approaches, the resource-saving, economic, and institutional efficiency of technologies was evaluated. Based on the results of monographic and experimental studies conducted in the Fergana Valley, priority directions for the widespread introduction of water-saving technologies have been substantiated.*

Keywords: *cotton growing, water-saving technologies, drip irrigation, water productivity, resource conservation, economic efficiency, institutional approach.*

KIRISH.

Global iqlim o‘zgarishi, suv resurslari taqchilligining kuchayishi va qishloq xo‘jaligida suvdan foydalanish samaradorligini oshirish zarurati suv tejovchi texnologiyalarni keng joriy etishni taqozo etmoqda. Ayniqsa, sug‘orma dehqonchilik ustun bo‘lgan mamlakatlarda suv resurslaridan oqilona

foydalanish agrar tarmoqning barqaror rivojlanishini ta’minlashning muhim omili hisoblanadi.

O‘zbekiston iqtisodiyotida paxtachilik strategik tarmoqlardan biri bo‘lib, uning barqaror rivojlanishi ko‘p jihatdan suv resurslaridan foydalanish samaradorligiga bog‘liq. Suv resurslarining cheklanganligi sharoitida tomchilatib sug‘orish va boshqa suv tejovchi texnologiyalarni joriy etish ishlab chiqarish samaradorligini oshirish, resurs xarajatlarini kamaytirish hamda ekologik barqarorlikni ta’minlashning muhim vositasi sifatida namoyon bo‘lmoqda.

Ilmiy adabiyotlarda suv tejovchi texnologiyalar samaradorligini baholash bo‘yicha turli yondashuvlar ishlab chiqilgan. Jumladan, B.Sultanov suv tejovchi texnologiyalarni resurs tejamkor va ekologik barqaror rivojlanishning muhim omili sifatida baholagan [1]. S.Umarov suv xo‘jaligini innovatsion rivojlantirish va gidromeliorativ tizimlarni modernizatsiya qilishning iqtisodiy jihatlarini tadqiq etgan [2]. F.Yusupova va Z.Shoxo‘jayeva tomonidan esa suv tejovchi texnologiyalarning iqtisodiy samaradorligi va suvdan foydalanish samaradorligini baholash masalalari o‘rganilgan [3,4]. Biroq mavjud tadqiqotlarda texnologiyalarning texnik, iqtisodiy va institutsional jihatlarini yagona tizim asosida kompleks baholash masalalari yetarli darajada yoritilmagan.

ASOSIY QISM.

Tadqiqotda qiyosiy tahlil, iqtisodiy-statistik tahlil, monografik kuzatuv, eksperimental tadqiqot va tizimli yondashuv usullaridan foydalanildi. Suv tejovchi texnologiyalar samaradorligini baholashda texnik-ekspluatatsion ko‘rsatkichlar, resurs tejamkorlik darajasi, iqtisodiy natijalar hamda institutsional omillar o‘zaro bog‘liq holda tahlil qilindi.

Mavjud ilmiy yondashuvlar tahlili shuni ko‘rsatadiki, suv tejovchi texnologiyalar samaradorligini baholashda ko‘pincha suv tejalishi yoki hosildorlik ko‘rsatkichlariga ustuvor ahamiyat beriladi. Biroq texnologiyaning

haqiqiy samaradorligi texnik ishonchlilik, suv mahsuldorligi, resurs tejamkorlik va iqtisodiy natijalarni kompleks baholash orqali aniqlanishi mumkin [5].

O‘zbekistonda suv tejovchi texnologiyalarni joriy etish ko‘lami yildan-yilga kengayib bormoqda. Rasmiy ma’lumotlarga ko‘ra, respublikadagi 4,3 mln gektar sug‘oriladigan yerlarning 2,6 mln gektarida suv tejovchi texnologiyalar joriy etilgan bo‘lib, bu umumiy maydonning qariyb 60 foizini tashkil etadi. Natijada har yili 2,5 mlrd kub metrga yaqin suv resurslari iqtisod qilinmoqda [6].

Monografik tadqiqotlar Farg‘ona vodiysi viloyatlarida amalga oshirildi. Tadqiqot natijalari Farg‘ona vodiysi tabiiy-geografik, agroiqlimiy va meliorativ sharoitlari jihatidan O‘zbekistonning eng muhim agrar hududlaridan biri ekanligini ko‘rsatdi. Hudud qishloq xo‘jaligi asosan sug‘orma dehqonchilikka asoslanganligi bilan ajralib turadi. Jumladan, sug‘oriladigan yerlar ulushi Farg‘ona viloyatida 99,3 foizni, Andijon viloyatida 93,4 foizni va Namangan viloyatida 84,3 foizni tashkil etadi. Bu esa suv resurslaridan samarali foydalanish masalasi hudud uchun strategik ahamiyatga ega ekanligini tasdiqlaydi.

Farg‘ona vodiysi viloyatlarida paxta ekin maydonlarining 2016–2024 yillardagi dinamik tahlili ularning bosqichma-bosqich qisqarib borayotganligini ko‘rsatdi. Xususan, tadqiqot davrida paxta maydonlari Farg‘ona viloyatida 23,7 foizga, Namangan viloyatida 23,7 foizga va Andijon viloyatida 26,7 foizga kamaygan. Mazkur holat qishloq xo‘jaligini diversifikatsiya qilish, oziq-ovqat xavfsizligini mustahkamlash hamda yuqori daromadli ekinlar ulushini oshirishga qaratilgan agrar islohotlar natijasi sifatida baholanishi mumkin.

Dala sharoitida o‘tkazilgan eksperimental tadqiqotlar tomchilatib sug‘orish texnologiyasining paxtachilikda yuqori samaradorlikka ega ekanligini tasdiqladi. Tadqiqot natijalariga ko‘ra, ushbu texnologiyani qo‘llash natijasida sug‘orish suvi sarfi o‘rtacha 40–53 foizga, mineral o‘g‘itlar sarfi esa 45–50 foizga qisqargan. Shu bilan birga, g‘o‘za hosildorligi oshib, resurslardan foydalanish samaradorligi sezilarli darajada yaxshilangani aniqlandi. Mazkur

natijalar tomchilatib sug‘orish texnologiyasining suv tanqisligi sharoitida paxtachilik samaradorligini oshirishning muhim omili ekanligini ko‘rsatadi.

Texnik-iqtisodiy ko‘rsatkichlar bo‘yicha amalga oshirilgan taqqoslama tahlillar mahalliy ishlab chiqaruvchilar tomonidan ishlab chiqilgan tomchilatib sug‘orish texnologiyalari ayrim parametrlar bo‘yicha xorijiy analoglardan kam emasligini, ayrim hollarda esa ustunlikka ega ekanligini ko‘rsatdi. Xususan, mahalliy texnologiyalarda ish vaqtidan foydalanish koeffitsienti yuqoriroq bo‘lib, bu ularning iqtisodiy samaradorligini oshirishga xizmat qilmoqda. Mazkur holat tomchilatib sug‘orish tizimlarini mahalliylashtirish va ishlab chiqarishni kengaytirish iqtisodiy jihatdan maqsadga muvofiq ekanligini asoslaydi.

Muallif fikricha, suv tejovchi texnologiyalar samaradorligini baholashda faqat iqtisodiy natijalarga tayanish yetarli emas. Texnologiyaning samaradorligi resurs tejamkorlik, suv mahsuldorligi, ekologik natijalar va institutsional qo‘llab-quvvatlash omillari bilan birgalikda baholanishi lozim. Aynan shu yondashuv investitsiya qarorlarining asoslanganligini oshirish hamda davlat tomonidan qo‘llab-quvvatlash mexanizmlarining samaradorligini kuchaytirish imkonini beradi.

XULOSA

Tadqiqot natijalari paxtachilikda suv tejovchi texnologiyalarni joriy etish suv resurslaridan foydalanish samaradorligini oshirish, ishlab chiqarish xarajatlarini kamaytirish va hosildorlikni ko‘paytirishda muhim ahamiyatga ega ekanligini ko‘rsatdi.

Farg‘ona vodiysi viloyatlarida amalga oshirilgan monografik va eksperimental tadqiqotlar tomchilatib sug‘orish texnologiyalarini qo‘llash natijasida sug‘orish suvi sarfi 40–53 foizga, mineral o‘g‘itlar sarfi esa 45–50 foizga kamayganligini tasdiqladi. Shu bilan birga, texnologiyalar hosildorlikni oshirish va resurslardan foydalanish samaradorligini yaxshilash imkonini bermoqda.

Kelgusida suv tejovchi texnologiyalar samaradorligini oshirish uchun ularni baholashning kompleks institutsional-iqtisodiy mexanizmini joriy etish, mahalliy ishlab chiqarilgan sug‘orish uskunalarini qo‘llab-quvvatlash, davlat subsidiyalari va imtiyozli kreditlash mexanizmlarini takomillashtirish hamda raqamli monitoring tizimlarini rivojlantirish maqsadga muvofiq hisoblanadi. Bu chora-tadbirlar suv resurslaridan oqilona foydalanish, paxtachilik tarmog‘ining raqobatbardoshligini oshirish va agrar sohaning barqaror rivojlanishini ta’minlashga xizmat qiladi.

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ИССЛЕДОВАНИЕ ДУШШЫБУЛАКСКОГО БАЗАЛЬТА ДЛЯ ТЕПЛОИЗОЛЯЦИОННЫХ МАТЕРИАЛОВ

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***Аннотация**: В представленной научной работе приведены результаты исследования образцов базальта Душшыбулаксого месторождения Республики Каракалпакстан с целью изучения их физико-химических и минералогических свойств. Описаны результаты комплексного анализа, включающего определение химического состава, минералогических особенностей и проведение рентгенофазового анализа исследуемого материала.*

***Abstract**: The present scientific work presents the results of investigating basalt samples from the Dusshybulak deposit of the Republic of Karakalpakstan to study their physicochemical and mineralogical properties. The results of comprehensive analysis, including determination of chemical composition, mineralogical features, and X-ray phase analysis of the investigated material, are described.*

***Ключевые слова:** базальт; минералогический состав; рентгенофазовый анализ; физико-химические свойства; прочность.*

***Keywords:** basalt; mineralogical composition; X-ray phase analysis; physicochemical properties; strength.*

ВВЕДЕНИЕ.

В последние годы в связи с интенсивным развитием строительной отрасли значительно возрастает потребность в эффективных и качественных строительных материалах. В этом направлении особое внимание уделяется изучению местных минеральных ресурсов и расширению возможностей их промышленного применения. Среди перспективных видов сырья важное место занимают магматические горные породы, в частности базальты, обладающие высокими физико-механическими показателями и устойчивостью к внешним воздействиям[2,4].

На территории Республики Каракалпакстан в результате геологоразведочных работ выявлены значительные запасы нерудных полезных ископаемых, пригодных для использования в строительной индустрии. К числу таких природных ресурсов относятся базальт, диабаз, диатомит, гранитные отходы и вермикулит. Особый интерес представляет базальт Душшыбулаксого месторождения, расположенного в Караузякском районе Республики Каракалпакстан. По данным геологических исследований, запасы месторождения составляют около 2,6 млн тонн, что свидетельствует о возможности его длительного промышленного освоения.

Базальт является магматической породой, характеризующейся высокой прочностью, плотностью и термической устойчивостью. Благодаря своим свойствам он может применяться при производстве различных строительных материалов и изделий. Для определения возможностей практического использования базальтовых пород необходимо детальное изучение их химического состава, минералогических особенностей и физико-механических характеристик[8,7].

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Экспериментально установлено, что предельно допустимое содержание SiO_2 в базальтовых породах составляет 43,7–49,3 %, что считается оптимальным при выборе состава сырья. При таких показателях базальты Душшыбулаксого месторождения подходят для производства теплоизоляционных волокнистых материалов, так как их температура плавления составляет 1350–1400 °C. Согласно табличным данным, в отличие от базальтов, применяемых для изготовления изоляторов различного потенциала, для производства теплоизоляционных волокон требуются породы с содержанием (%): SiO_2 – 43–47, MgO – до 7, Al_2O_3 – до 20, CaO – до 10 и (K_2O + Na_2O) – не более 3,5.

В данной работе для оценки пригодности базальтовых пород в производстве теплоизоляционных материалов применен рентгенофазовый метод исследования. Минералогический состав базальтовых образцов определяли посредством рентгенодифракционного анализа, выполненного порошковым методом на дифрактометре Shimadzu LABX XRD-6100 (Япония) с использованием CuKα-излучения. Рентгенограммы регистрировали с шагом 0,02° при параметрах излучения 30 мА и 30 кВ. Идентификацию выявленных минеральных фаз проводили на основании полученных данных с применением стандартных справочников и референтной базы ICDD PDF-2[1,3].

Таблица 1. Химический состав образцов базальта Душшыбулакского месторождений

Наименование сырья	Содержание оксидов, мас. %								ППП, мас.%
	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	K_2O	Na_2O	
ДшБ -1	55,68	15,12	9,76	0,58	4,84	4,49	2,24	2,11	5,18
ДшБ 2	58,42	14,20	8,56	0,61	4,92	4,18	2,20	1,96	4,95
ДшБ 3	59,14	14,31	7,45	0,59	4,24	3,91	2,10	2,03	6,23

Наименование сырья	Содержание оксидов, мас. %								ППП, мас.%
	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	K_2O	Na_2O	
ДшБ сред.	57,75	14,54	8,59	0,59	4,67	4,19	2,18	2,03	5,46

При рентгенофазовом анализе некальцинированного базальта Душшыбулаксого месторождения были получены данные, представленные на рисунке 1. На рентгенограмме образца базальтовых пород наблюдаются дифракционные отражения, соответствующие основным минералам: кварцу (SiO_2), хлориту ($(Mg,Fe)_3(Si,Al)_4O_{10}(OH)_2$), альбиту ($Na[AlSi_3O_8]$), а также в незначительном количестве кальциту ($CaCO_3$)

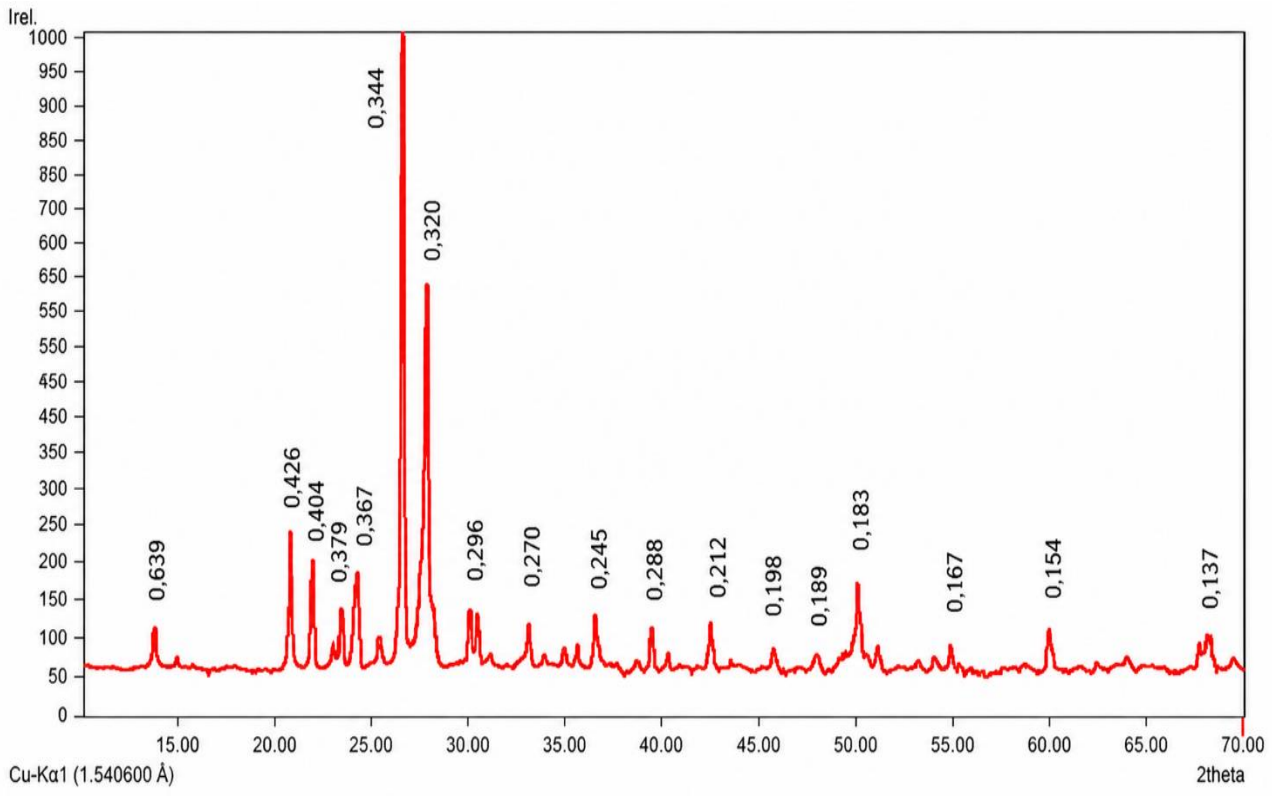

Рис.1 Рентгенограмма базальта Душшыбулаксого месторождение

Для кварца характерны межплоскостные расстояния d = 0,424; 0,333; 0,245; 0,228; 0,223; 0,212; 0,197; 0,181; 0,166; 0,153; 0,137 нм. Минерал хлорит идентифицирован по значениям d = 0,713; 0,496; 0,424; 0,365; 0,352; 0,296; 0,255; 0,228; 0,197 нм. Для альбита установлены значения d = 0,636;

0,352; 0,318; 0,310; 0,259; 0,212 нм. Наличие кальцита подтверждается межплоскостными расстояниями d = 0,385; 0,302; 0,228 нм.

Полученные результаты рентгенофазового анализа исследуемых проб показали, что их химико-минералогический состав является аналогичным с традиционными базальтовыми породами и состоит в основном из минералов альбита, кварца, хлорита, кальцита, а также прочих минералов, содержание которых составляют в очень незначительных количествах.

ЗАКЛЮЧЕНИЕ

Таким образом, представлены результаты исследования по определению химико-минералогического состава, а также физико-механических свойств исходных и обожженных образцов базальта из месторождения Душшыбулак. Установлено, что этот базальт аналогичными минералами других магматических пород, что указывает на возможность его использования в строительной отрасли при производстве теплоизоляционных материалов различного назначения (зданий или сооружений).

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4-SECTION

BODY MASS DYNAMICS IN ELITE BOXING: A 53-DAY LONGITUDINAL CASE STUDY OF HASANBOY DUSMATOV BEFORE THE PARIS 2024 OLYMPIC GAMES

Hasanboy Dusmatov

Annotatsiya

Mazkur longitudinal keys-tadqiqotda Hasanboy Do‘smatovning Parij-2024 Olimpiya o‘yinlari oldidan 53 kunlik musobaqaoldi davridagi tana vazni dinamikasi tahlil qilindi. Tahlil 2024-yil 5-iyundan 28-iyulgacha bo‘lgan to‘rtta ketma-ket bosqichning chegaraviy ko‘rsatkichlariga asoslandi. Tana vazni 57,75 kg dan 51,65 kg gacha kamayib, umumiy pasayish 6,10 kg (10,56%) ni tashkil etdi. Uchinchi bosqichda eng katta mutlaq kamayish (3,00 kg; umumiy kamayishning 49,2%i) va eng yuqori o‘rtacha kamayish sur’ati (0,23 kg/kun) qayd etildi. Yakuniy 51,65 kg ko‘rsatkich 51 kg vazn toifasi limitidan 0,65 kg yuqori bo‘lgan; rasmiy tortish natijasi ma’lumotlar to‘plamiga kiritilmagan. Natijalar vazn pasayishining bosqichlar bo‘yicha taqsimlanganini ko‘rsatadi, biroq gidratatsiya, ovqatlanish, mashg‘ulot yuklamasi va ish qobiliyati ko‘rsatkichlari mavjud bo‘lmagani sababli yondashuvning xavfsizligi yoki sport natijasini saqlagani haqida sababiy xulosa chiqarishga imkon bermaydi.

Kalit so‘zlar: *boks, tana vazni dinamikasi, vazn toifasi, Olimpiya tayyorgarligi, longitudinal keys-tadqiqot, musobaqaoldi mezosikl*

Аннотация

В данном продольном исследовании одного случая проанализирована динамика массы тела Хасанбоя Дусматова в течение 53-дневного предсоревновательного периода перед Олимпийскими играми Париж-2024. Анализ основывался на граничных значениях четырех последовательных этапов в период с 5 июня по 28 июля 2024 года. Масса тела снизилась с 57,75 до 51,65 кг, то есть на 6,10 кг (10,56%). На третьем этапе отмечены наибольшее абсолютное снижение (3,00 кг; 49,2% общего снижения) и самый высокий средний темп снижения (0,23 кг/сут). Последнее зарегистрированное значение 51,65 кг оставалось на 0,65 кг выше лимита весовой категории 51 кг; результат официального взвешивания в набор данных не входил. Полученные данные описывают поэтапно распределенное снижение массы тела, однако отсутствие показателей гидратации, питания, тренировочной нагрузки и работоспособности не позволяет делать причинные выводы о безопасности подхода или сохранении спортивной готовности.

Ключевые слова: *бокс, динамика массы тела, весовая категория, олимпийская подготовка, продольное исследование случая, предсоревновательный мезоцикл*

Abstract

This longitudinal single-case study examined body mass dynamics during Hasanboy Dusmatov's 53-day pre-competition period before the Paris 2024 Olympic Games. The analysis used phase-boundary values from four consecutive intervals between 5 June and 28 July 2024. Body mass decreased from 57.75 to 51.65 kg, a total reduction of 6.10 kg (10.56%). Phase 3 produced both the largest absolute decrease (3.00 kg; 49.2% of the total reduction) and the highest mean loss rate (0.23 kg/day). The final recorded value of 51.65 kg remained 0.65 kg above the 51 kg category limit; official weigh-in mass was not included in the dataset. The findings describe a phase-distributed reduction in body mass, but the absence of hydration, dietary, training-load, and performance measures prevents causal conclusions regarding safety or preservation of competitive readiness.

Keywords: *boxing, body mass dynamics, weight category, Olympic preparation, longitudinal case study, pre-competition mesocycle*

1. Introduction

Body mass management is a central component of preparation in weight-category sports, including boxing, wrestling, judo, taekwondo, and mixed martial arts. Athletes may reduce body mass before official weigh-ins to qualify for a lower category; however, the physiological and performance consequences depend on the magnitude, timing, methods, and recovery period associated with the reduction.

Rapid weight loss is common in combat sports and may involve energy restriction, fluid restriction, sauna use, impermeable clothing, or other dehydration-oriented methods. Artioli et al. [1] argued for formal weight-control programs in judo, while Franchini et al. [2] reviewed a high prevalence of rapid weight-loss practices and described potential adverse effects on health, physical capacity, cognition, and mood. These risks make the temporal pattern of body mass change an important monitoring variable, although body mass alone cannot identify the tissues or fluids responsible for the change.

Sport-specific context is essential. Reale et al. [3] reviewed acute body mass loss and post-weigh-in recovery in Olympic combat sports, emphasizing that recommendations should reflect the sport's weigh-in rules and recovery opportunities. Matthews and Nicholas [4] documented the magnitude and methods of rapid weight loss and regain in United Kingdom mixed martial arts

athletes; their study illustrates the scale of short-term fluctuations that can occur but does not establish the effects of a longer periodized strategy.

Boxing also places substantial technical and physiological demands on athletes. Time-motion analysis has shown that maintaining a high rate of attacking movements and effective punching is important in amateur boxing [5]. In simulated elite bouts, oxygen uptake and peak heart-rate responses exceeded 90% of maximal values [6]. Accordingly, any body mass reduction plan should be evaluated alongside training quality, recovery, and physiological readiness rather than from scale readings alone.

Punch impact is related to muscular strength and power [7,8] as well as to technique and force transfer through the kinetic chain. Liu et al. [9] reported higher punch velocity, force, and impulse in higher-level boxers, and Kacprzak et al. [11] found that effective mass and force-transfer mechanics were more informative for punch force than total body mass alone. Training studies have also reported improvements in power output or acute punch performance after targeted interventions [10,12]. These findings underscore why body mass change should not be interpreted as a proxy for boxing performance.

Despite a substantial literature on rapid weight loss and combat-sport physiology, relatively few reports describe real-world body mass trajectories of Olympic-level boxers across an entire pre-competition block. A carefully delimited single-case analysis can document the timing and magnitude of change while avoiding claims that require unmeasured physiological or performance outcomes.

2. Aim and Objectives

The aim was to describe body mass dynamics across a 53-day pre-competition period in an Olympic-level boxer preparing for the Paris 2024 Olympic Games.

1. Quantify absolute and relative body mass change across four sequential phases.
2. Calculate the mean body mass loss rate and each phase's contribution to the total observed reduction.
3. Identify what can, and cannot, be inferred from phase-boundary body mass data alone.

3. Materials and Methods

3.1. Study Design

A retrospective longitudinal single-case descriptive design was used. No experimental intervention or control condition was included, and the analysis was limited to the body mass values reported in the source manuscript.

3.2. Participant

The case concerned Hasanboy Dusmatov, the Rio 2016 Olympic champion who subsequently won the men's 51 kg title at the Paris 2024 Olympic Games [13]. At the time of the monitoring period, he was preparing for his Paris 2024 campaign. The source manuscript reported that training continued without interruption and that no injury or illness affecting preparation was present; no independent clinical verification was supplied.

3.3. Observation Period and Phase Definitions

The observation interval extended from 5 June to 28 July 2024, representing 53 elapsed days. Four sequential phases were defined in the source manuscript: Phase 1 (5-13 June; 8 elapsed days), Phase 2 (13 June-9 July; 26 days), Phase 3 (9-22 July; 13 days), and Phase 4 (22-28 July; 6 days). The boundary date shared by two adjacent phases was treated as the end of one interval and the start of the next; it was not double-counted when calculating elapsed time.

3.4. Data Source and Measurement Scope

The source manuscript stated that body mass was recorded regularly; however, the dataset available for the present phase-level analysis contained five phase-boundary values: 57.75, 56.00, 55.60, 52.60, and 51.65 kg. The weighing-device model, calibration procedure, measurement precision, time of day, clothing, hydration conditions, and timing relative to training or food intake were not reported. Official competition weigh-in mass was also not included.

3.5. Data Analysis

For each phase, absolute change was calculated as end mass minus start mass. Relative change was calculated as absolute change divided by start mass and expressed as a percentage. Mean loss rate was calculated as the magnitude of mass loss divided by elapsed days. Each phase's share of total loss was calculated as the phase loss divided by the total 6.10 kg reduction. Because this was a single-case descriptive analysis, no inferential statistics were applied. Values were rounded to two decimal places, with percentage shares rounded to one decimal place.

4. Results

4.1. Overall Body Mass Change

Across the 53-day interval, body mass decreased from 57.75 to 51.65 kg. The total observed reduction was 6.10 kg, equivalent to 10.56% of the initial value. The mean loss rate across the complete interval was 0.12 kg/day (Table 1; Figure 1).

Table 1. Phase-by-phase body mass dynamics across the 53-day pre-Olympic observation interval.

Phase	Dates (2024)	Elapsed days	Start (kg)	End (kg)	Change kg (%)	Mean loss (kg/day)	Share of total loss (%)
1	5-13 Jun	8	57.75	56.00	-1.75 (-3.03)	0.22	28.7
2	13 Jun-9 Jul	26	56.00	55.60	-0.40 (-0.71)	0.02	6.6
3	9-22 Jul	13	55.60	52.60	-3.00 (-5.40)	0.23	49.2
4	22-28 Jul	6	52.60	51.65	-0.95 (-1.81)	0.16	15.6
Total	**5 Jun-28 Jul**	**53**	**57.75**	**51.65**	**-6.10 (-10.56)**	**0.12**	**100.0**

Note. Mean loss rates were recalculated from elapsed calendar days; positive rate values denote the magnitude of loss. Rounding may cause phase shares to total 100.1%.

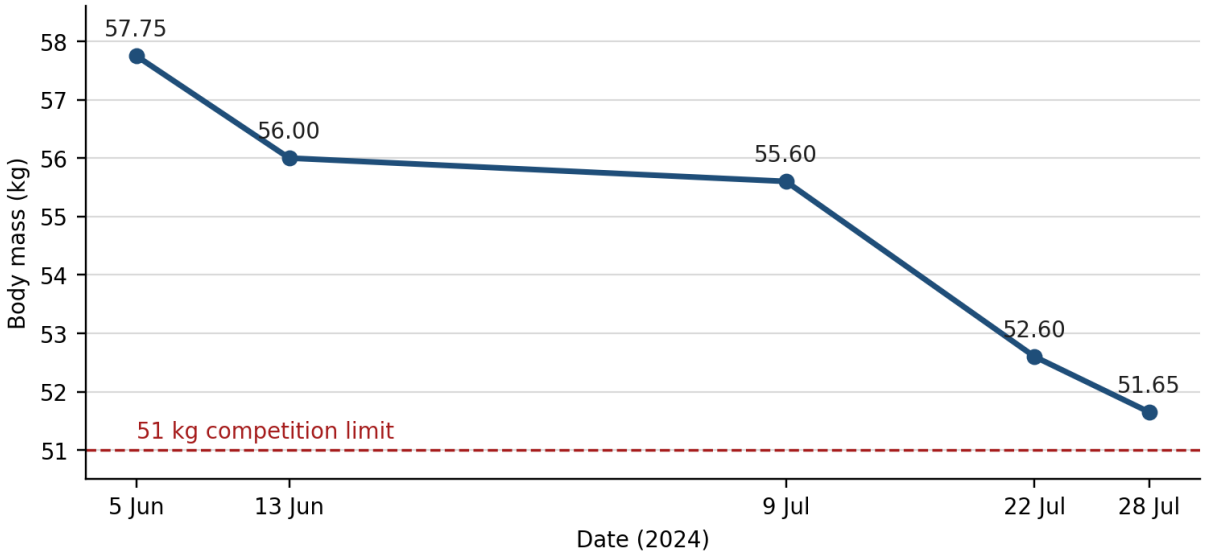

Figure 1. Body mass at the five reported phase boundaries. The connecting line visualizes the ordered trajectory and does not imply measurements on unreported intermediate dates.

4.2. Phase-by-Phase Dynamics

During Phase 1, body mass decreased by 1.75 kg (3.03%) over 8 elapsed days, corresponding to a mean loss rate of 0.22 kg/day. Phase 2 was comparatively stable: the decrease was 0.40 kg (0.71%) over 26 days, or 0.02 kg/day.

The largest change occurred during Phase 3, when body mass decreased by 3.00 kg (5.40%) over 13 days. This phase accounted for 49.2% of the total

observed reduction and had the highest mean loss rate (0.23 kg/day). During Phase 4, body mass decreased by a further 0.95 kg (1.81%) over 6 days, equivalent to 0.16 kg/day.

The final reported value was 51.65 kg. Because the Paris 2024 men's category limit was 51 kg [13], the last available measurement was 0.65 kg above the category limit. The dataset therefore documents substantial progress toward the limit but does not itself document the official competition weigh-in value.

5. Discussion

This single-case analysis documented a 6.10 kg (10.56%) reduction across a 53-day pre-competition interval. The trajectory was not uniform: Phase 2 functioned as a long period of relative stability, whereas nearly half of the total reduction occurred during Phase 3. The corrected calculations also show that Phase 3, not Phase 1, had the highest mean loss rate.

The phase distribution indicates that the reduction was spread across several weeks rather than confined to the final days. Nevertheless, this pattern should not automatically be described as gradual, safe, or free from acute dehydration. When expressed as simple weekly equivalents, the relative reductions in Phases 1, 3, and 4 were approximately 2.7%, 2.9%, and 2.1% of phase-start mass per week, respectively. These rates exceed the 1.5% per-week control benchmark discussed in the combat-sport review literature [2]. Such a comparison does not establish harm, because endpoint values cannot distinguish fat loss, glycogen-associated water change, normal measurement variation, or deliberate dehydration; it does, however, preclude a claim of safety from body mass data alone.

The final phase contributed only 15.6% of the total reduction, which is compatible with a plan that avoided placing the entire burden in the last few days. However, the last recorded mass remained above the 51 kg limit, and no official weigh-in value was available. Accordingly, the results support the statement that the athlete approached the competition limit; they do not support the stronger statement that the target mass had already been achieved by 28 July.

The physiological relevance of this distinction is important. Reviews of combat-sport weight cutting [1-3] and observational data from mixed martial arts [4] show that magnitude and timing alone do not identify the method used or its effect on health and performance. Hydration status, dietary intake, recovery time, and the rules governing repeated weigh-ins can materially alter outcomes. None of these variables was available in the present dataset.

Similarly, the present study did not measure punching force, speed, endurance, training quality, or competitive readiness. Boxing-specific research indicates that high physiological output [6], muscular strength and power [7,8], kinetic-chain mechanics [9,11], and targeted power interventions [10,12] are relevant to performance. Therefore, any claim that readiness was preserved would require direct performance or training-load evidence, not body mass observations alone.

5.1. Practical Implications

For applied monitoring, the phase structure provides a useful descriptive framework: coaches can calculate loss rates, identify plateaus, and locate periods of concentrated change. A stronger monitoring system would pair standardized morning body mass with hydration markers, dietary records, session rating of perceived exertion, training load, wellness, and boxing-specific performance tests. This combination would allow staff to evaluate both progress toward the category limit and the cost of that progress.

5.2. Limitations

The findings are limited to one athlete and cannot be generalized to other boxers or weight categories. The analysis used only five reported phase-boundary values; intermediate measurements were not available for verification of day-to-day variability or nonlinear change. Measurement standardization and scale reliability were not reported. No body-composition, hydration, nutritional, physiological, psychological, training-load, or performance data were available. Finally, official weigh-in mass was not included, so achievement of the 51 kg limit cannot be confirmed from the analyzed dataset.

6. Conclusion

Hasanboy Dusmatov’s reported body mass decreased from 57.75 to 51.65 kg across the 53-day interval preceding the Paris 2024 Olympic Games, a total reduction of 6.10 kg (10.56%). The reduction was phase-distributed but uneven: Phase 3 produced 49.2% of the total loss and the highest mean loss rate, whereas Phase 2 was relatively stable. The final available measurement remained 0.65 kg above the 51 kg category limit.

The case provides a clear descriptive account of when body mass changed, but it does not establish the mechanisms, safety, or performance consequences of the reduction. Future case monitoring should include a standardized weighing protocol, official weigh-in value, hydration and nutritional measures, training-load data, and boxing-specific performance indicators.

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TIBBIY OLIY TA'LIM MUASSASALRI TALABALARIDA LINGVISTIK KOMPETENTLIK DARAJASINI DIAGNOSTIKA QILISH METODIKASI.

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Annotatsiya. *Bugungi kunda bo'lajak shifokorlarning kasbiy mahorati nafaqat tibbiy bilimlar, balki ularning muloqot madaniyati va lingvistik qobiliyatlariga ham bog'liqdir. Tibbiyot oliygohlari talabalarida lingvistik kompetentlikni to'gri baholash, ularning kelajakda xorijiy adabiyotlar bilan ishlash, bemorlar hamda xalqaro hamjamiyat bilan erkin muloqot qilish ko'nikmalarini shakllantirishda muhim ahamiyat kasb etadi. Tibbiyot yo'nalishidagi talabalarning lingvistik kompetentlik darajasini aniq, xolis va samarali baholashga xizmat qiladigan diagnostika metodikasini ishlab chiqish hamda uning pedagogik shart - sharoitlarini asoslab berilishi haqida ma'lumot beriladi. Tibbiy ta'lim kontekstida lingvistik kompetentlikning tarkibiy qismlari (leksik, grammatik, terminologik va diskursiv) belgilandi. Kasbiy sohaga yo'naltirilgan matnlar bilan ishlash va tibbiy terminologiyani o'zlashtirish darajasini o'lchash mezonlari(indikatorlari) ishlab chiqilganligi haqida tushuncha beriladi.*

Kalit so'zlar: *lingvistik kompetentlik, tibbiy ta'lim, diagnostika, metodika, baholash mezonlari, kasbiy muloqot, tibbiy terminologiya va indikator.*

Abstract: *Today, the professional skills of future doctors depend not only on medical knowledge, but also on their communication culture and linguistic abilities. Correct assessment of linguistic competence in students of medical universities is of great importance*

in forming their future skills of working with foreign literature, freely communicating with patients and the international community. The development of a diagnostic methodology that serves to accurately, objectively and effectively assess the level of linguistic competence of students in the medical field and the justification of its pedagogical conditions were revealed. The components of linguistic competence in the context of medical education (lexical, grammatical, terminological and discursive) were determined. Criteria (indicators) for measuring the level of work with texts oriented to the professional field and the mastery of medical terminology were developed.

Keywords: *linguistic competence, medical education, diagnostics, methodology, assessment criteria, professional communication, medical terminology and indicator.*

Аннотация: *Сегодня профессиональные навыки будущих врачей зависят не только от медицинских знаний, но и от их коммуникативной культуры и языковых способностей. Правильная оценка языковой компетенции студентов медицинских вузов имеет большое значение для формирования их будущих навыков работы с зарубежной литературой, свободного общения с пациентами и международным сообществом. В работе раскрыта методика диагностики, позволяющая точно, объективно и эффективно оценивать уровень языковой компетенции студентов медицинского профиля, и обоснованы её педагогические условия. Определены компоненты языковой компетенции в контексте медицинского образования (лексические, грамматические, терминологические и дискурсивные). Разработаны критерии (индикаторы) измерения уровня работы с текстами, ориентированными на профессиональную сферу, и владения медицинской терминологией.*

Ключевые слова: *языковая компетенция, медицинское образование, диагностика, методология, критерии оценки, профессиональная коммуникация, медицинская терминология и показатели.*

KIRISH

Tibbiy ta'limda bo'lajak shifokorlarning lingvistik kompetentligini maqsadli shakllantirish uchun avvalo uning mavjud darajasini aniq va ishonchli tarzda aniqlash zarur. Diagnostika — har qanday pedagogik jarayonning tayanch bosqichi bo'lib, u o'qituvchiga talabaning haqiqiy ehtiyojlarini ko'rish, zaif tomonlarini bartaraf etish va o'quv jarayonini maqsadga yo'naltirish imkonini beradi.[1]

Biroq, tibbiy ta'lim muassasalarida lingvistik kompetentlik darajasini aniqlashga mo'ljallangan maxsus diagnostika vositalarining yo'qligi jiddiy muammo bo'lib qolmoqda. Mavjud umumiy til testlari (IELTS, TOEFL va b.) tibbiy muloqotning o'ziga xos xususiyatlarini — empatik nutq, klinik terminologiya, anamnez olish ko'nikmalarini — to'liq qamrab olmaydi. Bu esa o'quv jarayonida lingvistik kompetentlikni rivojlantirishga yo'naltirilgan maqsadli pedagogik ta'sir ko'rsatishga imkon bermasligi dolzarb muammo bo'lib qolmoqda.[2]

MAVZUGA OID ADABIYOTLAR SHARHI

Lingvistik kompetentlikni baholashning xalqaro tajribasi

Til ko'nikmalarini baholash sohasida Common European Framework of Reference (CEFR, 2001) eng keng qo'llaniladigan mezon sifatida e'tirof etilgan. CEFR modeli A1 dan C2 gacha bo'lgan olti darajani belgilab, har birida tinglab tushunish, o'qish, yozish va gapirish ko'nikmalarini alohida baholashni nazarda tutadi. Biroq bu model umumiy kommunikativ kompetentlikka yo'naltirilgan bo'lib, tibbiy kasbiy muloqotning o'ziga xos talablarini hisobga olmaydi.[5]

Douglas (2000) ning kasbga yo'naltirilgan til baholash nazariyasi (Language for Specific Purposes — LSP assessment) tibbiy ta'lim uchun muhim metodologik asos hisoblanadi. Uning yondashuvida baholash vaziyatlari real kasbiy kontekstga maksimal darajada yaqinlashtiriladi. Tibbiy soha uchun yaratilgan OET (Occupational English Test) ushbu nazariya asosida ishlab chiqilgan bo'lib, amaliyotda keng qo'llanilmoqda.[3]

Mahalliy tadqiqotlarda til diagnostikasi ko'proq umumta'lim kontekstida o'rganilgan. Tibbiy ta'limga ixtisoslashtirilgan diagnostika vositalarini yaratish esa O'zbekistonda deyarli o'rganilmagan yo'nalish bo'lib qolmoqda.[9] O'zbekiston tibbiy oliy ta'lim muassasalarida o'tkazilgan dastlabki kuzatishlar shuni ko'rsatadiki, talabalarning 58 foizi klinik amaliyotda bemorlar bilan muloqotda til vositalaridan foydalanishda qiyinchiliklarga duch keladi

(Usmonova, 2022). Ushbu qiyinchiliklarning aniq tabiati va kelib chiqish sabablari esa tizimli diagnostikasiz aniqlanishi mumkin emas.[10]

Tadqiqotning maqsadi — tibbiy oliy ta'lim muassasalari talabalarining lingvistik kompetentlik darajasini aniqlashga mo'ljallangan ilmiy asoslangan diagnostika metodikasini ishlab chiqish va sinovdan o'tkazishdan iborat. Quyidagi **vazifalar** hal etiladi:

- lingvistik kompetentlikni diagnostika qilishning mavjud yondashuvlarini tahlil qilish;
- tibbiy ta'limga mos diagnostika mezonlari va ko'rsatkichlarini ishlab chiqish;
- diagnostika vositalarini amaliy sinovdan o'tkazish va natijalarni tahlil qilish.

Diagnostika mezonlari va ko'rsatkichlari

Lingvistik kompetentlikni baholashda tadqiqotchilar ikki yondashuvni ajratadi: holistik baholash (umumiy taassurot asosida) va analitik baholash (har bir komponentni alohida o'lchash). Tibbiy ta'lim uchun analitik yondashuv samaraliroq hisoblanadi, chunki u muayyan zaif komponentni aniqlab, maqsadli ta'sir ko'rsatishga imkon beradi.

Fulcher (2003) baholash vositalarini ishlab chiqishda uchta asosiy mezonni ajratadi: ishonchlilik (reliability), yaroqlilik (validity) va amaliylik (practicality). Tibbiy ta'lim kontekstida yaroqlilik — ya'ni test natijalari haqiqatan ham real kasbiy muloqotni qanchalik aks ettirishiga — alohida e'tibor qaratilishi lozim.[6]

TADQIQOT METODOLOGIYASI

Tadqiqotda quyidagi metodlardan foydalanildi:

-ilmiy adabiyotlar tahlili;

-kuzatish va suhbat;

- so'rovnoma va test;

-statistik tahlil

Tadqiqot 2024–2027-yillarda Abu Ali ibn Sibo nomidagi Buxoro davlat tibbiyot instituti va Osiyo Xalqaro Universitetida (n=120,1-4-kurs) o’tkazildi.

Diagnostika vositasi sifatida maxsus ishlab chiqilgan **«MedLing-Test»** qo'llanildi, u besh blokdan iborat: (1) tibbiy leksika va terminologiya; (2) og'zaki muloqot (klinik suhbat simulyatsiyasi); (3) tinglash va tushunish; (4) yozma hujjatlashtirish; (5) empatik nutq.[8]

NATIJALAR VA MUHOKAMA

Umumiy natijalar

1-jadval

Talabalarning lingvistik kompetentlik darajasi (n=120)

Daraja	Talabalar soni	Foiz (%)	Tavsif
Yuqori (C1–C2)	16	13,3	Kasbiy muloqotga to'liq tayyor
O'rta-yuqori (B2)	26	21,6	Asosan mustaqil muloqot
O'rta (B1)	40	33,3	Qisman mustaqil
Past-o'rta (A2)	30	25	Yordamga muhtoj
Past (A1)	8	6,6	Jiddiy qiyinchiliklar
Jami	**120**	**100**	

Jadvaldan ko'rinib turibdiki, talabalarning yarmidan ko'pi (64,9%) B1 va undan past darajada bo'lib, klinik amaliyotda mustaqil kasbiy muloqot uchun yetarli lingvistik tayyorgarlikka ega emas.

Komponentlar bo'yicha tahlil

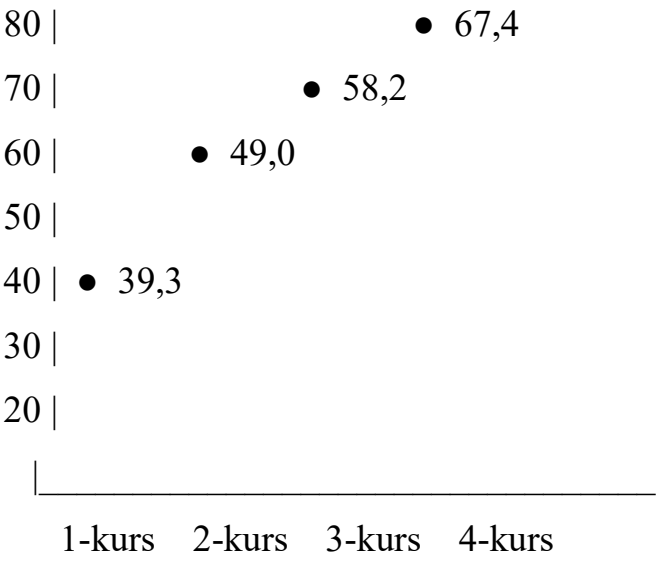
2-jadval

Lingvistik kompetentlik komponentlari bo'yicha o'rtacha ball (100 ballik tizim

Komponent	1-kurs	2-kurs	3-kurs	4-kurs	O'rtacha
Tibbiy leksika	36,4	50,2	65,7	72,1	56,4
Og'zaki muloqot	43,2	50,8	56,3	69,4	54,7
Tinglash/tushunish	55,3	61,4	67,8	74,2	63,9
Yozma hujjatlashtirish	33,1	44,6	55,2	62,8	49,7
Empatik nutq	29,3	37,8	46,1	59,4	42,7
Umumiy	**39,3**	**49,0**	**58,2**	**67,4**	**53,5**

1-diagramma. Lingvistik kompetentlik komponentlari bo'yicha o'rtacha natijalar (%)

urs bo'yicha dinamika



2-diagramma. Kurslar bo'yicha lingvistik kompetentlik dinamikasi (o'rtacha ball)

O'sish sur'ati har yili taxminan **9–10 ball** ni tashkil etadi. Biroq 4-kurs talabalarining o'rtacha natijasi (67,4) ham klinik amaliyot uchun minimal talab darajasi (75 ball) dan past ekanligi tashvish uyg'otadi.

3-jadval

Talabalar uchun eng qiyin va oson vazifalar

№	Vazifa turi	O'rtacha ball	Qiyinlik darajasi
1	Empatik so'z tanlash	39,2	Juda qiyin
2	Tibbiy epikriz yozish	42,5	Qiyin
3	Bemor shikoyatini talqin qilish	43,8	Qiyin
4	Tibbiy terminlarni izohlash	54,6	O'rta
5	Diagnozni bemor tiliga o'girish	48,3	O'rta
6	Tibbiy so'z boyligini bilish	62,4	Nisbatan oson
7	Tinglash va asosiy ma'noni ajratish	67,8	Oson

XULOSA

Tadqiqot natijalari quyidagi muhim xulosalar chiqarishga imkon berdi:

Tibbiy oliy ta'lim muassasalari talabalarining lingvistik kompetentlik darajasi klinik amaliyot talablaridan sezilarli darajada past (o'rtacha 53,5 ball,

talab — 75 ball). Bu holat o'quv jarayonida lingvistik kompetentlikni rivojlantirishga maqsadli e'tibor qaratish zarurligini ko'rsatadi.

Komponentlar orasida empatik nutq (42,7%) va yozma hujjatlashtirish (49,7%) eng zaif tomonlar bo'lib, ularga alohida pedagogik ta'sir ko'rsatish talab etiladi.

Ishlab chiqilgan «MedLing-Test» diagnostika vositasi yuqori darajadagi ishonchlilik (Cronbach $\alpha = 0,87$) va yaroqlilikni ko'rsatdi hamda tibbiy ta'lim muassasalarida keng qo'llash uchun tavsiya etiladi.

Kelgusi tadqiqotlarda aniqlangan muammolarni bartaraf etishga yo'naltirilgan innovatsion pedagogik texnologiyalar va ularning samaradorligini baholash masalalari ko'rib chiqiladi.

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O‘QUV- MASHG‘ULOT BOSQISHIDAGI ERKIN KURASHCHILARNING KOMBINATSION HARAKATLARINI TAKOMILLASHTIRISH MODELINI ISHLAB CHIQISH VA MASHG‘ULOT JARAYONIGA JORIY ETISH

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Annotatsiya. *Mazkur maqolada erkin kurashchilarning kombinatsion harakatlarini takomillashtirishning modeli ishlab chiqilgan hamda uni o‘quv-mashg‘ulot jarayoniga joriy etishning uslubiy asoslari yoritilgan. Model sportchilarning jismoniy, texnik, taktik va psixologik tayyorgarligini o‘zaro integratsiyalashgan holda rivojlantirishga xizmat qiladi. Tadqiqot natijalari model asosida tashkil etilgan mashg‘ulotlar kombinatsion harakatlarning samaradorligini va musobaqa natijalarini oshirishga ijobiy ta‘sir ko‘rsatishini asoslaydi.*

Kalit so‘zlar: *Erkin kurash, kombinatsion harakatlar, strukturaviy-funksional model, texnik-taktik tayyorgarlik, mashg‘ulot jarayoni, metodika.*

Аннотация: *В данной статье разработана модель совершенствования комбинационных движений борцов вольного стиля и освещены методические основы ее внедрения в учебно-тренировочный процесс. Модель служит взаимно интегрированному развитию физической, технической, тактической и психологической подготовки спортсменов. Результаты исследования обосновывают, что тренировки, организованные на основе модели, оказывают положительное влияние на повышение эффективности комбинационных движений и результатов соревнований.*

Ключевые слова: *Вольная борьба, комбинационные движения, структурно-функциональная модель, технико-тактическая подготовка, тренировочный процесс, методика*

Abstract: *This article develops a model for improving the combinational movements of freestyle wrestlers and outlines the methodological foundations for its implementation in the training process. The model serves to develop the physical, technical, tactical, and*

psychological training of athletes through mutual integration. The research results substantiate that training organized based on the model has a positive impact on increasing the effectiveness of combinational movements and competitive results.

***Keywords**: Freestyle wrestling, combinational movements, structural-functional model, technical-tactical training, training process, methodology*

KIRISH

Mamlakatimizda sportni rivojlantirish, yoshlarni sog‘lom turmush tarziga jalb etish hamda xalqaro musobaqalarda yuqori natijalarga erishish davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Ayniqsa, erkin kurash sport turida sportchilarning texnik-taktik mahoratini takomillashtirish, zamonaviy mashg‘ulot usullarini ishlab chiqish va ularni amaliyotga tatbiq etish dolzarb ilmiy muammolardan biridir. Zamonaviy erkin kurash musobaqalarining tahlili shuni ko‘rsatadiki, g‘alabaga erishishda alohida usullarni mukammal bajarishning o‘zi yetarli emas. Sportchi qisqa vaqt ichida vaziyatni baholashi, raqib harakatlarini oldindan sezishi va ketma-ket kombinatsion hujumlarni samarali qo‘llay olishi zarur.

Shu sababli kombinatsion harakatlarni shakllantirish va takomillashtirish mashg‘ulot jarayonining asosiy yo‘nalishlaridan biri hisoblanadi. Amaliyot shuni ko‘rsatmoqdaki, ko‘pgina sport maktablarida kombinatsion harakatlarni o‘rgatish alohida mashqlar orqali amalga oshiriladi, biroq ularni yagona tizim asosida rejalashtirish, nazorat qilish va baholash mexanizmlari yetarli darajada ishlab chiqilmagan. Natijada sportchilarning texnik-taktik tayyorgarligi va musobaqa samaradorligi o‘rtasida uzviy bog‘liqlik to‘liq ta'minlanmaydi. Shu munosabat bilan kombinatsion harakatlarni rivojlantirishga xizmat qiluvchi strukturaviy-funksional modelni ishlab chiqish, mashg‘ulot jarayoniga joriy etish va uning samaradorligini ilmiy asoslash muhim ilmiy-amaliy ahamiyat kasb etadi.

Muammoning o‘rganilganlik darajasi. Bugungi kunda mavzuga oid ilmiy-uslubiy adabiyotlarni tahlil qilish jarayonida, turli yoshdagi kurashchilar

uchun sportchilarni sinovdan o‘tkazish, mashg‘ulot va musobaqa yuklamalarini me’yorlash, sportga layoqatliligini aniqlash mezonlari hamda kurashchilarning texnik va taktik harakatlarni o‘rgatish muammolari bo‘yicha bir qator ilmiy ishlar olib borilgan.

Xususan, respublika olimlaridan F.A.Kerimov, Solaydinov.E.Sh, Pirimbetov.A.A, Z.A.Bakiyev, O.J.Dadabayev,D.Y.Tashnazarov, Yakupbaev.A.A, Xamidjonov.AU, Satipov.A.B Jarilkapov.U.B tomonidan ilmiy izlanishlar olib borilgan. Ularda yosh kurashchilarning maxsus mashg‘ulot tizimining asosiy tarkiblari bayon qilingan, o‘rgatish, o‘quv-mashg‘ulot jarayonlari mazmunini tizimlashtirilgan, texnik-taktik takomillashtirish texnologiyalari ishlab chiqilgan hamda muvoffaqiyatli sinovdan o‘tkazilgan. Bu tadqiqotlar natijalari erkin kurashchilarning mashg‘ulot jarayoni vositalari hamda uslublarini optimallashtirishda katta nazariy va amaliy ahamiyatga ega.

Mustaqil Davlatlar Hamdo‘stligi mamlakatlari olimlaridan M.V.Тархаrov Шахмурадов.Ю.А, Таймазов.А.Б. Султанахмедов.Г.С. Батукаев.А.А Валеев.Р.Г o‘z tadqiqotlarida kurash mashg‘ulotlarida texnik arsenalni boyitish, texnik-taktik harakatlarning tahlili va sportchilarning musobaqa faoliyatini tizimli tashkil qilish qonuniyatlarini ko‘rib chiqqanlar. Ularning ishlarida kurashchilarning harakat funksiyalari va usullarni charchoq holatida ham barqaror bajara olish qobiliyati ko‘p jihatdan texnik mahoratning mukammalligiga bog‘liqligi ta’kidlangan bo‘lsa-da, aynan o‘quv-mashq bosqichida erkin kurashchilarning kombinatsiyalarini takomillashtirish modelini uslubiyati alohida tadqiq etilmagan.

Xorijiy davlatlarda kurashchilarning jismoniy tayyorgarligiga olahida etbor bergan Vračan.D, Mario.B, Tropin.Yu, Ruchka.Y. tomonidan o‘rganilgan. Yakkakurash sport turlarida musobaqa faoliyati modelini yaratish, samarali hujum va himoya harakatlarining soni hamda sifati, texnik-taktik usullarning xilma-xilligi, sport kurashi davomida yuqori ish qobiliyatini saqlab qolish xususiyatlari Ramiz.A , Párraga Montilla JA, Mirzaei.B Sybil.M Jerzy.S Erkan

.D Qasim.Dr va Dariusz.G tomonidan ilmiy tadqiq etilgan. Shunga qaramay, xalqaro miqyosdagi zamonaviy tendensiyalar o‘quv-mashq bosqichidagi yosh sportchilarning individual kombinatsion harakatlarini takomillashtirishning metodik jihatlarini yanada chuqurroq izlanishlar asosida ishlab chiqishni taqozo etmoqda.

Tadqiqot metodlari. Tadqiqot davomida pedagogik kuzatish, ilmiy-uslubiy adabiyotlarni tahlil qilish, pedagogik tajriba, ekspert baholash, video tahlil, test sinovlari hamda matematik-statistik usullardan foydalanildi. Pedagogik kuzatish orqali sportchilarning mashg‘ulot va musobaqa jarayonidagi texnik-taktik harakatlari o‘rganildi. Video tahlil usuli yordamida kombinatsion harakatlarning bajarilish sifati, texnik xatolar va hujumlarning samaradorligi baholandi. Tadqiqot ishlarida erkin kurashchilarning 20 nafar sportchi qatnashti 10 nafar tajriba guruhi, 10 nafari nazorat huruga ajratik hamda shulardan nazorat testlarini oldik**. (1 jdvalga qaram)**

1-jadval

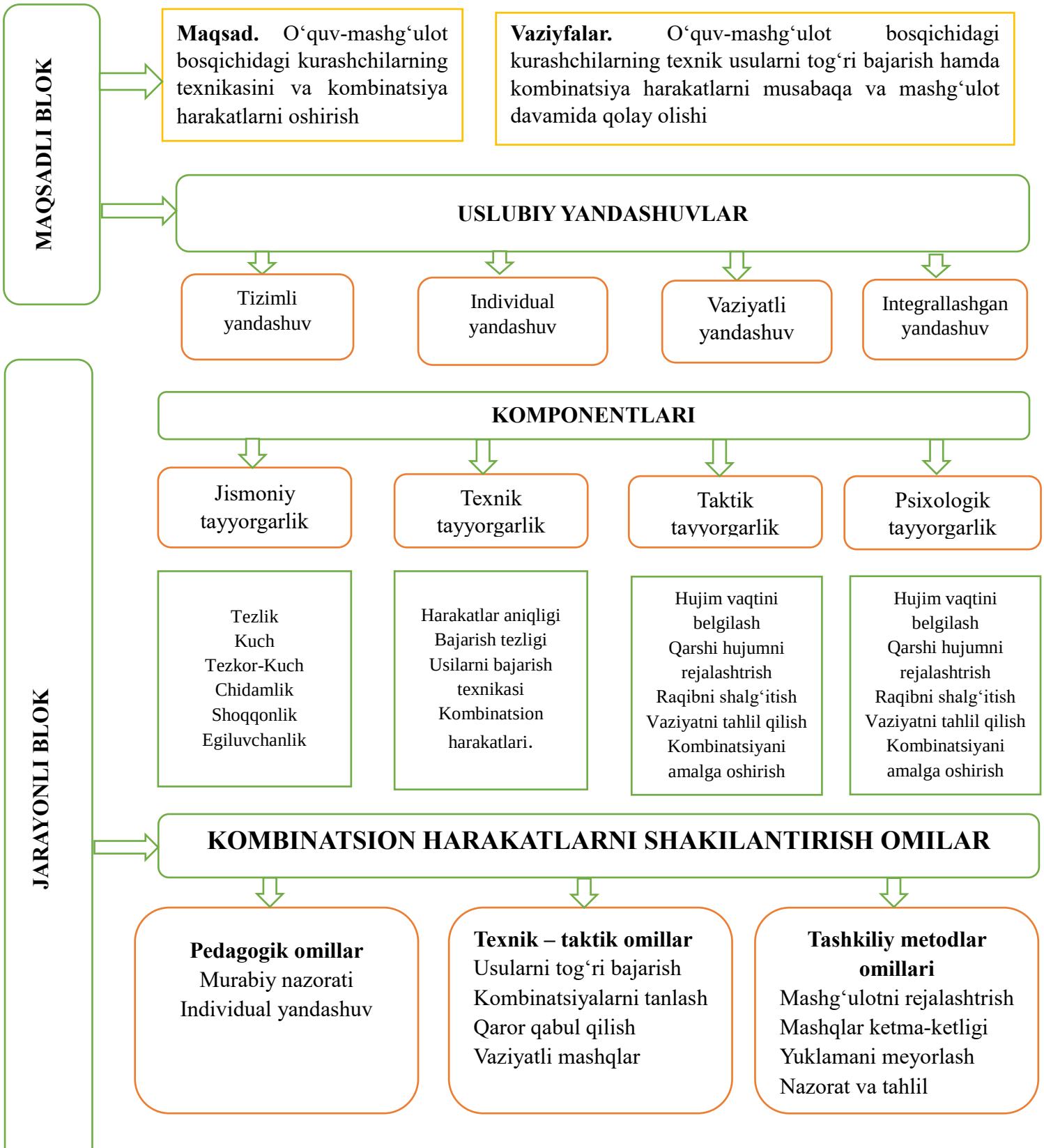
Tajriba va nazarot guruhlari ko‘rsatkichlar n=20

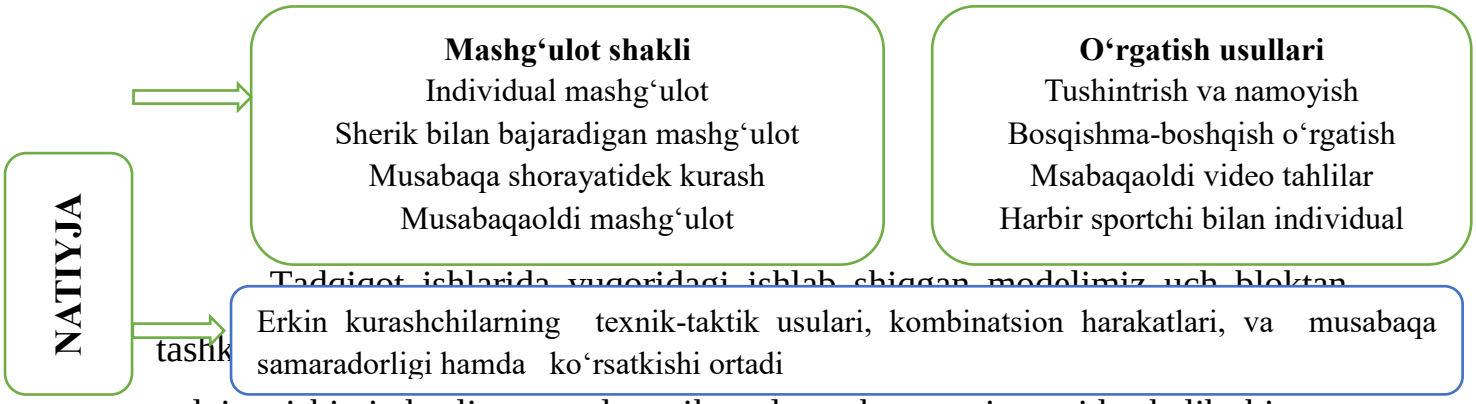
Ko‘rsatkichlar	TG (n=10)	NG (n=10)	TG (n=10)	NG (n=10)
Egiluvchanlik sm	15,3±2,58	15,4 ± 2,60	16,3 ± 3,58	15,60 ± 2,60
Yelkadan oshrib tashlash 30 soniyada (plicho)	6,90 ± 2,02	6,95 ± 2,10	7,90 ± 2,60	7,20 ± 2,10
Qo‘l va bo‘ynini ushlab beldan oshirib tashlash(bedro) 30 soniyada	8,10 ± 1,66	8,11 ± 1,70	9,70 ± 2,66	8,40 ± 1,70

Jadvalda keltirilgan natijalar shuni ko‘rsatadiki, tajriba boshlanishida nazorat va tajriba guruhlari ko‘rsatkichlari o‘rtasida sezilarli farq kuzatilmagan. Bu esa tadqiqot natijalarining keyingi bosqichlarda obyektiv baholanishiga imkon yaratadi. Shu munasabat bilan erkin kurashchilarning kombinatsion harakatlarini takomillashtirishning modelini ishlab chiqdik. Tadqiqot ishidan

kiyin ko‘rnib turibdiki tajriba guruh ko‘rsatkishi nazarot guruhiga qaraganda sezlarli darajda oskani ko‘rib turibdi nazorat guruhida ham ayrim o‘sishlar kuzatilgan bo‘lsada, ularning darajasi tajriba guruhiga nisbatan pastroq ekanligi aniqlandi. Bu esa tajriba guruhida qo‘llanilgan maxsus mashg‘ulot metodikasi erkin kurashchilarning texnik va jismoniy tayyorgarligini oshirishda samarali ekanligini tasdiqlaydi

2-jadval





Tadqiqot ishlarida yuqoridagi ishlab chiqqan modelimiz uch bloktan tashk

tadqiqot ishimizda olingan pedagogik testlar va kuzatuv jaraynidan kelib shiqgan holda ushbu modelni tavsiya etik . Modelning maqsadli blokida o‘quv-mashg‘ulot bosqichidagi kurashchilarning texnikasini va kombinatsiya harakatlarni oshirish maqsadi, Vaziyfasi esa o‘quv-mashg‘ulot bosqichidagi kurashchilarning texnik usularni tog‘ri bajarish hamda kombinatsiya harakatlarni musabaqa va mashg‘ulot davamida qolay olishi hisoblanadi. Ushbu blokga uslubiy yandashuvlarga tizimli yandashuv, individual yandashuv, vaziyatli yandashuv, integrallashgan yandashuv hisoblanadi

Modelimizning ikkinchi blogi yaniy jarayonli blok bo‘lib kompanentlardan tashkil to‘pkan bo‘lib jismoniy tayyorgarlik tezlik ,Kuch, tezkor-Kuch, chidamlik, shoqqonlik, egiluvchanlik.

Texnik tayyorgarlik, Harakatlar aniqligi, Bajarish tezligi, Usilarni bajarish texnikasi, Kombinatsion harakatlari

Taktik tayyorgarlik Hujim vaqtini belgilash, Qarshi hujumni rejalashtrish, Raqibni shalg‘itish, vaziyatni tahlil qilish, kombinatsiyani amalga oshirish

Psixologik tayyorgarlik motivatsiya, o‘zini boshqarish, raqibga moslashish, tezkor qaror qabul qilish, reaksiyani eytlshtrish larni o‘z ishiga oladi.

Ushbu jarayon blokiga kombinatsion harakatlarni shakilantrish omillariyam kiradi bularga prdagogik omillar murabiy nazorati, individual

yandashuv, texnik – taktik omilarga usularni tog‘ri bajarish, kombinatsiyalarni tanlash, qaror qabul qilish, vaziyatli mashqlar , tahkiliy metodlar omillari bularga Mashg‘ulotni rejalashtrish, Mashqlar ketma-ketligi, Yuklamani meyorlash, Nazorat va tahlil o‘z ishiga oladi.

Jarayon bloki davam etar ekan mashg‘ulot shakli va o‘rgatish usularniyam o‘z ishiga oladi Individual mashg‘ulot, sherik bilan bajaradigan mashg‘ulot, musabaqa shorayatidek kurash, musabaqaoldi mashg‘ulot, Tushintrish va namoyish, bosqishma-boshqish o‘rgatish, msabaqaoldi video tahlilar, harbir sportchi bilan individual ishlash o‘z ishiga oladi

Uchinchi bloki natiyja hisoblanadi kutiliyatgan o‘quv-mashg‘ulot bosqishidagi erkin kurashchilarning texnik – taktik usulari, kombinatsion harakatlari va musabaqada qolay olishi hamda yuqori natiyjaga ershishi yordam beradi.

Tadqiqot natijasi va muhokamasi. Ishlab chiqilgan strukturaviy-funksional model o‘quv-mashg'ulot jarayoniga integratsiyalashgan holda qo'llanilganda, sportchilarning kombinatsion harakatlarni bajarish sifati, texnik aniqligi va taktik qaror qabul qilish qobiliyatini rivojlantirish uchun qulay sharoit yaratadi. Modelning asosiy afzalligi mashg'ulotning barcha tarkibiy qismlarini yagona tizim asosida boshqarish imkonini berishidir. Nazorat guruhida ham ayrim ijobiy o‘zgarishlar kuzatilgan bo‘lsa-da, ularning ko‘rsatkichlari tajriba guruhiga nisbatan kamroq darajada o‘zgargani aniqlandi. Bu esa mashg‘ulot jarayonida kombinatsion yondashuv asosida ishlab chiqilgan maxsus model erkin kurashchilarning texnik tayyorgarligini oshirishda samarali ekanligini ko‘rsatadi. Olingan natijalar erkin kurash sportida kombinatsion harakatlarni takomillashtirishning modelini hamda texnikalarini ilmiy asosda o‘rgatish sportchilarning umumiy sport mahoratini rivojlantirishda muhim omil ekanligini tasdiqlaydi. O‘tkazilgan tajriba-sinov ishlari natijalari erkin kurashchilarning kombinatsion harakatlarini takomillashtirishning ishlab chiqilgan modeli hamda uni o‘quv-mashg‘ulot jarayoniga joriy etish sportchilarning texnik-taktik

tayyorgarligini rivojlantirishda muhim ahamiyat kasb etishini ko‘rsatdi. Tadqiqot natijalariga ko‘ra, tajriba guruhida kombinatsion harakatlarni bajarish aniqligi, ketma-ket texnik usullarni qo‘llash samaradorligi, hujum va qarshi hujum harakatlarining uyg‘unligi hamda maxsus jismoniy tayyorgarlik ko‘rsatkichlari sezilarli darajada yaxshilangani aniqlandi.

Tajriba guruhida kuzatilgan ijobiy o‘zgarishlar mashg‘ulot jarayoniga joriy etilgan kombinatsion harakatlarni takomillashtirish modelining samarali qo‘llanilishi bilan izohlanadi. Mazkur model sportchilarda texnik usullarni o‘zaro bog‘liq holda bajarish, vaziyatni tezkor tahlil qilish, raqib harakatlariga mos ravishda optimal texnik yechimlarni tanlash hamda kombinatsion fikrlashni rivojlantirishga qaratilgan maxsus mashqlar tizimini o‘z ichiga oldi. Natijada kurashchilar musobaqa sharoitida texnik usullarni ketma-ket va uzluksiz qo‘llash, hujumni samarali davom ettirish hamda qarshi hujumlarda yuqori natijadorlikka erishish imkoniyatiga ega bo‘ldilar.

Nazorat guruhida ham mashg‘ulotlar davomida ayrim ijobiy o‘zgarishlar kuzatilgan bo‘lsa-da, ularning darajasi tajriba guruhiga nisbatan pastroq bo‘ldi. Bu esa erkin kurashchilarning kombinatsion harakatlarini takomillashtirish modeli asosida tashkil etilgan mashg‘ulotlar sportchilarning texnik-taktik mahoratini, harakatlar barqarorligini va musobaqa faoliyatidagi samaradorligini yanada yuqori darajada rivojlantirishga xizmat qilishini tasdiqlaydi.

Tadqiqot natijalari kombinatsion harakatlarni o‘rgatish va takomillashtirish bo‘yicha olib borilgan ilmiy izlanishlar natijalari bilan hamohang bo‘lib, mashg‘ulotlarni ilmiy asoslangan model asosida tashkil etish sportchilarning musobaqa faoliyatida yuqori natijalarga erishishiga ijobiy ta‘sir ko‘rsatishini isbotladi. Shu bois ishlab chiqilgan modelni erkin kurash bo‘yicha o‘quv-mashg‘ulot jarayoniga keng joriy etish sportchilarning texnik-taktik tayyorgarligini oshirishning samarali vositalaridan biri sifatida tavsiya etiladi.

Xulosa. Olib borilgan tadqiqot ishlari va pedagogik tajribalar natijasida erkin kurashchilarning kombinatsion harakatlarini sifat jihatidan yangi

bosqichga ko‘tarish hamda ularni takomillashtirishga qaratilgan kompleks model ishlab chiqildi. Mazkur model zamonaviy sport biomexanikasi, jismoniy tarbiya nazariyasi va metodikasi hamda sport fiziologiyasining ilg‘or tamoyillariga asoslangan bo‘lib, o‘quv-mashg‘ulot jarayonini tizimli tashkil etishda yangicha yondashuvni belgilab beradi.

Tadqiqot davomida aniqlanishicha, erkin kurashda faqatgina alohida olingan texnik usullarni mukammal bilish yuqori darajadagi musobaqa muhitida g‘alabani ta‘minlash uchun yetarli emas. Zamonaviy gilam ustidagi kurash sportchidan yuqori darajadagi dinamik vaziyatlarni tezkor baholashni va aldamchi harakatlar bilan uyg‘unlashgan hujum hamda qarshi hujum kombinatsiyalarini zanjirsimon tarzda, to‘xtovsiz amalga oshirishni talab etadi. Taklif etilayotgan strukturaviy-funksional model aynan mana shu bo‘shliqni to‘ldirishga, yani sportchilarning texnik-taktik tayyorgarlik darajasini tizimli ravishda mukammallashtirishga va buning natijasida ularning musobaqa faoliyati samaradorligini keskin oshirish uchun mustahkam metodik asos bo‘lib xizmat qiladi.

Ushbu modelning amaliy ahamiyati shundaki, uni o‘quv-mashg‘ulot jarayoniga joriy etish murabbiylarga mashg‘ulot yuklamalari va vositalarini empirik (shunchaki tajribaga tayanib) emas, balki chuqur ilmiy-metodik asosda rejalashtirish imkonini beradi. Model tarkibidagi nazorat va baholash bloklari tufayli murabbiylar har bir sportchining individual rivojlanish trayektoriyasini, uning funksional imkoniyatlari hamda o‘ziga xos taktik uslubini hisobga olgan holda samarali boshqarish dastaklarini qo‘lga kiritadilar.

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IMPROVING TREATMENT APPROACHES FOR POST-BURN SCARS OF THE FACE AND NECK

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Abstract. *Post-burn scars of the face and neck cause functional, aesthetic and psychosocial impairment. This study evaluated an optimized diagnostic and treatment strategy in 146 patients: 72 received conventional care and 74 received optimized management based on inflammatory markers, laser Doppler flowmetry and selective intraoperative Hemoben use. The optimized approach reduced marginal graft necrosis from 13.9% to 8.1%, complete graft rejection from 8.3% to 2.7%, and wound suppuration from 6.9% to 4.1%. WHOQOL-BREF outcomes improved more markedly in the main group. The proposed strategy may reduce postoperative complications and improve quality of life.*

Keywords: *post-burn scars; reconstructive surgery; graft necrosis; graft rejection; microcirculation; quality of life.*

INTRODUCTION

Post-burn scar deformities of the face and neck remain a major challenge in reconstructive surgery because this anatomical region combines functional, aesthetic and psychosocial importance. Head and neck involvement has been reported in approximately 26.5% of burn patients and may reach 30.3% in emergency cohorts. Hypertrophic and keloid scars may cause contracture, impaired mobility, recurrent deformity and substantial deterioration in quality of life.

Surgical correction includes local flap techniques, rotational flaps, free skin grafting and combined reconstruction. However, graft loss, marginal necrosis, infection and recurrent scarring remain clinically important complications, especially in patients with impaired microcirculation, ischemic heart disease (IHD) or type 2 diabetes mellitus (T2DM). Modern management

therefore requires not only an appropriate reconstructive technique but also preoperative assessment of inflammation and tissue perfusion. The aim of this study was to improve quality of life and reduce postoperative complications in patients with post-burn scars of the face and neck by optimizing diagnostic and treatment tactics.

MATERIALS AND METHODS

A retrospective-prospective study was conducted at Ibn Sino City Clinical Hospital No. 1 and the clinical base of Tashkent International University KIMYO during 2020-2025. A total of 146 patients were included. The control group comprised 72 patients treated using conventional diagnostic and therapeutic tactics, while the main group included 74 patients managed using an optimized algorithm (Table 1).

Table 1

Characteristics of groups

Characteristic	Control (n=72)	Main (n=74)
Men	32 (44.4%)	35 (47.3%)
Women	40 (55.6%)	39 (52.7%)
Mean age, years	51.5 ± 2.2	49.1 ± 3.4
IHD	18 (25.0%)	14 (19.4%)
T2DM	10 (13.9%)	8 (11.1%)
Face reconstruction	38 (52.8%)	41 (55.4%)
Neck reconstruction	34 (47.2%)	33 (44.6%)

The optimized strategy included assessment of the leukocyte intoxication index (LII), procalcitonin (PCT), interleukin-6 (IL-6), D-dimer and laser Doppler flowmetry (LDF). LDF was performed in the scar area and within 5 mm of its border to assess local perfusion. Patients with abnormal microcirculation and marker values received preoperative correction aimed at improving blood rheology and tissue perfusion. The main group was divided into two subgroups: 40 patients (54.1%) underwent marker- and LDF-guided management without Hemoben, while 34 patients (45.9%) additionally received the powdered Hemoben component intraoperatively.

The principal reconstructive procedures were advancement flaps, rotational flaps, free skin grafting and combined plastic surgery. Outcomes included postoperative complications and quality of life assessed using the WHOQOL-BREF questionnaire before and after treatment. Quantitative variables are presented as mean ± standard deviation (M±SD) with 95% confidence intervals (CI). Categorical variables were compared using Fisher's exact test; $p<0.05$ was considered statistically significant.

RESULTS

Dynamic monitoring showed an expected early postoperative rise in inflammatory markers followed by gradual normalization and progressive improvement in microcirculation (Table 2).

Table 2

Dynamic if indicators

Indicator	Pre-op	Day 1	Day 3	Week 1	Week 2	Month 1
LII	3.5	6.8	5.2	3.9	3.4	2.9
PCT	1.9	7.5	4.1	1.8	1.9	1.5
IL-6	9.1	15.7	12.2	8.6	6.5	7.4
D-dimer	564	671	587	485	432	445
Perfusion	3.5	4.1	5.3	5.9	6.7	7.2

Reduced microcirculation and abnormal marker values were identified in 11 patients with IHD (14.9%) and 7 patients with T2DM (9.4%). After preoperative correction, perfusion in the scar area increased in patients with IHD from 3.5±0.7 to 6.7±0.5 perfusion units and on the fingers of the left hand from 3.9±0.8 to 6.6±0.7. In patients with T2DM, scar-area perfusion increased from 3.2±0.4 to 6.4±0.6, while finger perfusion increased from 3.1±0.6 to 6.6±0.7.

Postoperative complications were less frequent in the main group: marginal necrosis decreased by 5.8 percentage points, complete rejection by 5.6 points and wound suppuration by 2.8 points. All occurred in patients with IHD or T2DM (Table 3).

Table 3

Complications in the groups

Complication	Control (n=72)	Main (n=74)	95% CI	p
Marginal graft necrosis	10 (13.9%)	6 (8.1%)	0.224-1.523	0.029
Complete graft rejection	6 (8.3%)	2 (2.7%)	0.068-1.554	0.016
Wound suppuration	5 (6.9%)	3 (4.1%)	0.145-2.353	0.049

Within the main group, Hemoben use was associated with fewer complications. Marginal necrosis occurred in 4 patients (11.8%) without Hemoben and in 2 (5.0%) with Hemoben. Complete rejection occurred in 2 patients (5.9%) and wound suppuration in 3 (8.8%) without Hemoben; neither complication was observed in the Hemoben subgroup.

WHOQOL-BREF assessment demonstrated more pronounced improvement in the main group. Physical health improved by 30.1% versus 8.3% in the control group, psychological health by 23.2% versus 7.5%, social relationships by 18.5% versus 9.3%, and the environmental domain by 18.7% versus 6.5%.

DISCUSSION

The findings indicate that postoperative outcomes in facial and neck scar reconstruction depend not only on the selected plastic technique but also on the condition of local microcirculation and systemic inflammatory activity. Marker-guided assessment and LDF made it possible to identify patients requiring preoperative correction. This was particularly relevant in IHD and T2DM, where impaired rheology and perfusion increased the risk of graft-related complications.

The reduction in marginal necrosis, complete rejection and wound infection supports the clinical value of the optimized algorithm. The absence of complete rejection and wound suppuration in the Hemoben subgroup also

suggests a potential benefit of the powdered component as an intraoperative adjunct. Nevertheless, this subgroup analysis was non-randomized and should be confirmed in larger prospective studies. The marked improvement in WHOQOL-BREF domains demonstrates that reduced complication rates were accompanied by meaningful functional and psychosocial benefits.

CONCLUSION

The optimized diagnostic and treatment strategy for post-burn scars of the face and neck, based on inflammatory markers, laser Doppler flowmetry, targeted preoperative correction and selective Hemoben use, reduced postoperative complications and improved quality of life. Compared with conventional care, marginal graft necrosis decreased from 13.9% to 8.1%, complete graft rejection from 8.3% to 2.7%, and wound suppuration from 6.9% to 4.1%. The main group also demonstrated substantially greater improvement in physical, psychological, social and environmental WHOQOL-BREF domains. The proposed strategy can be recommended for further clinical evaluation and broader use in reconstructive burn surgery.

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ASSESSMENT OF QUALITY OF LIFE IN PATIENTS WITH POST-BURN SCARS OF THE FACE AND NECK AFTER OPTIMIZATION OF TREATMENT TACTICS

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Abstract. *This comparative study evaluated an optimized diagnostic and treatment strategy for post-burn scars of the face and neck. Outcomes of 146 patients treated in 2020–2025 were analyzed: 72 received conventional care and 74 received optimized monitoring of inflammatory markers and microcirculation; 34 of the latter also received Hemoben. The optimized strategy reduced marginal graft necrosis by 5.8%, complete graft rejection by 5.6%, and wound suppuration by 2.8%. With Hemoben, only 2 (5.0%) cases of marginal necrosis occurred, with no complete rejection or suppuration.*

Keywords: *post-burn scars; face and neck; reconstructive surgery; microcirculation; Hemoben; postoperative complications.*

INTRODUCTION

Post-burn scars of the face and neck are a major problem in reconstructive surgery because they may impair breathing, swallowing, facial expression and neck mobility, while also causing disfigurement, psychosocial distress and reduced quality of life. Head and neck involvement is reported in approximately 8–47% of clinical burn populations and may reach 30–60% in severe burns. Hypertrophic scars occur in 32–72% of patients, whereas scar contractures develop in 38–54%.

Treatment is staged and individualized. Conservative measures include silicone products, pressure therapy, massage, physiotherapy and laser treatment. Surgical correction is indicated for contractures, facial deformity, ectropion, microstomia, disturbed cervicomental angle, restricted movement and functional impairment. Options include linear excision, Z-plasty, skin grafting, regional flaps and free microsurgical reconstruction. However, graft loss, wound infection and recurrent contracture remain clinically important, particularly in patients with impaired tissue perfusion or metabolic disease.

The aim of this study was to improve surgical outcomes in patients with post-burn scars of the face and neck by introducing an optimized diagnostic and treatment strategy based on dynamic assessment of inflammatory markers and tissue microcirculation, with selective intraoperative use of the powdered component Hemoben.

MATERIALS AND METHODS

A comparative study included 146 patients treated at Ibn Sino City Clinical Hospital No. 1 and the clinical base of KIMYO International University in Tashkent between 2020 and 2025. The control group comprised 72 patients managed using conventional diagnostic and treatment tactics; their outcomes were evaluated retrospectively. The main group comprised 74 patients managed prospectively using the optimized strategy.

Table 1.

Baseline characteristics of the study groups

Characteristic	Control (n=72)	Main (n=74)	Total (n=146)
Women, n (%)	40 (55.6%)	39 (52.7%)	79 (54.1%)
Men, n (%)	32 (44.4%)	35 (47.3%)	67 (45.9%)
Mean age, years	51.5±2.2	49.1±3.4	50.3±1.2
Ischemic heart disease	18 (25.0%)	14 (18.9%)	32 (21.9%)
Type 2 diabetes mellitus	10 (13.9%)	8 (10.8%)	18 (12.3%)

Other comorbidities included chronic obstructive pulmonary disease in 10 (6.8%) patients, chronic pyelonephritis in 8 (5.5%), and duodenal ulcer in 6 (4.1%). The optimized protocol included leukocytic intoxication index (LII), procalcitonin (PCT), interleukin-6 (IL-6), D-dimer and laser Doppler flowmetry (LDF) perfusion measurements before surgery and on postoperative day 1, day 3, week 1, week 2 and month 1. These indicators were selected to identify early inflammatory, thrombotic and ischemic changes and to assess graft-bed microcirculation.

The main group was divided into two subgroups: 40 (54.1%) patients underwent optimized diagnostic monitoring without Hemoben, while 34 (45.9%) received intraoperative Hemoben in addition to the optimized protocol. Statistical comparisons included 95% confidence intervals and Fisher's exact test; $p<0.05$ was considered statistically significant.

RESULTS

The principal operations were local advancement or transposition flaps, rotation flaps, free skin grafting and combined reconstruction. In the control group, 38 (52.8%) operations were performed on the face and 34 (47.2%) on the neck. In the main group, the corresponding values were 41 (55.4%) and 33 (44.6%). The original figures were converted into Table 2.

Table 2.

Distribution of reconstructive procedures by anatomical site

Group/site	Advancement flap	Rotation flap	Free skin graft	Combined repair
Control: face	18 (25.0%)	0	8 (11.1%)	12 (16.7%)
Control: neck	0	14 (19.4%)	10 (13.9%)	10 (13.9%)
Main: face	19 (25.7%)	0	12 (16.2%)	10 (13.5%)
Main: neck	0	13 (17.7%)	11 (14.8%)	9 (12.1%)

Hemoben was used in 19 (25.7%) facial operations and 15 (20.2%) neck operations. For facial reconstruction, it was applied in 9 (12.2%) advancement-flap procedures, 6 (8.1%) free skin grafts and 4 (5.4%) combined procedures.

For neck reconstruction, it was used in 8 (10.8%) rotation flaps, 5 (6.7%) free skin grafts and 2 (2.7%) combined procedures.

LDF was measured within 5 mm of the scar border at a tissue depth of up to 5 mm. Microcirculation was reduced in 11 of 14 patients with ischemic heart disease and in 7 of 8 patients with type 2 diabetes.

Table 3.

Dynamic changes in inflammatory markers and microcirculation

Time point	LII, units	PCT, ng/mL	IL-6, pg/mL	D-dimer, ng/mL	Perfusion, PU
Preoperative	3.5±2.2	1.9±1.4	9.1±2.1	564±124	3.5±0.9
Day 1	6.8±3.4	7.5±1.1	15.7±1.9	671±115	4.1±1.2
Day 3	5.2±2.9	4.1±1.6	12.2±2.1	587±98	5.3±0.8
Week 1	3.9±2.5	1.8±1.1	8.6±1.7	485±81	5.9±1.1
Week 2	3.4±2.1	1.9±0.9	6.5±1.3	432±86	6.7±0.7
Month 1	2.9±2.3	1.5±1.1	7.4±1.1	445±78	7.2±0.6

After preoperative treatment aimed at improving blood rheology and perfusion, mean LDF values increased from 3.5±0.7 to 6.7±0.5 perfusion units in patients with ischemic heart disease and from 3.2±0.4 to 6.4±0.6 in those with diabetes. Comparable improvement was observed on the fingers of the left hand: from 3.9±0.8 to 6.6±0.7 and from 3.1±0.6 to 6.6±0.7, respectively.

Table 4.

Postoperative complications in the study groups

Outcome	Control (n=72)	Main (n=74)	Absolute reduction	95% CI (RR)	p
Marginal graft necrosis	10 (13.9%)	6 (8.1%)	5.8%	0.224–1.523	0.02992
Complete graft rejection	6 (8.3%)	2 (2.7%)	5.6%	0.068–1.554	0.01632
Wound suppuration	5 (6.9%)	3 (4.1%)	2.8%	0.145–2.353	0.04909

The optimized strategy significantly reduced all three major complications. In the subgroup without Hemoben, marginal necrosis occurred in

4 (11.8%) cases, complete rejection in 2 (5.9%) and wound suppuration in 3 (8.8%). In the Hemoben subgroup, marginal necrosis occurred in only 2 (5.0%) cases, while complete graft rejection and wound suppuration were not observed. The reported Fisher exact-test values were p=0.04041, p=0.02077 and p=0.04923, respectively. All complications were managed conservatively with local wound sanitation.

DISCUSSION

Dynamic assessment of LII, PCT, IL-6 and D-dimer supported early recognition of inflammatory and thrombotic changes, whereas LDF provided direct information about perfusion near the scar and graft. This was particularly relevant in patients with ischemic heart disease and type 2 diabetes, in whom baseline microcirculation was frequently impaired. The increase in perfusion after targeted preparation indicates that potentially modifiable vascular risk can be identified before reconstruction.

The lower incidence of marginal necrosis, complete rejection and wound suppuration in the main group suggests that combining laboratory markers with microcirculatory monitoring can improve selection, preparation and postoperative surveillance. The additional reduction in adverse events in the Hemoben subgroup may be related to improved local hemostasis and wound conditions. These findings should nevertheless be interpreted in light of the non-randomized design and relatively small subgroups; larger prospective studies are needed to confirm the independent contribution of Hemoben.

CONCLUSION

The optimized diagnostic and treatment strategy, based on dynamic monitoring of inflammatory markers and tissue microcirculation before and after reconstructive surgery, reduced marginal graft necrosis by 5.8%, complete graft rejection by 5.6% and wound suppuration by 2.8%. Intraoperative Hemoben was associated with only 2 (5.0%) cases of marginal necrosis and no cases of

complete graft rejection or wound suppuration. The approach is especially useful in patients with ischemic heart disease or type 2 diabetes, in whom impaired microcirculation requires correction before surgery.

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DIAGNOSTIC METHODS FOR COMPLICATIONS OF PURULENT-NECROTIC PROCESSES IN THE MAXILLOFACIAL REGION OF VARIOUS ETIOLOGIES

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Abstract. *Purulent-necrotic processes of the maxillofacial region comprise a heterogeneous group of rapidly progressive infections that may arise from odontogenic, traumatic, postoperative, salivary-gland, sinusogenic, hematogenous, or immunosuppression-related causes. Their complications include upper-airway obstruction, deep neck-space infection, necrotizing fasciitis, osteomyelitis, internal jugular vein thrombosis, descending mediastinitis, cavernous sinus thrombosis, sepsis, and multiple-organ dysfunction. Early diagnosis is difficult because visible local changes may underestimate the extent of fascial and deep-space involvement. This analytical thesis summarizes contemporary diagnostic approaches and proposes a staged assessment model combining clinical red flags, laboratory severity markers, microbiological verification, and targeted imaging. Contrast-enhanced computed tomography is emphasized as the main emergency modality for mapping deep-space spread and identifying drainable collections, gas, vascular complications, and mediastinal extension. Magnetic resonance imaging is valuable when intracranial, orbital, marrow, or complex soft-tissue involvement is suspected. Timely integration of these methods improves risk stratification and supports urgent multidisciplinary decision-making.*

Keywords: *maxillofacial infection, purulent-necrotic process, necrotizing fasciitis, computed tomography, magnetic resonance imaging, sepsis, complications.*

INTRODUCTION

Purulent-necrotic diseases of the maxillofacial region remain clinically important because the anatomical spaces of the face and neck communicate with

the parapharyngeal, retropharyngeal, carotid, orbital, intracranial, and mediastinal compartments. Even an initially localized dental or soft-tissue infection may therefore progress to a life-threatening condition. Severe maxillofacial space infections are most frequently associated with dentoalveolar disease, but they may also complicate sialadenitis, trauma, surgery, malignancy, systemic vasculitis, diabetes mellitus, renal failure, autoimmune disease, and long-term immunosuppressive therapy [1, 2]. The rich vascular supply of the face may partially limit necrosis, yet it also allows rapid inflammatory and hematogenous dissemination. The principal diagnostic problem is that the external appearance may be modest while deep fascial necrosis, thrombosis, or abscess formation is already extensive. Consequently, the diagnosis must be based not on a single symptom or test, but on a coordinated clinical, laboratory, radiological, microbiological, and, when necessary, surgical assessment.

MAIN PART

Contrast-enhanced multidetector CT of the maxillofacial region and neck is the principal emergency imaging method. It rapidly demonstrates the primary source, fascial-space involvement, rim-enhancing collections, fat stranding, fascial thickening, fluid along fascial planes, soft-tissue gas, airway narrowing, bone destruction, and extension toward the mediastinum. CT angiographic phases may be added when internal jugular vein thrombosis, carotid involvement, pseudoaneurysm, active bleeding, or septic embolic disease is suspected. Imaging recommendations of the European Society of Head and Neck Radiology emphasize contrast-enhanced CT as the most commonly used emergency modality for suspected deep infection and for detecting drainable abscesses and complications [6]. However, the absence of gas does not exclude necrotizing fasciitis, and rim enhancement alone does not always differentiate a mature abscess from phlegmon. Therefore, CT findings must be interpreted together with disease tempo and clinical toxicity [5, 6].

MRI provides superior soft-tissue contrast and is particularly useful when CT findings are equivocal or when orbital, intracranial, skull-base, marrow, perineural, or vascular involvement is suspected. Diffusion-weighted imaging helps identify purulent collections, while fat-suppressed post-contrast sequences delineate fascial enhancement and non-enhancing necrotic tissue. MRI is also valuable for early osteomyelitis, cavernous sinus thrombosis, dural involvement, and intracranial abscess. Its limitations are longer acquisition time, motion sensitivity, restricted availability, and the possibility of delaying urgent surgery in unstable patients. Thus, MRI should complement rather than postpone emergency intervention [5, 7].

The fourth stage is microbiological and morphological verification. Samples should preferably be obtained from deep aspirate, tissue, or the abscess wall rather than from superficial swabs. Gram staining, aerobic and anaerobic culture, and antimicrobial susceptibility testing are necessary because severe infections are commonly polymicrobial and may include streptococci, staphylococci, anaerobes, gram-negative organisms, and, in immunocompromised patients, fungi [2, 8]. Blood cultures and tissue cultures should be collected before antibiotics when this can be done without delaying treatment. Molecular methods, including broad-range bacterial PCR or targeted fungal assays, are useful when cultures are negative after previous antimicrobial exposure or when unusual pathogens are suspected. Histopathological examination can confirm fascial necrosis, vascular thrombosis, neutrophilic infiltration, osteonecrosis, or invasive fungal elements and is especially important in differential diagnosis with malignancy, vasculitic necrosis, pyoderma gangrenosum, medication-related osteonecrosis, and radiation injury.

A rational integrated algorithm can therefore be formulated. Patients without systemic toxicity and without deep-space signs may undergo focused dental imaging or ultrasonography. Patients with rapid progression, trismus, dysphagia, airway symptoms, immunosuppression, severe pain, cranial

neuropathy, or abnormal inflammatory markers require urgent contrast-enhanced CT from the facial source through the neck; chest CT should be added when retropharyngeal or mediastinal spread is possible. MRI is indicated for suspected orbital, intracranial, skull-base, marrow, or cavernous sinus complications. Immediate surgical exploration remains decisive when clinical suspicion of necrotizing infection is high, because neither normal laboratory scores nor negative imaging can safely exclude early fascial necrosis [1, 3, 5]. The diagnostic process should be coordinated by oral and maxillofacial surgeons with anesthesiologists, otorhinolaryngologists, radiologists, infectious-disease specialists, microbiologists, and intensive-care physicians.

CONCLUSION

Complications of purulent-necrotic processes in the maxillofacial region should be diagnosed through a staged, risk-oriented approach. Clinical red flags and airway assessment identify patients requiring immediate escalation; laboratory markers define systemic severity but cannot independently exclude necrotizing infection; contrast-enhanced CT is the primary emergency method for mapping deep-space spread and complications; MRI refines the assessment of intracranial, orbital, marrow, and complex soft-tissue involvement; and deep-tissue microbiology with histopathology confirms etiology and supports differential diagnosis. The greatest diagnostic benefit is achieved when these methods are applied simultaneously and do not delay urgent surgical decision-making.

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HOW DO DENTAL FEATURES AND SOCIAL MEDIA EXPOSURE INFLUENCE THE PERCEPTION OF SMILE AESTHETICS AMONG YOUNG ADULTS?

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Annotation: *This study evaluated the perception of smile aesthetics among young adults using an online questionnaire. A total of 131 participants assessed eight smile variations on a 5-point Likert scale. The results indicated that smiles with proper alignment, symmetry, and tooth whiteness were rated most attractive, whereas smiles with crowding, tooth discoloration, and excessive gingival display received lower aesthetic ratings. These findings highlight the factors influencing smile attractiveness among young adults.*

Keywords: *Smile aesthetics; aesthetic perception; young adults; smile attractiveness; questionnaire survey; gingival display.*

Annotatsiya*: Mazkur tadqiqot onlayn so‘rovnoma yordamida yoshlar orasida tabassum estetikasining qabul qilinishini baholashga qaratildi. Tadqiqotda 131 nafar ishtirokchi 5 ballik Likert shkalasi asosida tabassumning sakkiz xil variantini baholadi. Natijalar shuni ko‘rsatdiki, tishlarning to‘g‘ri joylashuvi, simmetriyasi va oqligi bilan ajralib turuvchi tabassumlar eng jozibali deb baholangan, tishlar qiyshiqligi, tish rangining o‘zgarishi hamda haddan tashqari milk ko‘rinishi mavjud tabassumlar esa pastroq estetik baholarga ega bo‘lgan. Olingan natijalar yoshlar orasida tabassum jozibadorligiga ta’sir etuvchi omillarni yoritib beradi.*

Kalit so‘zlar: *tabassum estetikasi; estetik idrok; yoshlar; tabassum jozibadorligi; so‘rovnoma; milkning ko‘rinishi.*

Аннотация*: Данное исследование посвящено изучению восприятия эстетики улыбки среди молодых людей с использованием онлайн-опроса. В исследовании приняли участие 131 респондент, оценивший восемь вариантов улыбки по 5-балльной шкале Лайкерта. Результаты показали, что улыбки с правильным расположением зубов, симметрией и белым цветом зубов были признаны наиболее привлекательными, тогда как улыбки со скученностью зубов, изменением цвета зубов и чрезмерной десневой экспозицией получили более низкие эстетические оценки. Полученные данные*

подчеркивают факторы, влияющие на восприятие привлекательности улыбки среди молодых людей.

Ключевые слова: *эстетика улыбки; эстетическое восприятие; молодые люди; привлекательность улыбки; анкетирование; десневая экспозиция.*

BACKGROUND

In recent years, increasing attention has been directed toward smile aesthetics among young adults, largely influenced by cultural standards, social media exposure, and contemporary beauty trends. Previous studies have demonstrated that factors such as tooth color, gingival display, smile arc, tooth length, and midline deviation significantly influence perceptions of facial attractiveness. However, despite numerous research on smile aesthetics, most studies have primarily focused on Western populations, while limited data are available regarding the Uzbek population. Therefore, the present study aims to further investigate how attractive smiles are perceived among young adults in Uzbekistan.

METHODOLOGY

A cross-sectional questionnaire-based study was carried out to evaluate the perception of aesthetically appealing smile among young adults. A total of 131 individuals participated in the study. Participation was anonymous and voluntary. Questionnaire was designed using Google Forms and distributed through social media platforms. The survey was accessible in three languages: Uzbek, Russian and English. Respondents were asked demographic questions regarding age, gender, nationality, dental background, social media usage, dental history and self-perception of their own smile. Eight grin images with different aesthetic characteristics were highlighted including variations in tooth color, alignment, gingival display, crowding and smile symmetry. Each image was rated using 5-point Likert scale. The collected data were analyzed and organized through descriptive statistics, percentages and mean scores.

RESULT

The survey included 101 female and 30 male participants, the majority of whom were Uzbeks (83%) and non-dental students (84%). Instagram was the most frequently used platform among participants aged predominantly 18-24. Regarding daily social media usage, 3-8 hours were the most selected duration. Although the majority of participants had never undergone orthodontic treatment (84%), a considerable proportion (75%) reported having cosmetic dental procedures. The generally positive self-perception was observed (92%) with relatively few respondents reporting negative self-evaluations (10%). Among the evaluated smile variations, Smile 1 demonstrated the highest acceptance (4.16) making dental alignment, symmetry and whiteness the most influential factors in smile attractiveness. In contrast , Smile 7 and 8 showed the lowest frequency of selection (2.15, 2.16) due to the presence of malocclusion, tooth discoloration and crowding. Smile 4 showed mixed responses among participants. Some respondents rated it as unattractive, while others considered it neutral or attractive. This suggests that slight gingival display does not strongly reduce smile attractiveness and may be acceptable to many individuals.

Image 1

Eight smile images with different variants used in the survey



Image 2

Ranking of the smile images based on participants' aesthetic EVALUATIONS.

Rank	Smile	Mean Score
1	Smile 1	~4.16
2	Smile 2	~3.73
3	Smile 4	~2.43
4	Smile 5	~2.40
5	Smile 3	~2.35
6	Smile 6	~2.31
7	Smile 8	~2.16
8	Smile 7	~2.15

CONCLUSION

Based on the findings of the present study, balanced smiles characterized by white and well-aligned teeth, minimal gingival display, and harmonious relationships between the lips and dentition were generally perceived positively by participants. In contrast, tooth discoloration, diastema, dental crowding, excessive gingival display, and an uneven smile arch were associated with lower aesthetic ratings. These findings suggest that cultural beauty standards and exposure to social media may significantly influence perceptions of smile attractiveness. Furthermore, understanding individuals' self-perception of smile aesthetics may assist clinicians in better interpreting patient expectations and improving orthodontic treatment planning.

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IMPROVING THE TACTICS OF MONITORING PATIENTS WITH PULMONARY TUBERCULOSIS

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Abstract. *Effective pulmonary tuberculosis treatment depends on reliable monitoring of anti-tuberculosis drug intake. This retrospective comparative study analyzed treatment monitoring results for 294 patients treated in 2021-2025; 107 patients received directly observed treatment (DOT), and 179 received video-observed treatment (VOT). Complete cure was achieved in 84.9% of VOT patients versus 75.7% in the DOT group. Drug-resistant tuberculosis decreased from 15.9% to 5.6%, and treatment failure from 6.5% to 2.2%. VOT shortened minimum and maximum treatment duration by 169 and 298 days, respectively, and reduced treatment costs.*

Keywords: *pulmonary tuberculosis; video-observed treatment; directly observed treatment; treatment monitoring; drug-resistant tuberculosis.*

INTRODUCTION

Pulmonary tuberculosis remains a major public health problem. Successful treatment depends not only on the activity of anti-tuberculosis drugs, but also on continuous adherence to the prescribed regimen. Irregular medication intake increases the risk of relapse, treatment failure and the development of drug-resistant tuberculosis.

Directly observed treatment (DOT) improves adherence, but it requires regular visits to healthcare facilities, increases the workload of medical personnel and creates financial and social burdens for patients. Digital technologies make it possible to preserve direct visual control while reducing these limitations. Video-observed treatment (VOT) allows patients to record

medication intake using a mobile device or web platform and enables healthcare personnel to review the recordings remotely.

The **aim of this study** was to improve monitoring of pulmonary tuberculosis treatment by using VOT and to compare its effectiveness with conventional DOT.

MATERIALS AND METHODS

A retrospective comparative study was conducted at the Republican Specialized Scientific and Practical Medical Center of Phthisiology and Pulmonology (Tashkent, Uzbekistan). Treatment monitoring results for 294 patients with pulmonary tuberculosis treated between 2021 and 2025 were analyzed. The comparison included 107 patients receiving DOT and 179 patients receiving VOT.

The DOT group included 54 women (50.5%) and 53 men (49.5%); mean age was 44.5 years. The VOT group included 84 women (46.9%) and 95 men (53.1%); mean age was 39.1 years. Infiltrative pulmonary tuberculosis predominated in both groups (51.4%). Other forms included disseminated, focal, pleural, tuberculoma, fibrocavitary, cavitary and cirrhotic tuberculosis.

Comorbidities were registered in both groups: ischemic heart disease in 24 (22.4%) and 38 (21.2%) patients; arterial hypertension in 16 (14.9%) and 22 (12.3%); chronic obstructive pulmonary disease in 17 (18.9%) and 33 (18.4%); diabetes mellitus in 8 (7.5%) and 15 (8.4%); duodenal ulcer in 6 (5.6%) and 10 (5.6%); chronic pyelonephritis in 7 (6.5%) and 11 (6.1%) patients, respectively.

Diagnosis and treatment monitoring were based on clinical examination, laboratory tests, radiography, computed tomography, ultrasonography and invasive procedures when indicated. VOT inclusion criteria were age ≥18 years, 100% adherence during at least 14 days of DOT, informed consent, access to an Internet-connected device and ability to use the platform independently or with family assistance. Patients receiving injectable anti-tuberculosis drugs,

prisoners, patients with severe psychiatric disorders and those unable to use electronic devices were excluded from VOT.

RESULTS

Treatment outcomes were better in the VOT group. Complete cure was achieved in 81 patients (75.7%) in the DOT group and in 152 patients (84.9%) in the VOT group, indicating an increase of 9.2 percentage points. Drug-resistant tuberculosis developed in 17 patients (15.9%) and 10 patients (5.6%), respectively, corresponding to a reduction of 10.3 percentage points. Treatment failure was recorded in 7 patients (6.5%) in the DOT group and in 4 patients (2.2%) in the VOT group. Mortality was 1.9% and 0.5%, respectively. Other outcomes were recorded in 12 VOT patients (6.7%) due to relocation or loss of contact (Fig. 1).

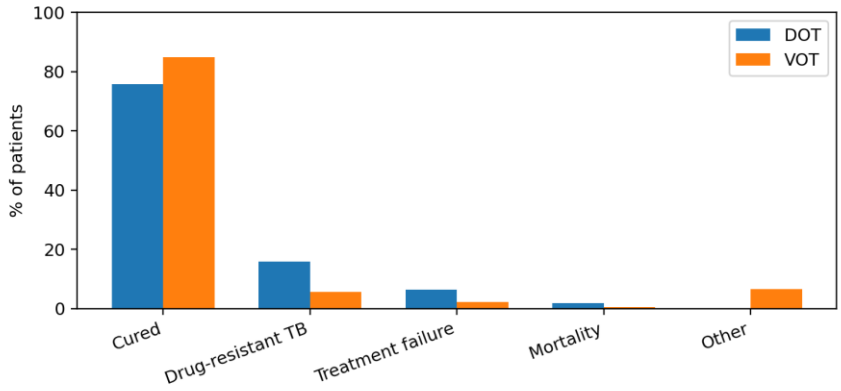

Figure 1. Treatment outcomes in patients receiving DOT and VOT.

A positive attitude toward VOT was reported by 171 patients (95.5%). Patients emphasized the absence of daily clinic visits, convenience of the application and the possibility of monitoring from different regions. VOT shortened the minimum treatment duration from 283 to 114 days and the maximum duration from 1406 to 1108 days (Fig. 2).

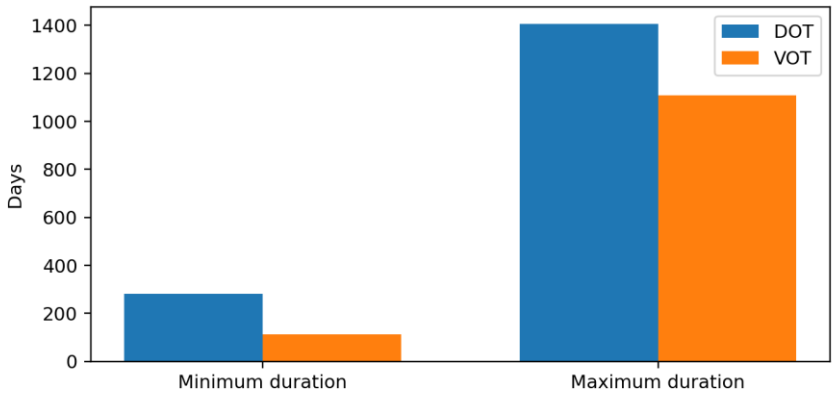

Figure 2. Comparative analysis of treatment duration in the study groups.

DISCUSSION

The results demonstrate that VOT is an effective alternative to conventional DOT. The method combines visual control of medication intake with patient-centered flexibility. It reduces the need for daily visits to healthcare facilities and decreases the burden on both patients and healthcare workers. Video recordings can be reviewed after upload or at the first available opportunity, which makes supervision more flexible without interrupting treatment monitoring.

The clinical advantages of VOT were reflected in a higher cure rate, fewer cases of drug-resistant tuberculosis and fewer unsuccessful outcomes. The programme is also useful when patients temporarily change their place of residence, because monitoring can continue through the digital platform. Economic analysis showed that VOT saved approximately 1,750,000 Uzbek soums from the total cost per treated patient.

CONCLUSION

Video-observed treatment improved monitoring of pulmonary tuberculosis therapy. Compared with conventional DOT, VOT increased complete cure from 75.7% to 84.9%, reduced drug-resistant tuberculosis from 15.9% to 5.6%, decreased treatment failure from 6.5% to 2.2% and reduced mortality from 1.9% to 0.5%. The method shortened treatment duration by 169 and 298 days, was positively evaluated by 95.5% of patients and reduced costs

by approximately 1,750,000 Uzbek soums per treated patient. VOT may therefore be recommended for wider implementation in routine tuberculosis care.

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COMPARATIVE EFFECTIVENESS OF DIRECTLY OBSERVED AND VIDEO-OBSERVED MONITORING OF PULMONARY TUBERCULOSIS TREATMENT

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Abstract. *Treatment outcomes in pulmonary tuberculosis largely depend on adherence to anti-tuberculosis therapy and the quality of medication-intake monitoring. This retrospective comparative study assessed 286 patients treated in 2021–2025: 107 received directly observed treatment (DOT) and 179 received video-observed treatment (VOT). Complete cure was achieved in 75.7% and 84.9%, respectively. Drug-resistant tuberculosis occurred in 15.9% versus 5.6% ($\chi^2=7.15$; $p=0.007$), while treatment failure decreased from 6.5% to 2.2%. VOT also shortened minimum and maximum treatment duration by 169 and 298 days. The findings support wider use of digital monitoring in routine tuberculosis care.*

Keywords: *pulmonary tuberculosis; treatment monitoring; directly observed treatment; video-observed treatment; drug-resistant tuberculosis.*

INTRODUCTION

The effectiveness of pulmonary tuberculosis treatment is determined by the bacterial burden, drug susceptibility of Mycobacterium tuberculosis, the activity and tolerability of anti-tuberculosis medicines, and, critically, the patient's adherence to the prescribed regimen. Irregular medication intake increases the probability of treatment failure, relapse and acquired drug resistance. Although directly observed treatment (DOT) remains an important adherence strategy, it requires repeated visits to healthcare facilities, substantial staff time and additional travel-related costs for patients.

Digital health technologies provide an opportunity to preserve visual confirmation of medication intake while reducing these organizational and social

barriers. Video-observed treatment (VOT) enables patients to record drug intake using a smartphone or web platform, after which the recording is reviewed remotely by responsible healthcare personnel. This approach may improve continuity of monitoring, particularly when a patient temporarily changes residence or lives far from a tuberculosis facility.

The **aim of the study** was to improve the effectiveness of pulmonary tuberculosis treatment monitoring through VOT and to compare its clinical and organizational outcomes with conventional DOT.

MATERIALS AND METHODS

A retrospective comparative study was conducted at the Republican Specialized Scientific and Practical Medical Center of Phthisiology and Pulmonology and its regional branches. Treatment-monitoring data from 286 patients with pulmonary tuberculosis observed during 2021–2025 were analyzed. The control group included 107 patients receiving DOT, whereas the main group included 179 patients receiving VOT.

The DOT group comprised 54 women (50.5%) and 53 men (49.5%), with a mean age of 44.5±4.2 years. The VOT group comprised 84 women (46.9%) and 95 men (53.1%), with a mean age of 39.1±5.4 years. Infiltrative pulmonary tuberculosis predominated in both groups: 55 (51.4%) and 92 (51.4%) cases, respectively. Cavitary and cirrhotic forms were least common: 1 (0.9%) and 1 (0.9%) in the DOT group, and 3 (1.7%) and 2 (1.1%) in the VOT group (Table 1).

Table 1

Baseline characteristics of the study groups

Characteristic	**DOT (n=107)**	**VOT (n=179)**
Women	54 (50.5%)	84 (46.9%)
Men	53 (49.5%)	95 (53.1%)
Mean age, years	44.5±4.2	39.1±5.4
Infiltrative tuberculosis	55 (51.4%)	92 (51.4%)

Ischemic heart disease	24 (22.4%)	38 (21.2%)
Arterial hypertension	16 (14.9%)	22 (12.3%)
Chronic obstructive pulmonary disease	17 (18.9%)	33 (18.4%)
Diabetes mellitus	8 (7.5%)	15 (8.4%)
Duodenal ulcer	6 (5.6%)	10 (5.6%)
Chronic pyelonephritis	7 (6.5%)	11 (6.1%)

VOT eligibility criteria were age ≥18 years, outpatient treatment or discharge after at least 14 days of 100% DOT adherence, informed consent, Internet access and ability to use an electronic device independently or with family support. Patients receiving injectable drugs, prisoners, persons with severe psychiatric disorders or those unable to use electronic devices were excluded. VOT was discontinued after prolonged loss of contact, relocation abroad, severe adverse reactions, clinical decompensation, voluntary transfer to DOT or completion of therapy.

Diagnosis and follow-up were based on clinical examination, laboratory testing, chest radiography, ultrasonography, multislice computed tomography and, when indicated, thoracentesis or diagnostic thoracoscopy. Quantitative variables were expressed as mean±standard deviation and 95% confidence intervals (95% CI). Categorical variables were compared using Pearson's χ^2 test. Differences were considered statistically significant at $p<0.05$.

RESULTS

Complete cure was recorded in 81 patients in the DOT group (75.7%; 95% CI 67.8–83.6) and in 152 patients in the VOT group (84.9%; 95% CI 79.7–90.1). The absolute increase was 9.2 percentage points; however, the difference did not reach statistical significance ($\chi^2=3.18$; $p=0.074$). Drug-resistant tuberculosis developed in 17 DOT patients (15.9%; 95% CI 9.0–22.8) and 10 VOT patients (5.6%; 95% CI 2.3–8.9). This reduction of 10.3 percentage points was statistically significant ($\chi^2=7.15$; $p=0.007$) (Table 2).

Table 2

Treatment outcomes according to monitoring strategy

Outcome	DOT (n=107)	VOT (n=179)	Difference
Cured	81 (75.7%)	152 (84.9%)	+9.2 pp
Drug-resistant tuberculosis	17 (15.9%)	10 (5.6%)	−10.3 pp
Treatment failure	7 (6.5%)	4 (2.2%)	−4.3 pp
Mortality	2 (1.9%)	1 (0.5%)	−1.4 pp
Other outcomes	0	12 (6.7%)	+6.7 pp

Treatment failure occurred in 7 patients (6.5%) receiving DOT and 4 patients (2.2%) receiving VOT. Mortality was 2 cases (1.9%) in the DOT group and 1 case (0.5%) in the VOT group. In the control group, one death was related to deterioration with pulmonary hemorrhage after unsuccessful treatment and one to progression of fibrocavitary tuberculosis. In the VOT group, the death was associated with progression of ischemic heart disease and myocardial infarction during unsuccessful anti-tuberculosis treatment.

Other outcomes were registered in 12 VOT patients (6.7%): 5 (2.8%) moved outside Uzbekistan, 6 (3.3%) moved to another district and were transferred from the study follow-up, and 1 (0.5%) lost contact without prior notification. A positive attitude toward VOT was reported by 171 patients (95.5%). The main advantages mentioned were the absence of daily clinic visits, ease of application use and the possibility of continuing monitoring from different regions.

The minimum treatment duration decreased from 283 days with DOT to 114 days with VOT, and the maximum duration decreased from 1406 to 1108 days. Thus, VOT reduced the minimum and maximum treatment duration by 169 and 298 days, respectively. The analysis reported statistically significant between-group differences ($p<0.05$) (Table 3).

Table 3

Duration of treatment in the study groups

Indicator	DOT	VOT	Reduction with VOT
Minimum duration, days	283	114	169 days
Maximum duration, days	1406	1108	298 days

DISCUSSION

VOT proved to be a practical alternative to DOT by combining visual confirmation of medication intake with greater flexibility. The higher cure proportion, lower treatment-failure rate and significant reduction in drug-resistant tuberculosis indicate that remote monitoring can support adherence and help identify problems earlier. Recordings can be reviewed immediately or later, allowing uninterrupted supervision without daily clinic attendance and reducing travel costs, time away from work and staff workload.

The study was retrospective and non-randomized, and the groups differed in mean age; therefore, selection bias cannot be excluded. Prospective multicenter randomized studies are required to confirm the effectiveness and cost-effectiveness of the adapted VOT programme.

CONCLUSION

Compared with DOT, VOT increased complete cure from 75.7% to 84.9%, reduced drug-resistant tuberculosis from 15.9% to 5.6%, treatment failure from 6.5% to 2.2%, and mortality from 1.9% to 0.5%. Minimum and maximum treatment duration decreased by 169 and 298 days. VOT was positively evaluated by 95.5% of participants. These results support broader implementation of VOT in eligible patients.

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THE SIGNIFICANCE OF THE POLYMERASE CHAIN REACTION METHOD IN THE DIAGNOSIS OF CHRONIC RHINOSINUSITIS WITH NASAL POLYPS

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Abstract. *Chronic rhinosinusitis with nasal polyps (CRSwNP) is a heterogeneous inflammatory disorder associated with epithelial dysfunction, type 2 inflammation, and microbial dysbiosis. Its routine diagnosis is based on symptoms lasting at least 12 weeks and objective confirmation by nasal endoscopy and/or computed tomography. Polymerase chain reaction (PCR) may supplement this assessment by detecting bacterial, fungal, or viral nucleic acids and by measuring inflammatory gene expression in polyp tissue. The method is highly sensitive and useful in culture-negative or atypical cases, but a positive result does not prove causation because colonization, nonviable microorganisms, contamination, and sampling differences may influence the findings. PCR should therefore be interpreted together with clinical, endoscopic, radiological, histological, and microbiological data.*

Keywords: *chronic rhinosinusitis with nasal polyps, polymerase chain reaction, real-time PCR, molecular diagnosis, microbiome, biomarkers.*

INTRODUCTION

CRSwNP is manifested by persistent nasal obstruction, discharge, impaired smell, and bilateral inflammatory polyps. International guidelines require both characteristic symptoms and objective evidence of sinonasal inflammation (Fokkens et al., 2020; Orlandi et al., 2021). However, similar clinical appearances may reflect different inflammatory endotypes and microbial

patterns, which can affect recurrence and treatment response. Molecular methods are therefore increasingly used to clarify disease mechanisms. The aim of this thesis was to evaluate the diagnostic role and limitations of PCR in CRSwNP.

MAIN PART

PCR selectively amplifies predefined nucleic-acid sequences. Conventional PCR confirms the presence of a target, real-time quantitative PCR (qPCR) permits quantification, reverse-transcription PCR evaluates RNA and messenger-RNA expression, and multiplex PCR detects several targets in one reaction. Suitable samples include middle-meatus swabs, nasal secretions, polyp tissue, uncinate-process tissue, and sinus aspirates. Tissue may provide more representative information than superficial swabs, although it is usually obtained during endoscopic surgery (Cho et al., 2021).

The principal clinical application is microbial detection. Culture remains important because it demonstrates viable organisms and permits antimicrobial-susceptibility testing, but it may miss fastidious, biofilm-associated, low-abundance, or previously treated microorganisms. PCR can detect bacterial or fungal genetic material when culture is negative and may identify resistance or virulence genes. Quantitative assays have been used to assess Staphylococcus burden, while targeted qPCR has been applied for fungal identification (Murr et al., 2006; Wagner Mackenzie et al., 2019). Such results may be useful in recurrent purulent exacerbations or atypical infection.

Nevertheless, CRSwNP is not usually a chronic infection caused by one universal pathogen. Molecular studies demonstrate altered microbial communities rather than a single specific organism. Bacteria and fungi detected in affected mucosa may also occur in healthy individuals; their significance depends on abundance, host immunity, biofilm formation, and sampling conditions (Michalik & Krawczyk, 2024). Consequently, microbial DNA alone should not be considered an indication for antibiotic or antifungal treatment.

PCR findings must be correlated with endoscopic purulence, tissue inflammation, clinical exacerbation, and culture results.

A second application is molecular endotyping. qRT-PCR can measure genes related to type 2 inflammation, epithelial-barrier injury, apoptosis, and regulatory microRNAs. These data may help explain eosinophilic inflammation, predict recurrence, and support future selection of targeted therapy. Differences in apoptosis-related mRNA and microRNA expression have been demonstrated in CRSwNP tissue (Morawska-Kochman et al., 2022). At present, however, these assays remain mainly research tools because specimen processing, reference genes, cut-off values, and laboratory platforms are not standardized sufficiently for routine diagnosis.

PCR should be included selectively in a diagnostic algorithm. Initial evaluation consists of symptoms, nasal endoscopy, and computed tomography when indicated. Allergy testing, blood eosinophils, total IgE, asthma status, and histopathology help characterize the inflammatory phenotype. Targeted or multiplex PCR is appropriate when culture is negative, an unusual pathogen is suspected, or repeated treatment has failed; qPCR may quantify a selected organism, and qRT-PCR may be used for research endotyping. Strict control of sampling, transport, nucleic-acid extraction, amplification inhibitors, and contamination is essential. Detection of DNA from dead organisms and the limited target range of specific assays must also be considered.

CONCLUSION

PCR has meaningful supplementary value in CRSwNP by sensitively detecting microbial nucleic acids and assessing inflammatory gene expression. Its greatest benefit is in culture-negative, recurrent, atypical, or scientifically endotyped cases. However, PCR cannot independently confirm the cause of CRSwNP or replace nasal endoscopy, computed tomography, histopathology, and conventional microbiology. The method should be applied according to a clear clinical indication and interpreted within a combined diagnostic approach.

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3D KINEMATIC ANALYSIS OF THE LEFT-HAND STRAIGHT PUNCH TO THE HEAD IN AN ELITE BOXER: A CASE STUDY

Ikboljon Xoldorov

Abstract

Background: Punching technique is a key determinant of performance in competitive boxing, yet the biomechanical mechanisms underlying individual punch types—particularly at the level of the hip and knee—remain incompletely characterized in elite, internationally competitive athletes. Objective: This case study characterized hip, knee, and ankle kinematics during the left-hand straight punch to the head in a single elite Uzbekistani boxer. Methods: Three-dimensional kinematic data were collected using a 12-camera, 240 Hz infrared motion capture system (STT Systems 3DMA), with 19 retroreflective markers applied according to a standardized full-body biomechanical model, across eight technically successful trials of the left-hand straight punch. Results: The punching-side hip and knee showed considerably greater range of motion in abduction/adduction (28.5° ± 4.9°) and flexion/extension (52.7° ± 11.0°), respectively, than typically reported for straight punches, while the non-punching-side knee showed the highest peak angular velocity of any joint examined (145.0°·s^{-1} ± 31.6°·s^{-1}). Pelvis rotation data could not be reported due to a suspected marker-tracking artifact affecting all trials in this condition. Conclusion: These findings provide a preliminary, individualized kinematic profile of the left-hand straight punch in an elite boxer, characterized by pronounced hip and knee involvement. Verification of pelvis kinematics and comparison with the right-hand punch and other punch types are addressed in companion work.

Keywords: *boxing; biomechanics; 3D motion capture; kinematics; hip; knee; case study*

Аннотация

Актуальность: Техника нанесения ударов является ключевым фактором, определяющим результативность в соревновательном боксе, однако биомеханические механизмы, лежащие в основе отдельных типов ударов — в частности, на уровне тазобедренного и коленного суставов, — остаются недостаточно изученными у элитных спортсменов международного уровня. Цель: В данном исследовании охарактеризована кинематика тазобедренного, коленного и голеностопного суставов

при выполнении прямого удара в голову левой рукой у элитного узбекистанского боксёра. Методы: Трёхмерные кинематические данные были получены с помощью системы захвата движения STT Systems 3DMA (12 инфракрасных камер, 240 Гц), с 19 маркерами, по стандартизированной полнотельной биомеханической модели, в восьми технически успешных попытках удара левой рукой. Результаты: Бьющая сторона в тазобедренном и коленном суставах показала значительно большую амплитуду отведения/приведения бедра (28.5° ± 4.9°) и сгибания/разгибания колена (52.7° ± 11.0°) соответственно, чем это обычно характерно для прямых ударов, тогда как небьющий коленный сустав показал наивысшую пиковую угловую скорость среди всех исследованных суставов (145.0°·с⁻¹ ± 31.6°·с⁻¹). Данные о ротации таза не могли быть представлены из-за предполагаемого артефакта отслеживания маркеров, затронувшего все попытки в этом условии. Заключение: Полученные данные представляют предварительный, индивидуализированный кинематический профиль прямого удара левой рукой у элитного боксёра, характеризующийся выраженным вовлечением тазобедренного и коленного суставов. Верификация кинематики таза и сравнение с ударом правой рукой и другими типами ударов рассматриваются в сопутствующей работе.

Ключевые слова: *бокс; биомеханика; 3D-захват движения; кинематика; тазобедренный сустав; коленный сустав; клинический случай*

Annotatsiya

Kirish: Zarba texnikasi professional boksda natijadorlikni belgilovchi asosiy omillardan biri hisoblanadi, biroq alohida zarba turlari — xususan, tos va tizza bo'g'imlari darajasidagi — biomexanik mexanizmlar elita, xalqaro darajadagi sportchilarda hali yetarlicha o'rganilmagan. Maqsad: Ushbu case study elita o'zbekistonlik bokschida chap qo'lda boshga qaratilgan to'g'ridan zarba davomida tos, tizza va to'piq kinematikasini tavsiflashga qaratilgan. Metodlar: Uch o'lchamli kinematik ma'lumotlar STT Systems 3DMA tizimi (12 ta infraqizil kamera, 240 Gts), 19 ta marker va standartlashtirilgan to'liq tanaviy biomexanik model asosida, chap qo'l bilan zarba berishning sakkizta texnik jihatdan muvaffaqiyatli urinishi davomida yig'ildi. Natijalar: Zarba beruvchi tomonning tos abduktsiya/adduktsiya harakat diapazoni (28.5° ± 4.9°) va tizza fleksiya/ekstenziya harakat diapazoni (52.7° ± 11.0°) to'g'ridan zarbalar uchun odatda kuzatilganidan sezilarli yuqori bo'lgan, zarba bermaydigan tizza bo'g'imi esa tekshirilgan barcha bo'g'imlar orasida eng yuqori cho'qqi burchak tezligini ko'rsatgan (145.0°/s ± 31.6°/s). Tos aylanishi ma'lumotlari

ushbu sharoitdagi barcha urinishlarga ta'sir qilgan, ehtimoliy marker kuzatuv artefakti sababli taqdim etilmadi. Xulosa: Ushbu natijalar elita bokschida chap qo'lda to'g'ridan zarbaning dastlabki, individual kinematik profilini taqdim etadi, tos va tizza bo'g'imlarining sezilarli ishtirokini ta'kidlaydi. Tos kinematikasini tasdiqlash va o'ng qo'l zarbasi hamda boshqa zarba turlari bilan solishtirish tegishli qo'shimcha ishda ko'rib chiqiladi.

Kalit so'zlar: *boks; biomexanika; 3D harakat tahlili; kinematika; tos bo'g'imi; tizza bo'g'imi; amaliy tadqiqot (case study)*

1. INTRODUCTION

Punching technique is a fundamental determinant of performance in competitive boxing, directly influencing scoring efficiency, knockout capability, and overall competitive success. Among the range of techniques employed in the sport, the straight punch (jab/cross) is among the most frequently used, characterized by a direct, linear trajectory toward the opponent's head or body. While straight punches are most commonly analyzed as thrown by the dominant hand, non-dominant-hand (lead-hand) straight punches are used extensively in competitive boxing for range-finding, scoring, and setting up subsequent combinations, yet their underlying lower-body biomechanics remain comparatively understudied at the level of the individual elite athlete.

Punching performance in boxing is widely recognized as a product of coordinated, sequential force transfer through the kinetic chain, originating in the lower limbs and culminating in the fist (Stewart et al., 2025; Tong-Iam et al., 2017). Straight punches have been found to rely heavily on linear force transfer and effective mass utilization (Kacprzak et al., 2025), with trunk and hip rotation shown to peak during the terminal phase of the punching motion (Tong-Iam et al., 2017). However, whether this coordination pattern is symmetric between the dominant and non-dominant striking hand within the same athlete remains insufficiently documented (Liu et al., 2023).

This case study addresses this gap by characterizing hip, knee, and ankle kinematics during the left-hand straight punch to the head in a single elite, internationally competitive Uzbekistani boxer. Using a three-dimensional

motion capture system, this study aimed to quantify peak angular velocity and range of motion at each joint, for both the punching-side and non-punching-side limbs, in order to characterize the individualized lower-body activation strategy underlying this punch in an elite performer.

2. METHODS

2.1. Participant

A single elite male boxer (Ikboljon Xoldorov; born 8 March 1997; age 29 years at the time of manuscript preparation; from Andijan, Uzbekistan) participated in this case study. The participant is an internationally competitive amateur boxer in the light welterweight division, with a competitive record including a silver medal at the 2017 World Amateur Boxing Championships (Hamburg), a gold medal at the 2018 Asian Games (Jakarta), and a gold medal at the 2017 Asian Boxing Championships (Tashkent).

2.2. Instrumentation

Three-dimensional kinematic data were collected using the STT Systems 3DMA Motion Capture System (STT Systems, San Sebastián, Spain), consisting of 12 synchronized infrared cameras operating at a sampling frequency of 240 Hz. Before testing, the system was calibrated according to the manufacturer's recommendations. A total of 19 retroreflective markers (14 mm diameter) were attached to standardized anatomical landmarks according to the STT Systems full-body biomechanical model, including the left and right greater trochanters and left and right lateral femoral epicondyles — the primary landmarks used to derive hip and knee joint centers and rotational kinematics — alongside markers on the forehead, vertex, occipital region, acromion processes, humeral epicondyles, radial styloid processes, lateral malleoli, fifth metatarsal heads, C7, and the sacrum.

2.3. Procedure

The participant performed a standardized warm-up ([_] minutes) followed by maximal-effort repetitions of the left-hand straight punch to the head, directed

at a stationary/suspended target. Eight technically successful trials were retained for kinematic analysis. Punches were thrown from the [orthodox/southpaw] stance, [with/without] gloves, at self-selected timing intervals to avoid fatigue-related decrements in performance.

2.4. Data Processing

Kinematic data were processed using the STT Systems biomechanical model to compute three-dimensional hip, knee, ankle, and pelvis kinematics for both the punching-side and non-punching-side limbs. The primary outcome variables were: (1) range of motion (ROM, °), calculated as the absolute difference between the maximum and minimum joint angle within each trial, and (2) peak angular velocity ($°\cdot s^{-1}$), extracted automatically from the segmental angular velocity curves generated by the STT Systems biomechanical model. The punch cycle was defined from [movement onset] to [target contact / peak fist velocity]. During data processing, pelvis rotation values across all eight trials were found to exceed physiologically plausible ranges (see Section 3 and Section 4); these values are attributed to a probable marker-tracking or calibration artifact and are therefore not reported.

2.5. Statistical Analysis

Descriptive statistics (mean ± SD) were calculated for each kinematic variable and limb side. To characterize the precision of each mean estimate, 95% confidence intervals (CI) were computed as mean ± t(0.025, df) × (SD / √n), with t = 2.365 (n = 8, df = 7). As this is a single-subject, repeated-trials case study, observations are not statistically independent; findings are therefore reported descriptively, and no inferential statistical tests were performed.

3. RESULTS

Descriptive hip, knee, and ankle kinematics for the left-hand straight punch to the head (n = 8 trials) are presented in Table 1. Pelvis rotation data are not reported (see Section 3.1 and Table 1, footnote a).

At the hip joint, flexion/extension range of motion was modest on both sides (punching-side: 13.9° ± 2.7°; non-punching-side: 10.7° ± 3.7°), while peak angular velocity was higher on the non-punching side (105.6°·s^{-1} ± 41.3°·s^{-1}) than the punching side (56.9°·s^{-1} ± 11.4°·s^{-1}). Hip abduction/adduction range of motion was considerably larger than that typically observed for straight punches, and comparable between the punching side (28.5° ± 4.9°) and non-punching side (27.4° ± 2.9°), with similar peak angular velocities on both sides (~50°·s^{-1}).

At the knee joint, range of motion was more than twice as large on the punching side (52.7° ± 11.0°) as on the non-punching side (20.5° ± 16.8°), while peak angular velocity was highest on the non-punching side (145.0°·s^{-1} ± 31.6°·s^{-1}) of any joint examined in this condition, exceeding the punching-side knee (119.5°·s^{-1} ± 14.6°·s^{-1}).

At the ankle joint, range of motion was greater on the punching side (21.3° ± 9.9°) than the non-punching side (9.3° ± 0.9°), while peak angular velocity was higher on the non-punching side (62.9°·s^{-1} ± 12.8°·s^{-1}) than the punching side (26.8°·s^{-1} ± 30.3°·s^{-1}), the latter showing considerable within-subject variability.

Table 1. *Descriptive summary of hip, knee, ankle, and pelvis kinematics during the left-hand straight punch to the head in a single elite boxer (n = 8 trials).*

Joint / Segment	Range of motion (°)			Peak angular velocity (°·s^{-1})		
	M	***SD***	**95% CI**	***M***	***SD***	**95% CI**
Pelvis	n/r[a]	—	—	n/r[a]	—	—
Hip flex/ext (punching-side)	13.9	2.7	[11.7, 16.2]	56.9	11.4	[47.4, 66.4]
Hip flex/ext (non-punching-side)	10.7	3.7	[7.6, 13.8]	105.6	41.3	[71.0, 140.1]

Joint / Segment	Range of motion (°)			Peak angular velocity (°·s⁻¹)		
	M	*SD*	95% CI	*M*	*SD*	95% CI
Hip abd/add (punching-side)	28.5	4.9	[24.5, 32.6]	50.9	6.2	[45.8, 56.1]
Hip abd/add (non-punching-side)	27.4	2.9	[24.9, 29.8]	50.6	18.3	[35.3, 65.9]
Knee flex/ext (punching-side)	52.7	11.0	[43.5, 61.9]	119.5	14.6	[107.2, 131.7]
Knee flex/ext (non-punching-side)	20.5	16.8	[6.5, 34.5]	145.0	31.6	[118.5, 171.4]
Ankle flex/ext (punching-side)	21.3	9.9	[13.0, 29.5]	26.8	30.3	[1.5, 52.1]
Ankle flex/ext (non-punching-side)	9.3	0.9	[8.5, 10.0]	62.9	12.8	[52.3, 73.6]

Note. *M* = mean; *SD* = standard deviation; 95% *CI* = 95% confidence interval of the mean, computed as $M \pm t(0.025, df) \times (SD / \sqrt{n})$, $t = 2.365$ ($n = 8$, $df = 7$). ROM = range of motion. Punching-side = limb ipsilateral to the striking hand; non-punching-side = contralateral limb. abd/add = abduction/adduction; flex/ext = flexion/extension; n/r = not reported.

[a] *Pelvis rotation values for all left-hand punch trials (ROM up to 137°; peak angular velocity up to 472°·s⁻¹) exceeded physiologically plausible limits for pelvic rotation, indicating a probable marker-tracking or calibration artifact during this recording session. These values are not reported. The source motion-capture data for this condition will be re-examined and, if corrected, reported in a future revision of this manuscript.*

4. DISCUSSION

This case study provides a detailed, individualized characterization of hip, knee, and ankle kinematics during the left-hand straight punch to the head in a single elite, internationally competitive boxer. The pronounced hip abduction/adduction range of motion observed on both sides, together with the large punching-side knee range of motion, suggest a coordination pattern for this punch that differs meaningfully from typical descriptions of straight-punch mechanics as primarily linear and sagittal-plane dominant (Kacprzak et al., 2025), potentially reflecting the athlete's individual technique when punching with the non-dominant hand.

The high peak angular velocity observed at the non-punching-side knee is consistent with a substantial contribution of the contralateral limb to force generation, broadly in line with descriptions of lower-limb kinetic chain involvement in punching (Stewart et al., 2025), though the magnitude observed here — the highest of any joint examined in this condition — warrants cautious interpretation given the single-subject design and should be corroborated in future trials.

A significant limitation of this study is the exclusion of pelvis rotation data, which could not be reported due to a suspected marker-tracking or calibration artifact affecting all eight trials in this condition. Because pelvis rotation is a key link between lower-limb force generation and upper-body striking velocity in the proposed kinetic chain model of punching (Tong-Iam et al., 2017), its absence limits the completeness of the present kinematic characterization; this will be addressed once the source motion-capture data have been re-examined and, if possible, corrected.

As a single-subject case study using repeated, non-independent trials, these findings are not intended to support statistical inference or generalization to the broader boxing population; rather, they offer ecologically valid, technique-specific insight characteristic of an elite performer (Liu et al., 2023). This manuscript focuses exclusively on the left-hand straight punch; comparison with

the right-hand straight punch, as well as the hook and uppercut, is reported in companion manuscripts as part of a broader characterization of this athlete's punching technique.

5. CONCLUSION

This case study characterizes hip, knee, and ankle kinematics during the left-hand straight punch to the head in a single elite boxer, identifying pronounced hip and knee involvement distinct from typical straight-punch mechanics. Pelvis kinematics could not be reported due to a data quality concern affecting all trials in this condition and should be addressed prior to final submission. These preliminary findings contribute an individualized biomechanical profile with potential relevance to technical coaching in elite boxing.

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3D KINEMATIC ANALYSIS OF THE RIGHT-HAND STRAIGHT PUNCH TO THE HEAD IN AN ELITE BOXER: A CASE STUDY

Ikboljon Xoldorov

Abstract

Background: Punching technique is a key determinant of performance in competitive boxing, yet the biomechanical mechanisms underlying individual punch types—particularly at the level of the hip and knee—remain incompletely characterized in elite, internationally competitive athletes. Objective: This case study characterized hip, knee, ankle, and pelvis kinematics during the right-hand straight punch to the head in a single elite Uzbekistani boxer. Methods: Three-dimensional kinematic data were collected using a 12-camera, 240 Hz infrared motion capture system (STT Systems 3DMA), with 19 retroreflective markers applied according to a standardized full-body biomechanical model, across ten technically successful trials of the right-hand straight punch. Results: The non-punching-side (lead) hip showed markedly higher flexion/extension range of motion (23.9° ± 1.9°) and peak angular velocity (198.0°·s⁻¹ ± 73.4°·s⁻¹) than the punching-side (rear) hip (17.6° ± 11.0°; 74.1°·s⁻¹ ± 12.0°·s⁻¹), indicating a substantial contribution of the lead limb to force transfer. Knee and ankle kinematics showed comparable punching-side and non-punching-side peak angular velocities, with greater ankle range of motion on the non-punching side. Pelvis rotation averaged 53.5° ± 20.9° (ROM) and 119.7°·s⁻¹ ± 25.4°·s⁻¹ (peak angular velocity). Conclusion: These findings provide a detailed, individualized kinematic profile of the right-hand straight punch in an elite boxer, highlighting a prominent role of the non-punching-side hip in force generation. Comparison with the left-hand punch and other punch types is reported in companion manuscripts.

Keywords: *boxing; biomechanics; 3D motion capture; kinematics; hip; knee; case study*

Аннотация

Актуальность: Техника нанесения ударов является ключевым фактором, определяющим результативность в соревновательном боксе, однако биомеханические механизмы, лежащие в основе отдельных типов ударов — в частности, на уровне тазобедренного и коленного суставов, — остаются недостаточно изученными у

элитных спортсменов международного уровня. Цель: В данном исследовании (case study) охарактеризована кинематика тазобедренного, коленного, голеностопного суставов и таза при выполнении прямого удара в голову правой рукой у элитного узбекистанского боксёра. Методы: Трёхмерные кинематические данные были получены с помощью системы захвата движения STT Systems 3DMA (12 инфракрасных камер, 240 Гц), с 19 маркерами, по стандартизированной полнотельной биомеханической модели, в десяти технически успешных попытках удара правой рукой. Результаты: Небьющая (передняя) нога в тазобедренном суставе показала заметно большую амплитуду сгибания/разгибания (23.9° ± 1.9°) и пиковую угловую скорость (198.0°·с⁻¹ ± 73.4°·с⁻¹) по сравнению с бьющей (задней) ногой (17.6° ± 11.0°; 74.1°·с⁻¹ ± 12.0°·с⁻¹), что указывает на существенный вклад передней ноги в передачу силы. Кинематика коленного и голеностопного суставов показала сопоставимые пиковые угловые скорости бьющей и небьющей сторон, с большей амплитудой движения голеностопного сустава на небьющей стороне. Ротация таза составила в среднем 53.5° ± 20.9° (амплитуда) и 119.7°·с⁻¹ ± 25.4°·с⁻¹ (пиковая угловая скорость). Заключение: Полученные данные представляют детальный, индивидуализированный кинематический профиль прямого удара правой рукой у элитного боксёра, подчёркивая значимую роль небьющего тазобедренного сустава в генерации силы. Сравнение с ударом левой рукой и другими типами ударов представлено в сопутствующих рукописях.

Ключевые слова: *бокс; биомеханика; 3D-захват движения; кинематика; тазобедренный сустав; коленный сустав; клинический случай*

Annotatsiya

Kirish: Zarba texnikasi professional boksda natijadorlikni belgilovchi asosiy omillardan biri hisoblanadi, biroq alohida zarba turlari — xususan, tos va tizza bo'g'imlari darajasidagi — biomexanik mexanizmlar elita, xalqaro darajadagi sportchilarda hali yetarlicha o'rganilmagan. Maqsad: Ushbu case study elita o'zbekistonlik bokschida o'ng qo'lda boshga qaratilgan to'g'ridan zarba davomida tos, tizza, to'piq va tos suyagi (pelvis) kinematikasini tavsiflashga qaratilgan. Metodlar: Uch o'lchamli kinematik ma'lumotlar STT Systems 3DMA tizimi (12 ta infraqizil kamera, 240 Gts), 19 ta marker va standartlashtirilgan to'liq tanaviy biomexanik model asosida, o'ng qo'l bilan zarba berishning o'nta texnik jihatdan muvaffaqiyatli urinishi davomida yig'ildi. Natijalar: Zarba bermaydigan (oldingi) oyoqning tos bo'g'imi fleksiya/ekstenziya harakat diapazoni (23.9° ± 1.9°) va cho'qqi burchak tezligi

(198.0°/s ± 73.4°/s) zarba beruvchi (orqa) oyoqqa nisbatan (17.6° ± 11.0°; 74.1°/s ± 12.0°/s) sezilarli yuqori bo'lgan, bu oldingi tos bo'g'imining kuch uzatishdagi muhim hissasini ko'rsatadi. Tizza va to'piq bo'g'imlari kinematikasi ikkala tomonda ham taqqoslanadigan cho'qqi burchak tezliklarini ko'rsatgan, to'piqning harakat diapazoni esa zarba bermaydigan tomonda kattaroq bo'lgan. Tos aylanishi o'rtacha 53.5° ± 20.9° (ROM) va 119.7°/s ± 25.4°/s (cho'qqi burchak tezligi) ni tashkil etgan. Xulosa: Ushbu natijalar elita bokschida o'ng qo'lda to'g'ridan zarbaning batafsil, individual kinematik profilini taqdim etadi, zarba bermaydigan tos bo'g'imining kuch generatsiyasidagi muhim rolini ta'kidlaydi. Chap qo'l zarbasi va boshqa zarba turlari bilan solishtirish tegishli qo'shimcha qo'lyozmalarda taqdim etiladi.

Kalit so'zlar: *boks; biomexanika; 3D harakat tahlili; kinematika; tos bo'g'imi; tizza bo'g'imi; amaliy tadqiqot (case study)*

1. INTRODUCTION

Punching technique is a fundamental determinant of performance in competitive boxing, directly influencing scoring efficiency, knockout capability, and overall competitive success. Among the range of techniques employed in the sport, the straight punch (jab/cross) is among the most frequently used, characterized by a direct, linear trajectory toward the opponent's head or body. Despite its tactical importance, the biomechanical mechanisms underlying this punch type—particularly at the level of the lower limb—remain incompletely understood in athletes competing at an elite, international level.

Punching performance in boxing is widely recognized as a product of coordinated, sequential force transfer through the kinetic chain, originating in the lower limbs and culminating in the fist (Stewart et al., 2025; Tong-Iam et al., 2017). Straight punches such as the jab and cross have been found to rely heavily on linear force transfer and effective mass utilization (Kacprzak et al., 2025), with trunk and hip rotation shown to peak during the terminal phase of the punching motion, connecting lower-body force generation to upper-limb striking velocity (Tong-Iam et al., 2017).

Within this kinetic chain, the hip and knee joints of both the punching-side and non-punching-side limbs play distinct roles in initiating and transferring

force. Rear-leg drive has been identified as a critical contributor to punch output (Stewart et al., 2025), yet detailed, joint-level characterization of this contribution in a single elite athlete—rather than as a group-level average—remains scarce in the literature (Liu et al., 2023).

This case study addresses this gap by characterizing hip, knee, ankle, and pelvis kinematics during the right-hand straight punch to the head in a single elite, internationally competitive Uzbekistani boxer. Using a three-dimensional motion capture system, this study aimed to quantify peak angular velocity and range of motion at each joint, for both the punching-side and non-punching-side limbs, in order to characterize the individualized lower-body activation strategy underlying this punch in an elite performer.

2. METHODS

2.1. Participant

A single elite male boxer (Ikboljon Xoldorov; born 8 March 1997; age 29 years at the time of manuscript preparation; from Andijan, Uzbekistan) participated in this case study. The participant is an internationally competitive amateur boxer in the light welterweight division, with a competitive record including a silver medal at the 2017 World Amateur Boxing Championships (Hamburg), a gold medal at the 2018 Asian Games (Jakarta), and a gold medal at the 2017 Asian Boxing Championships (Tashkent).

2.2. Instrumentation

Three-dimensional kinematic data were collected using the STT Systems 3DMA Motion Capture System (STT Systems, San Sebastián, Spain), consisting of 12 synchronized infrared cameras operating at a sampling frequency of 240 Hz. Before testing, the system was calibrated according to the manufacturer's recommendations. A total of 19 retroreflective markers (14 mm diameter) were attached to standardized anatomical landmarks according to the STT Systems full-body biomechanical model, including the left and right greater trochanters and left and right lateral femoral epicondyles — the primary landmarks used to

derive hip and knee joint centers and rotational kinematics — alongside markers on the forehead, vertex, occipital region, acromion processes, humeral epicondyles, radial styloid processes, lateral malleoli, fifth metatarsal heads, C7, and the sacrum.

2.3. Procedure

The participant performed a standardized warm-up ([_] minutes) followed by maximal-effort repetitions of the right-hand straight punch to the head, directed at a stationary/suspended target. Ten technically successful trials were retained for kinematic analysis. Punches were thrown from the [orthodox/southpaw] stance, [with/without] gloves, at self-selected timing intervals to avoid fatigue-related decrements in performance.

2.4. Data Processing

Kinematic data were processed using the STT Systems biomechanical model to compute three-dimensional hip, knee, ankle, and pelvis kinematics for both the punching-side and non-punching-side limbs. The primary outcome variables were: (1) range of motion (ROM, °), calculated as the absolute difference between the maximum and minimum joint angle within each trial, and (2) peak angular velocity ($°\cdot s^{-1}$), extracted automatically from the segmental angular velocity curves generated by the STT Systems biomechanical model. The punch cycle was defined from [movement onset] to [target contact / peak fist velocity].

2.5. Statistical Analysis

Descriptive statistics (mean ± SD) were calculated for each kinematic variable and limb side. To characterize the precision of each mean estimate, 95% confidence intervals (CI) were computed as mean ± t(0.025, df) × (SD / √n), with t = 2.262 (n = 10, df = 9). As this is a single-subject, repeated-trials case study, observations are not statistically independent; findings are therefore reported descriptively, and no inferential statistical tests were performed.

3. RESULTS

Descriptive hip, knee, ankle, and pelvis kinematics for the right-hand straight punch to the head (n = 10 trials) are presented in Table 1.

At the hip joint, the non-punching-side (lead) limb showed both greater flexion/extension range of motion (23.9° ± 1.9°) and substantially higher peak angular velocity (198.0°·s^{-1} ± 73.4°·s^{-1}) than the punching-side (rear) limb (17.6° ± 11.0°; 74.1°·s^{-1} ± 12.0°·s^{-1}), indicating a prominent contribution of the lead hip to force transfer during this punch. Hip abduction/adduction range of motion and peak angular velocity were modest on both sides (punching-side: 7.6° ± 1.4°, 41.8°·s^{-1} ± 13.8°·s^{-1}; non-punching-side: 5.3° ± 1.1°, 34.8°·s^{-1} ± 14.7°·s^{-1}).

At the knee joint, flexion/extension range of motion was greater on the punching side (26.7° ± 8.9°) than the non-punching side (18.2° ± 4.5°), while peak angular velocity was substantially higher on the punching side (125.2°·s^{-1} ± 26.9°·s^{-1}) than the non-punching side (50.6°·s^{-1} ± 16.8°·s^{-1}).

At the ankle joint, range of motion was greater on the non-punching side (27.3° ± 10.6°) than the punching side (15.9° ± 3.2°), whereas peak angular velocity was comparable between sides (36.9°·s^{-1} ± 38.6°·s^{-1} vs. 50.2°·s^{-1} ± 21.3°·s^{-1}), with considerable within-subject variability on the non-punching side.

Pelvis rotation averaged 53.5° ± 20.9° in range of motion and 119.7°·s^{-1} ± 25.4°·s^{-1} in peak angular velocity across the ten trials.

Table 1. *Descriptive summary of hip, knee, ankle, and pelvis kinematics during the right-hand straight punch to the head in a single elite boxer (n = 10 trials).*

Joint / Segment	Range of motion (°)			Peak angular velocity (°·s^{-1})		
	M	*SD*	95% CI	*M*	*SD*	95% CI
Pelvis	53.5	20.9	[38.5, 68.4]	119.7	25.4	[101.5, 137.9]

Joint / Segment	Range of motion (°)			Peak angular velocity (°·s⁻¹)		
	M	*SD*	95% CI	*M*	*SD*	95% CI
Hip flex/ext (punching-side)	17.6	11.0	[9.7, 25.4]	74.1	12.0	[65.5, 82.7]
Hip flex/ext (non-punching-side)	23.9	1.9	[22.5, 25.3]	198.0	73.4	[145.5, 250.5]
Hip abd/add (punching-side)	7.6	1.4	[6.5, 8.6]	41.8	13.8	[31.9, 51.7]
Hip abd/add (non-punching-side)	5.3	1.1	[4.5, 6.2]	34.8	14.7	[24.4, 45.3]
Knee flex/ext (punching-side)	26.7	8.9	[20.3, 33.1]	125.2	26.9	[106.0, 144.4]
Knee flex/ext (non-punching-side)	18.2	4.5	[15.0, 21.5]	50.6	16.8	[38.6, 62.6]
Ankle flex/ext (punching-side)	15.9	3.2	[13.6, 18.1]	50.2	21.3	[35.0, 65.4]
Ankle flex/ext (non-punching-side)	27.3	10.6	[19.7, 34.9]	36.9	38.6	[9.3, 64.6]

Note. *M* = mean; *SD* = standard deviation; 95% *CI* = 95% confidence interval of the mean, computed as $M \pm t(0.025, df) \times (SD / \sqrt{n})$, $t = 2.262$ ($n = 10$, $df = 9$). ROM = range of motion. Punching-side = limb ipsilateral to the striking hand; non-punching-side = contralateral (lead) limb. abd/add = abduction/adduction; flex/ext = flexion/extension.

4. DISCUSSION

This case study provides a detailed, individualized characterization of hip, knee, ankle, and pelvis kinematics during the right-hand straight punch to the head in a single elite, internationally competitive boxer. The markedly higher peak angular velocity observed at the non-punching-side (lead) hip relative to

the punching-side hip supports the proposed role of the contralateral, lead limb in generating and transferring rotational force through the kinetic chain toward the striking arm (Tong-Iam et al., 2017; Stewart et al., 2025), consistent with the linear, force-transfer-dominant mechanics previously described for straight punches (Kacprzak et al., 2025).

The comparatively larger punching-side knee range of motion and peak angular velocity, together with greater non-punching-side ankle range of motion, together suggest a coordinated push-off and weight-transfer strategy in which the rear leg drives forward propulsion while the lead leg contributes to postural stabilization and directional control — a pattern broadly consistent with descriptions of lower-limb kinetic chain sequencing in boxing (Stewart et al., 2025).

As a single-subject case study using repeated, non-independent trials, these findings are not intended to support statistical inference or generalization to the broader boxing population; rather, they offer ecologically valid, technique-specific insight characteristic of an elite performer (Liu et al., 2023). This manuscript focuses exclusively on the right-hand straight punch; comparison with the left-hand straight punch, as well as the hook and uppercut, is reported in companion manuscripts as part of a broader characterization of this athlete's punching technique.

5. CONCLUSION

This case study characterizes hip, knee, ankle, and pelvis kinematics during the right-hand straight punch to the head in a single elite boxer, identifying a prominent contribution of the non-punching-side (lead) hip to force generation. These findings contribute an individualized biomechanical profile with potential relevance to technical coaching in elite boxing.

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THE SIGNIFICANCE OF IL4 rs2243250 AND FCER1A rs2251746 GENE POLYMORPHISMS IN THE DIAGNOSIS OF ALLERGIC RHINITIS

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Abstract. *Allergic rhinitis is a multifactorial IgE-mediated disorder in which genetic susceptibility interacts with environmental exposure. IL4 rs2243250 and FCER1A rs2251746 are biologically relevant because they participate in Th2 cytokine signaling and high-affinity IgE-receptor function. Published studies indicate that the IL4 rs2243250 T allele and TT genotype may increase susceptibility to allergic rhinitis, although pooled results vary across populations. FCER1A rs2251746 is associated more consistently with total serum IgE regulation than with allergic rhinitis itself. Therefore, both variants should be regarded as supplementary molecular risk markers rather than independent diagnostic tests. Their clinical value is greatest when genotyping is integrated with symptoms, nasal examination, allergen-specific IgE or skin-prick testing, total IgE, and family history.*

Keywords: *allergic rhinitis, IL4, rs2243250, FCER1A, rs2251746, gene polymorphism, immunoglobulin E.*

INTRODUCTION

Allergic rhinitis (AR) is a chronic inflammatory disease of the nasal mucosa manifested by sneezing, rhinorrhea, nasal obstruction, and itching after exposure to relevant allergens. Its pathogenesis is characterized by a type 2 immune response, allergen-specific IgE production, and activation of mast cells and basophils. Genetic studies support an inherited contribution to atopy and AR, but no single variant explains the entire phenotype (Laulajainen-Hongisto et al., 2020). IL4 rs2243250, located in the promoter region of the interleukin-4 gene, and FCER1A rs2251746, located in a regulatory region of the gene encoding the alpha chain of the high-affinity IgE receptor, are among the most relevant candidate variants [1, 4, 6]. The aim of this thesis was to evaluate their diagnostic significance and limitations in AR.

MAIN PART

IL-4 promotes differentiation of naive T lymphocytes toward the Th2 phenotype and stimulates B-cell class switching to IgE. The rs2243250 polymorphism, also described as C-590T or C-589T, may modify IL4 promoter activity and influence allergic sensitization. A Jordanian case-control study found the TT genotype to be significantly associated with AR (Moh'd Al-Rawashdeh et al., 2020). A meta-analysis of nine studies involving 1,709 patients likewise concluded that the T allele and TT genotype increased AR susceptibility (Jiang & Yan, 2021). These data support the use of rs2243250 as a marker of inherited predisposition, especially after population-specific validation [2].

The evidence is not fully consistent. A later systematic review using different inclusion criteria found no significant association between IL4 rs2243250 and AR (Xiang et al., 2022). Differences in ethnicity, allele frequency, allergen spectrum, age, phenotype definition, sample size, and

control selection may explain the contradictory findings [3, 5]. Accordingly, carriage of the T allele cannot confirm AR, and its absence cannot exclude the disease. The variant should therefore refine, not replace, a clinical probability assessment.

FCER1A encodes the alpha subunit of the high-affinity IgE receptor and is central to allergen-dependent activation of mast cells and basophils. A large genome-wide association study identified FCER1A as a susceptibility locus regulating total serum IgE and demonstrated a strong association of rs2251746 with IgE concentration (Weidinger et al., 2008). However, direct prediction of AR remains uncertain. In a Han Chinese study of 378 patients and 288 controls, common FCER1A variants were not associated with AR susceptibility or total IgE, including analyses stratified by allergen sensitivity (Zhang et al., 2010). Thus, rs2251746 may characterize an IgE-prone immunological background more accurately than the presence of nasal allergic inflammation.

In clinical practice, these polymorphisms should be interpreted within a combined diagnostic algorithm. AR is first suspected from typical symptoms and their relationship with allergen exposure. Sensitization is then confirmed by skin-prick testing or serum allergen-specific IgE; total IgE provides supportive but nonspecific information. Genotyping may be useful in research, familial clustering, atypical phenotypes, and multivariable risk models. IL4 rs2243250 may indicate enhanced Th2/IgE pathway susceptibility, whereas FCER1A rs2251746 may reflect genetically influenced IgE-receptor regulation. Their diagnostic contribution depends on validation in the local population and integration with clinical and immunological findings.

CONCLUSION

IL4 rs2243250 and FCER1A rs2251746 are pathogenetically relevant markers of allergic inflammation. The IL4 rs2243250 T allele/TT genotype may increase AR susceptibility, but the association is population-dependent. FCER1A rs2251746 is more consistently related to total IgE regulation than to

AR itself. Neither polymorphism can replace standard clinical and allergological diagnostics; both are best used as supplementary components of individualized risk assessment and locally validated prediction models.

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PRENATAL DEVELOPMENT OF THE BRONCHIAL TREE: EMBRYOLOGICAL ASPECTS OF BRONCHOGENESIS

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Abstract. *The bronchial tree undergoes complex morphogenetic transformations during prenatal development, progressing through five well-defined stages: embryonic, pseudoglandular, canalicular, saccular, and alveolar. Bronchogenesis begins on day 22 of gestation with the formation of the laryngotracheal groove and is completed in its basic architecture by Carnegie stage (CS) 23, when all segmental bronchi are formed. The branching pattern of the proximal bronchial tree — including all lobar bronchi — is genetically determined, whereas peripheral branching is subject to environmental influence. By the end of the embryonic period, the prototype of the adult bronchial branching structure is established and maintained. Understanding the embryological basis of bronchial development is essential for interpreting congenital bronchopulmonary anomalies and pathological conditions encountered in early childhood.*

Keywords: *bronchogenesis, prenatal development, bronchial tree, embryology, Carnegie stages, lung morphogenesis, pseudoglandular stage.*

INTRODUCTION

The respiratory system is one of the most complex organ systems in terms of embryological development. The bronchial tree, which serves as the structural and functional foundation of the conducting zone of the lungs, undergoes a precisely orchestrated sequence of morphogenetic events beginning in the third week of gestation and continuing postnatally until approximately 8 years of age [1, 2]. Although the final number of bronchial branching generations is established by birth, histological and functional maturity of the bronchial wall — including ciliated epithelium differentiation and muscularis mucosae development — is achieved only by 2–3 years of postnatal life [10]. A thorough

understanding of prenatal bronchogenesis is critical not only for developmental anatomy, but also for the clinical interpretation of congenital bronchopulmonary malformations — including bronchial atresia, congenital lobar emphysema, pulmonary sequestration, and accessory bronchi — which collectively affect approximately 1 in 2,500 live births [3].

Recent advances in phase-contrast X-ray computed tomography and three-dimensional reconstruction of human embryo specimens have substantially expanded our knowledge of the precise timing and sequence of bronchial branching during the embryonic period [4, 5]. These studies have confirmed that the prototype of the adult bronchial branching architecture is established as early as Carnegie stage (CS) 23, and that the branching mode of lobar bronchi follows a consistent monopodial pattern across individuals [5]. The present thesis reviews the current understanding of prenatal bronchial tree development with emphasis on morphological, molecular, and clinical aspects.

The aim of this thesis is to systematize contemporary data on the embryological aspects of bronchogenesis, with focus on the staging, branching patterns, molecular regulation, and clinical significance of prenatal bronchial tree development.

Stages of Prenatal Lung and Bronchial Development

Prenatal development of the lungs and bronchial tree is conventionally divided into five sequential stages, each characterized by distinct morphological and histological features (Table 1) [1, 6].

Table 1. Stages of prenatal lung and bronchial tree development

Stage	Gestational period	Carnegie stage	Key events
Embryonic	Weeks 3–7	CS 10–23	Laryngotracheal groove; primary, secondary, tertiary bronchi formed

Stage	Gestational period	Carnegie stage	Key events
Pseudoglandular	Weeks 5–17	—	Branching to terminal bronchioles; glandular appearance; no gas exchange
Canalicular	Weeks 16–26	—	Respiratory bronchioles appear; vascularisation; surfactant synthesis begins
Saccular	Weeks 24–38	—	Terminal saccules form; surfactant production increases; gas exchange possible
Alveolar	Week 36 – 8 years	—	Alveologenesis; secondary septa; mature gas exchange surface established

Note: data compiled from Rehman & Bacha (2023), Schittny (2017), Fujii et al. (2024).

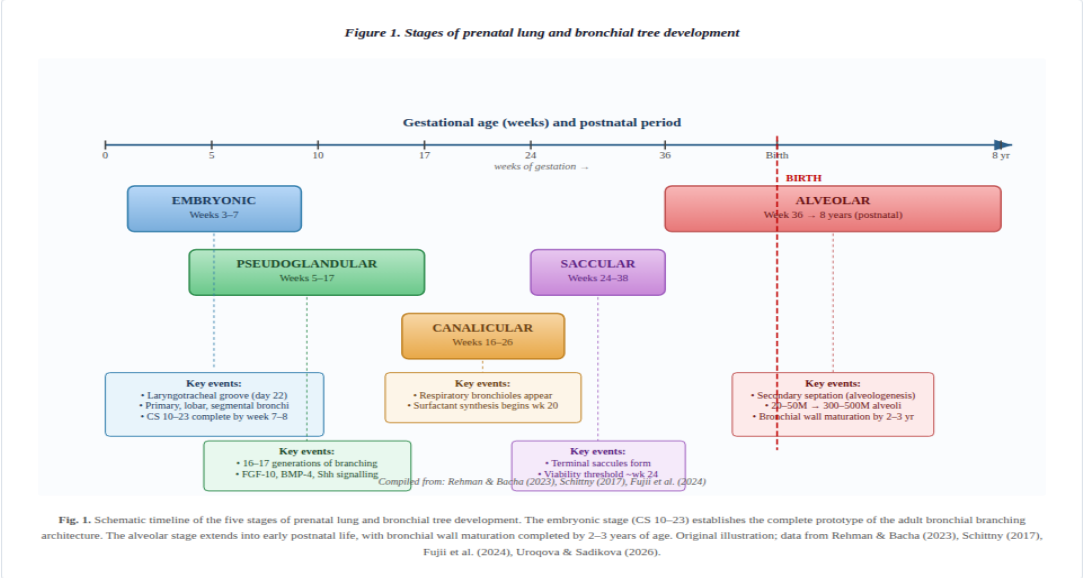

Fig. 1. Schematic timeline of the five stages of prenatal lung and bronchial tree development. The embryonic stage (CS 10–23) establishes the complete prototype of the adult bronchial branching architecture. The alveolar stage extends into early postnatal life, with bronchial wall maturation completed by 2–3 years of age. Original illustration; data from Rehman & Bacha (2023), Schittny (2017), Fujii et al. (2024), Uroqova & Sadikova (2026).

Fig. 1. Schematic timeline of the five stages of prenatal lung and bronchial tree development. The alveolar stage extends into postnatal life, with bronchial wall maturation completed by 2–3 years of age. Original illustration; data from

Rehman & Bacha (2023), Schittny (2017), Fujii et al. (2024), Uroqova & Sadikova (2026).

Embryonic Stage: Initiation of Bronchogenesis (CS 10–23)

Bronchogenesis is initiated on approximately day 22 of gestation (CS 10) with the formation of the laryngotracheal groove on the ventral wall of the primitive foregut endoderm [1, 6]. By CS 13–14, the lung buds — two lateral diverticula of the laryngotracheal groove — have formed and begun to invade the surrounding splanchnic mesenchyme. The primary bronchial buds give rise to the main (primary) bronchi, which are established by CS 14–15 [4].

Secondary bronchi (lobar bronchi) emerge between CS 14 and CS 17, with the right lung forming three lobar bronchi and the left lung forming two, reflecting the asymmetry of the definitive adult lung. All lobar bronchi are formed via monopodial branching, in which child branches extend laterally from the wall of the parent bronchus rather than via tip bifurcation [5]. Tertiary (segmental) bronchi develop between CS 17 and CS 23, and by the end of the embryonic period (CS 23, approximately week 7–8), the complete prototype of the adult segmental bronchial branching architecture is established [4].

A landmark finding of recent three-dimensional reconstructive studies is that the morphology and branching position of all lobar bronchi and the majority of segmental bronchi (B6, B8, B9, and the subsegmental bronchus of B10) are genetically determined, as their variations correspond directly to those observed in the adult lung [4]. In contrast, peripheral branching distal to the subsegmental level is subject to environmental influences and exhibits greater individual variation.

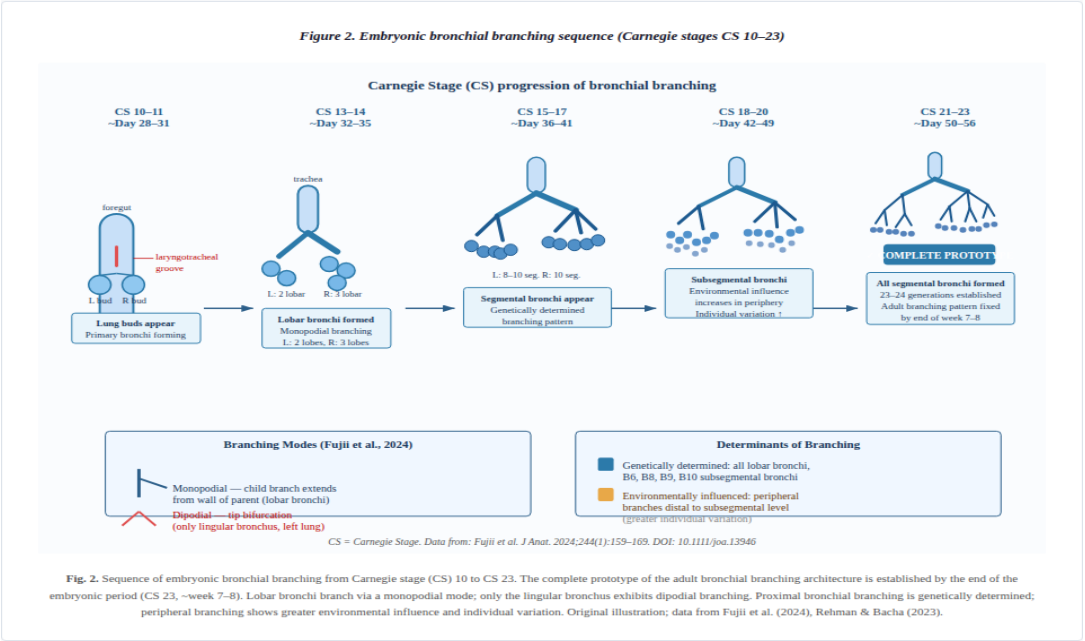

Fig. 2. Sequence of embryonic bronchial branching from Carnegie stage (CS) 10 to CS 23. The complete prototype of the adult bronchial architecture is established by CS 23 (~week 7–8). Lobar bronchi branch via monopodial mode; only the lingular bronchus exhibits dipodial branching. Original illustration; data from Fujii et al. (2024).

Pseudoglandular Stage: Branching Morphogenesis (Weeks 5–17)

During the pseudoglandular stage, the bronchial tree undergoes extensive dichotomous branching, progressing from the segmental bronchi through to the terminal bronchioles — a total of approximately 16–17 generations of branching by week 17 [1, 7]. The lung at this stage has a glandular appearance on histological examination, with tubular epithelial structures surrounded by loose mesenchyme, resembling an exocrine gland. No functional gas exchange is possible at this stage.

The molecular regulation of branching morphogenesis during this stage is mediated by reciprocal epithelial-mesenchymal signalling involving fibroblast growth factors (FGF-10, FGF-7), bone morphogenetic proteins (BMP-4), Wnt ligands, and Sonic Hedgehog (Shh). FGF-10 secreted by the distal mesenchyme acts as a chemoattractant for the bronchial epithelial tip, while Shh expressed by

the epithelium provides negative feedback to restrict mesenchymal FGF-10 expression and prevent aberrant branching [7, 8].

Canalicular and Saccular Stages: Preparation for Gas Exchange

From week 16 onward, the canalicular stage is characterized by the appearance of respiratory bronchioles and the vascularization of the distal lung parenchyma. Type II pneumocytes begin to differentiate and produce surfactant by approximately week 20–24, although surfactant levels remain insufficient for survival outside the uterus until approximately week 24–28 [1, 6]. The viability threshold of approximately 24 weeks gestation corresponds to the transition between the canalicular and saccular stages.

The saccular stage (weeks 24–38) is marked by the formation of terminal saccules — the precursors of future alveoli — through expansion and thinning of the distal airway walls. The interstitium thins markedly, and the air-blood barrier becomes sufficiently thin to permit gas exchange, enabling survival of preterm neonates born from week 28 onward with appropriate medical support [2, 9].

Clinical Significance of Prenatal Bronchogenesis

Disruption of the precisely timed sequence of bronchogenesis at any stage results in characteristic congenital anomalies. Defects occurring during the embryonic stage (CS 10–23) may result in tracheoesophageal fistula, bronchial atresia, or pulmonary agenesis — conditions reflecting failure of primary or secondary bronchial bud formation [3]. Disturbances during the pseudoglandular stage may lead to congenital cystic adenomatoid malformation (CCAM/CPAM), in which abnormal branching produces dysplastic cystic lung tissue without functional alveoli [3, 8].

Premature birth interrupts the saccular-to-alveolar transition, resulting in bronchopulmonary dysplasia (BPD) — the most common chronic lung disease of preterm infants, characterized by impaired alveologenesis and simplified lung

architecture. The severity of BPD is directly related to the gestational age at birth and the degree of disruption of the normal developmental programme [9].

Knowledge of the embryological basis of bronchial development is therefore indispensable for understanding the pathophysiology of congenital bronchopulmonary malformations and the long-term respiratory consequences of preterm birth, both of which have significant implications for paediatric pulmonology and neonatology.

CONCLUSION

Prenatal development of the bronchial tree proceeds through five precisely regulated stages, beginning with the formation of the laryngotracheal groove on day 22 of gestation and concluding with the establishment of the complete segmental bronchial architecture by Carnegie stage 23. The branching pattern of the proximal bronchial tree is genetically determined, while peripheral branching is subject to environmental modulation. Molecular regulation by FGF, BMP, Wnt, and Shh signalling pathways governs the branching morphogenesis process. Disruption of bronchogenesis at specific developmental windows results in characteristic congenital anomalies, underscoring the clinical importance of understanding prenatal bronchial morphogenesis. These findings provide the embryological foundation for interpreting both congenital bronchopulmonary pathology and the developmental sequelae of preterm birth.

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ACOUSTIC ANALYSIS OF THE VOICE: BASIC PRINCIPLES AND CLINICAL PARAMETERS

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INTRODUCTION

Acoustic voice analysis is a non-invasive, objective method widely used in phoniatric practice to quantify vocal function from a recorded speech signal. Unlike perceptual evaluation, which depends on the examiner's subjective judgment, acoustic analysis provides reproducible numerical parameters that can be tracked over time and compared between individuals or normative groups. Recent literature continues to refine both the classical perturbation measures and newer multiparametric indices, making this an actively developing area of phoniatric diagnostics relevant to the early detection of voice disorders in professional voice users and vocal performers [1, 6].

AIM

To review the basic principles of acoustic voice analysis, describe its core clinical parameters and recent multiparametric indices, and summarize their normative ranges and diagnostic limitations based on the current literature.

Keywords: acoustic voice analysis, jitter, shimmer, harmonics-to-noise ratio, Acoustic Voice Quality Index, dysphonia.

Recording and Signal Processing Principles

Acoustic analysis is typically performed on a sustained vowel phonation (most commonly /a/) or on connected speech, recorded under controlled conditions with a calibrated microphone at a fixed mouth-to-microphone distance, in a quiet environment free of background noise. The recorded waveform is processed by dedicated software — most commonly the freely

available Praat program [8] — which detects individual glottal cycles and calculates a set of perturbation and spectral parameters from the extracted fundamental period and amplitude values. Recording conditions, including the use of protective face masks, have themselves been shown to measurably affect several acoustic parameters and must therefore be standardized in clinical and research protocols [4].

Perturbation Measures: Jitter and Shimmer

Jitter reflects cycle-to-cycle variation in the fundamental frequency of vocal fold vibration and is associated with irregularity of vocal fold closure; it increases in the presence of mass lesions, scarring, or reduced neuromuscular control of the vocal folds [2]. Shimmer reflects cycle-to-cycle variation in the amplitude of the acoustic signal and is particularly sensitive to incomplete glottal closure and turbulent airflow through the glottis [2]. Several variants of each parameter exist, differing in the number of consecutive cycles used for smoothing (Table 1). Notably, both jitter and shimmer are influenced by vocal loudness: increasing vocal intensity has been shown to systematically decrease jitter and shimmer and increase HNR in both healthy speakers and voice patients, meaning that sound pressure level must be considered a confounding variable in clinical interpretation [1].

Fig. 1. Schematic illustration of cycle-to-cycle period and amplitude variation (original illustration by the author)

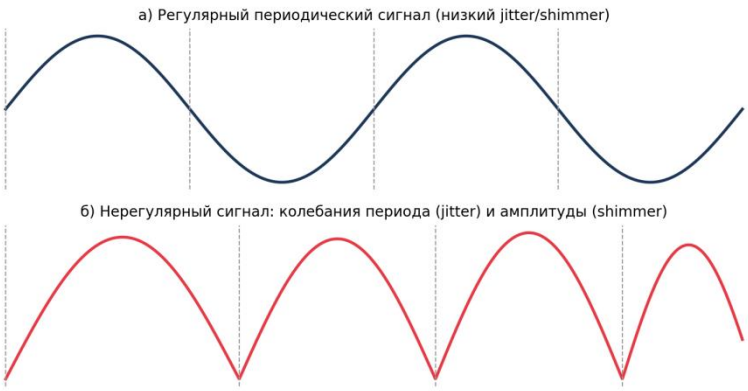

Fig. 1. Schematic illustration of a regular periodic signal versus a signal with period (jitter) and amplitude (shimmer) perturbation (original illustration by the author).

Parameter	Definition
Jitter (local, %)	Average absolute difference between consecutive periods, divided by the average period
Jitter (absolute, μs)	Average absolute difference between consecutive periods, in microseconds
RAP	Relative Average Perturbation — jitter smoothed over 3 consecutive periods
PPQ5	Five-point Period Perturbation Quotient — jitter smoothed over 5 periods
Shimmer (local, %)	Average absolute difference between the amplitudes of consecutive periods, divided by the average amplitude
Shimmer (dB)	Average absolute difference between consecutive periods' amplitudes, expressed in decibels
APQ	Amplitude Perturbation Quotient — shimmer smoothed over 11 periods

Table 1. Common jitter and shimmer parameters used in clinical acoustic analysis [1, 2].

Harmonics-to-Noise Ratio

The harmonics-to-noise ratio (HNR), expressed in decibels, quantifies the relative proportion of periodic (harmonic) versus aperiodic (noise) energy in the acoustic signal. A lower HNR indicates greater breathiness or hoarseness and reflects increased noise components generated by turbulent airflow through an incompletely closed glottis. Like jitter and shimmer, HNR is sensitive to vocal loudness and recording conditions and should be interpreted alongside these confounders rather than in isolation [1, 4].

Recent Advances: Multiparametric Indices

Because single perturbation measures such as jitter and shimmer correlate only moderately with perceptual dysphonia severity and become unreliable in strongly aperiodic voices, recent research has increasingly focused on multiparametric acoustic indices that combine several measures into a single, more robust score (Table 3). The Acoustic Voice Quality Index (AVQI) and the related Acoustic Breathiness Index (ABI) have now been validated across more than a dozen languages and consistently demonstrate high sensitivity and specificity for distinguishing dysphonic from normophonic voices [3, 5]. A recent systematic review and meta-analysis confirmed that both major AVQI versions achieve pooled sensitivity above 0.80 and specificity above 0.90, with the newer version showing a modest advantage in overall diagnostic accuracy [5]. At the same time, methodological research continues to refine the requirements for reliable AVQI measurement, including minimum speech sample length and recording conditions appropriate for digital and telehealth applications [7]

Index	Composition / Clinical use
CPPS	Smoothed Cepstral Peak Prominence — a spectral measure of harmonic periodicity strength; considered one of the most robust single predictors of overall dysphonia severity, including in aperiodic voices where jitter/shimmer become unreliable
AVQI	Acoustic Voice Quality Index — a weighted multivariate combination of CPPS, HNR, local shimmer, shimmer (dB), and long-term average spectrum slope/tilt, yielding a single score (range ~0–10) that correlates strongly with perceptual dysphonia severity

ABI	Acoustic Breathiness Index — an analogous multivariate index specifically weighted toward the perceptual dimension of breathiness

Table 3. Recent multiparametric acoustic indices and their clinical role [3, 5].

Normative Values and Confounding Factors

Normative acoustic values differ by sex, largely reflecting anatomical differences in vocal fold length and mass, and must be interpreted against population- and equipment-specific reference ranges rather than universal cut-offs (Table 2). Beyond sex, recent studies have highlighted additional confounders relevant to professional voice users, including vocal loudness [1], bilingual or multilingual speech production patterns [6], and recording protocol (e.g., use of face coverings) [4], all of which can shift acoustic parameter values independently of true vocal pathology.

Parameter	Females	Males	Unit
Fundamental frequency (f0)	~200–210	~115–120	Hz
Jitter	~0.5–0.7	~0.4–0.5	%
Shimmer	~0.2–0.3	~0.2–0.3	dB
HNR	~10–11	~9–10	dB

Table 2. Representative normative acoustic ranges for the sustained vowel /a/ in healthy adults, by sex, consistent with recent normative studies [2].

Clinical Applications and Limitations

Jitter, shimmer, HNR, and the newer multiparametric indices are commonly reported alongside stroboscopic and perceptual (GRBAS) findings as part of a multidimensional voice assessment. However, these measures must be interpreted with caution: they are influenced by recording conditions, vocal loudness, the stability of the sustained phonation task, and inter-software

variability, and classical perturbation measures in particular become unreliable in severely disordered voices where periodicity itself breaks down [1, 2]. For this reason, acoustic analysis — whether based on classical perturbation measures or modern multiparametric indices — should always be considered a complement to, rather than a replacement for, direct visualization of the larynx and perceptual voice evaluation.

CONCLUSION

Acoustic analysis provides an objective, quantifiable complement to auditory-perceptual and stroboscopic examination of the voice. A solid understanding of jitter, shimmer, and HNR, together with the increasingly validated multiparametric indices such as AVQI and ABI, as well as awareness of confounding factors and methodological limitations, is essential for the correct interpretation of acoustic data in the early detection and monitoring of voice disorders among professional voice users, including performers of traditional vocal genres.

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УДК 618.5-005.1:616.155.194.8

ВЛИЯНИЕ ЖЕЛЕЗОДЕФИЦИТНОЙ АНЕМИИ ТЯЖЁЛОЙ СТЕПЕНИ НА СОКРАТИТЕЛЬНУЮ АКТИВНОСТЬ МАТКИ В РОДАХ И ЧАСТОТУ ГИПОТОНИЧЕСКИХ КРОВОТЕЧЕНИЙ

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Аннотация. *Железодефицитная анемия (ЖДА) является наиболее распространённым экстрагенитальным заболеванием беременных и, при тяжёлом течении, рассматривается как значимый фактор риска акушерских кровотечений. Цель настоящего обзора — систематизировать современные представления о влиянии тяжёлой ЖДА на сократительную активность матки в родах и на частоту гипотонических кровотечений. Проведён анализ литературных источников, посвящённых патофизиологии миометрия в условиях дефицита железа. Показано, что тяжёлая ЖДА сопровождается гемической гипоксией тканей и дефицитом железозависимых ферментов, что ведёт к снижению энергообеспечения гладкомышечных клеток, нарушению кальциевого гомеостаза и уменьшению чувствительности миометрия к утеротоникам. Совокупность этих механизмов формирует предпосылки для гипотонии матки и повышения риска гипотонических кровотечений. Своевременная диагностика и коррекция тяжёлой анемии рассматриваются как важный резерв профилактики послеродовых кровотечений.*

Ключевые слова: *железодефицитная анемия, беременность, роды, сократительная активность матки, миометрий, гипотоническое кровотечение, послеродовое кровотечение, профилактика.*

Abstract. *Iron deficiency anemia (IDA) is the most common extragenital disorder in pregnant women and, in its severe form, is regarded as a significant risk factor for obstetric hemorrhage. The aim of this review is to systematize current concepts regarding the impact of severe IDA on uterine contractile activity during labor and on the incidence of hypotonic*

bleeding. An analysis of the literature devoted to the pathophysiology of the myometrium under conditions of iron deficiency was performed. It has been shown that severe IDA is accompanied by hemic tissue hypoxia and a deficiency of iron-dependent enzymes, which leads to reduced energy supply of smooth muscle cells, impaired calcium homeostasis, and decreased myometrial sensitivity to uterotonic agents. Together, these mechanisms create the preconditions for uterine hypotonia and an increased risk of hypotonic bleeding. Timely diagnosis and correction of severe anemia are considered an important reserve for the prevention of postpartum hemorrhage.

Keywords: *iron deficiency anemia, pregnancy, labor, uterine contractile activity, myometrium, hypotonic bleeding, postpartum hemorrhage, prevention.*

ВВЕДЕНИЕ

Анемия беременных остаётся одной из наиболее значимых проблем современного акушерства, что обусловлено её высокой распространённостью и разнообразием неблагоприятных последствий как для матери, так и для плода. По оценкам Всемирной организации здравоохранения, анемия осложняет течение беременности приблизительно у 38–40 % женщин в мире[5], причём в структуре анемий беременных на долю железодефицитных состояний приходится подавляющее большинство случаев. В регионах с ограниченными ресурсами и недостаточным нутритивным обеспечением показатели заболеваемости существенно выше, а доля тяжёлых форм анемии возрастает.

В соответствии с общепринятыми критериями, анемией беременных считают снижение концентрации гемоглобина ниже 110 г/л; при этом выделяют лёгкую (100–109 г/л), среднюю (70–99 г/л) и тяжёлую (менее 70 г/л) степени[6]. Тяжёлая железодефицитная анемия (ЖДА) представляет собой особую клиническую категорию, поскольку именно при таком

[5] Рекомендации ВОЗ по оказанию дородовой помощи для формирования положительного опыта беременности. — Женева: ВОЗ, 2016.

[6] Концентрации гемоглобина для диагностики анемии и оценки степени её тяжести. — Женева: ВОЗ, 2011.

уровне гемоглобина наблюдается наиболее выраженное нарушение кислородного обеспечения тканей и функциональных резервов организма, что имеет непосредственное значение для течения родового акта.

Послеродовые кровотечения продолжают занимать одно из ведущих мест в структуре причин материнской смертности во всём мире[7]. Основной причиной ранних послеродовых кровотечений признана гипотония (атония) матки — состояние, при котором миометрий утрачивает способность к адекватному сокращению после рождения плода и последа[8]. В связи с этим особый интерес представляет вопрос о том, каким образом состояние системы кроветворения и, в частности, тяжёлый дефицит железа могут отражаться на сократительной способности матки.

Патогенетическая взаимосвязь между тяжёлой ЖДА и нарушением сократительной активности матки представляется закономерной, поскольку сокращение гладкомышечных клеток миометрия является энергозависимым процессом, критически чувствительным к кислородному и энергетическому обеспечению. Дефицит железа, будучи не только субстратом синтеза гемоглобина, но и кофактором множества ферментных систем, потенциально способен нарушать каждое из звеньев этого процесса.

Цель обзора — обобщить и систематизировать современные научные данные о влиянии тяжёлой железодефицитной анемии на сократительную активность матки в родах и на частоту развития гипотонических кровотечений, а также рассмотреть основные патофизиологические механизмы этой взаимосвязи.

МАТЕРИАЛЫ И МЕТОДЫ

[7] Рекомендации ВОЗ по профилактике и лечению послеродового кровотечения. — Женева: ВОЗ, 2012.

[8] Cunningham F.G., Leveno K.J., Bloom S.L. et al. Акушерство Уильямса. — 25-е изд. — New York: McGraw-Hill Education, 2018.

Работа представляет собой аналитический обзор литературы. Поиск источников проводился в электронных базах данных PubMed/MEDLINE, Cochrane Library, eLibrary и Google Scholar. При формировании поисковых запросов использовались ключевые слова и их сочетания на русском и английском языках: «железодефицитная анемия», «беременность», «сократительная активность матки», «гипотоническое кровотечение», «послеродовое кровотечение», «миометрий», «iron deficiency anemia», «uterine contractility», «postpartum hemorrhage», «uterine atony».

В обзор включались оригинальные исследования, систематические обзоры, метаанализы, клинические рекомендации и фундаментальные работы, посвящённые патофизиологии дефицита железа и механизмам сокращения миометрия. Приоритет отдавался публикациям, отражающим современные представления о проблеме. Исключались материалы, не содержавшие сведений по рассматриваемой теме, а также источники с недостаточно раскрытой методологией. Полученные данные были структурированы по тематическим направлениям и подвергнуты качественному сопоставительному анализу.

РЕЗУЛЬТАТЫ

Эпидемиология и клиническое значение тяжёлой ЖДА

Анализ литературы подтверждает, что железодефицитная анемия сохраняет лидирующие позиции в структуре экстрагенитальной патологии беременных[9]. Физиологическое увеличение объёма циркулирующей плазмы, возрастающие потребности растущего плода и плаценты, а также нередко исходно сниженные депо железа создают условия для быстрого развития дефицита[10]. При отсутствии своевременной коррекции лёгкие формы анемии закономерно прогрессируют, и часть пациенток к моменту

[9] Breymann C. Железодефицитная анемия при беременности // Seminars in Hematology. — 2015. — Т. 52, № 4. — С. 339–347.

[10] Milman N. Железо и беременность: тонкий баланс // Annals of Hematology. — 2006. — Т. 85, № 9. — С. 559–565.

родов подходит с анемией средней и тяжёлой степени. Именно тяжёлая ЖДА ассоциируется с наиболее выраженным ухудшением исходов родов, что и определяет актуальность её углублённого изучения.

Роль железа в энергетике миометрия

Сокращение гладкомышечных клеток миометрия представляет собой строго энергозависимый процесс[11]. Источником энергии служит аденозинтрифосфат (АТФ), синтезируемый преимущественно в ходе окислительного фосфорилирования в митохондриях. Железо участвует в этом процессе на нескольких уровнях: оно входит в состав гемоглобина, обеспечивающего доставку кислорода к тканям, миоглобина, депонирующего кислород в мышечной ткани, а также цитохромов и железосерных кластеров дыхательной цепи, непосредственно ответственных за выработку АТФ.



Рисунок 1. Основные железозависимые функции, критичные для сократимости миометрия.

Таким образом, дефицит железа затрагивает как систему транспорта кислорода, так и внутриклеточный аппарат его утилизации. В условиях тяжёлой ЖДА формируется двойной механизм энергетического дефицита: с одной стороны — гемическая гипоксия вследствие снижения

[11] Wray S. Современные представления о функции матки // Experimental Physiology. — 2007. — Т. 92, № 4. — С. 621–631.

кислородной ёмкости крови, с другой — прямое нарушение работы железозависимых ферментов, обеспечивающих клеточное дыхание.

Патофизиологические механизмы снижения сократимости матки

На основании анализа литературных данных можно выделить несколько взаимосвязанных механизмов, посредством которых тяжёлая ЖДА нарушает сократительную активность матки. Ключевым звеном выступает дефицит энергетического обеспечения гладкомышечных клеток. Снижение синтеза АТФ ограничивает работу ионных насосов, в первую очередь Na^+/K^+-АТФазы и кальциевых транспортных систем, от корректного функционирования которых зависит поддержание мембранного потенциала и своевременное удаление ионов кальция из цитоплазмы.

Нарушение кальциевого гомеостаза имеет принципиальное значение, поскольку именно повышение внутриклеточной концентрации кальция запускает актин-миозиновое взаимодействие и обеспечивает сокращение. Расстройство циклической регуляции уровня кальция ведёт к неполноценным, некоординированным сокращениям миометрия и его быстрому утомлению в родах.

Дополнительным механизмом является снижение чувствительности миометрия к утеротоническим стимулам. В ряде работ обсуждается уменьшение экспрессии и функциональной активности рецепторов окситоцина в условиях тканевой гипоксии и метаболического стресса. Это означает, что даже при сохранённом или повышенном уровне эндогенного и экзогенного окситоцина ответ матки может оставаться недостаточным, что клинически проявляется слабостью родовой деятельности и гипотонией матки в последовом и раннем послеродовом периодах.

Совокупность описанных процессов удобно представить в виде последовательного патофизиологического каскада, который связывает

тяжёлый дефицит железа с конечным неблагоприятным исходом — гипотоническим кровотечением.



Рисунок 2. Патофизиологический каскад: от тяжёлой ЖДА к гипотоническому кровотечению.

Клинические данные о частоте гипотонических кровотечений

Клинические и эпидемиологические исследования в целом поддерживают представление о том, что тяжёлая анемия сопряжена с повышенным риском гипотонических кровотечений. По мере нарастания степени тяжести анемии отмечается тенденция к увеличению частоты нарушений сократительной активности матки и связанной с ними патологической кровопотери. Обобщённые ориентировочные данные, характеризующие эту зависимость, представлены на рисунке 3.

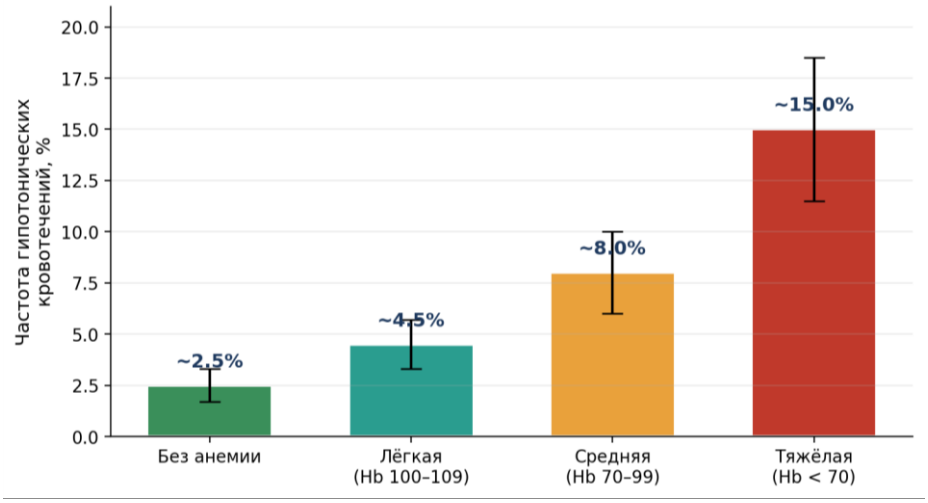

Рисунок 3. Ориентировочная частота гипотонических кровотечений в зависимости от степени тяжести анемии (обобщённые данные литературы).

Следует подчеркнуть, что тяжёлая ЖДА не только повышает вероятность возникновения гипотонического кровотечения, но и существенно ухудшает его прогноз. Сниженный исходный уровень гемоглобина уменьшает физиологические резервы организма и толерантность к кровопотере: объём кровопотери, который у женщины без анемии протекает субкомпенсированно, у пациентки с тяжёлой анемией может привести к быстрой декомпенсации, развитию геморрагического шока и полиорганной недостаточности. Тем самым тяжёлая анемия выступает одновременно и как фактор риска возникновения кровотечения, и как фактор, отягощающий его последствия.

ОБСУЖДЕНИЕ

Обобщение представленных данных позволяет рассматривать взаимосвязь тяжёлой ЖДА и нарушения сократительной активности матки как патогенетически обоснованную и клинически значимую. В основе этой связи лежит фундаментальная зависимость сократительной функции миометрия от адекватного кислородного и энергетического обеспечения, которое в значительной степени определяется состоянием обмена железа.

Вместе с тем необходимо учитывать многофакторный характер послеродовых кровотечений. Помимо анемии, к развитию гипотонии матки предрасполагают перерастяжение матки, аномалии родовой деятельности, длительные и стремительные роды, оперативные вмешательства, патология плаценты и ряд других состояний. Многие из этих факторов нередко сочетаются с анемией, что затрудняет выделение её самостоятельного вклада и требует осторожности при интерпретации причинно-следственных связей.

Тем не менее патофизиологическая логика и накопленные клинические наблюдения согласованно указывают на то, что коррекция тяжёлого дефицита железа до родов является рациональной стратегией снижения акушерского риска. Своевременная диагностика анемии, оценка её степени и адекватная терапия препаратами железа[12], а при тяжёлых формах и наличии показаний — рассмотрение иных методов коррекции, позволяют улучшить энергетический потенциал миометрия и повысить толерантность к предстоящей кровопотере[13].

Практическое значение рассмотренной проблемы состоит в том, что тяжёлая анемия относится к потенциально управляемым факторам риска. Это определяет важность профилактического направления: раннего выявления и коррекции железодефицитных состояний на этапе прегравидарной подготовки и в течение всей беременности, а также готовности акушерской службы к оказанию помощи при кровотечении у пациенток с исходно сниженными резервами[14].

[12] Api O., Breymann C., Çetiner M. et al. Диагностика и лечение железодефицитной анемии во время беременности и в послеродовом периоде // Journal of the Turkish-German Gynecological Association. — 2015. — Т. 16, № 4. — С. 234–240.

[13] Peña-Rosas J.P., De-Regil L.M., Garcia-Casal M.N., Dowswell T. Ежедневный пероральный приём препаратов железа во время беременности // Cochrane Database of Systematic Reviews. — 2015. — Вып. 7. — CD004736.

[14] Серов В.Н., Сухих Г.Т. и др. Анемия у беременных: клинические рекомендации. — Москва, 2021.

Ограничения настоящего обзора связаны с неоднородностью методологии анализируемых источников, различиями в критериях диагностики анемии и оценке кровопотери, а также с преимущественно описательным характером обобщения. Приведённые количественные показатели носят ориентировочный характер и предназначены для иллюстрации общих закономерностей, а не для точной статистической оценки.

ЗАКЛЮЧЕНИЕ

Тяжёлая железодефицитная анемия представляет собой значимый фактор, неблагоприятно влияющий на сократительную активность матки в родах. Дефицит железа реализует своё патогенное действие через сочетание гемической гипоксии и нарушения работы железозависимых ферментных систем, что ведёт к энергетическому дефициту миометрия, расстройству кальциевого гомеостаза и снижению чувствительности к утеротоникам. Итогом этих процессов является повышение риска гипотонии матки и гипотонических кровотечений, течение которых у пациенток с тяжёлой анемией отличается особой тяжестью.

Своевременную диагностику и полноценную коррекцию железодефицитной анемии на прегравидарном этапе и в течение беременности следует рассматривать как важный резерв профилактики послеродовых кровотечений и улучшения материнских исходов. Дальнейшее изучение молекулярных механизмов влияния дефицита железа на миометрий представляет перспективное направление научных исследований.

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CLINICAL AND LABORATORY SIGNIFICANCE OF ENDOTHELIAL DYSFUNCTION AND HEMOSTATIC ALTERATIONS IN THE EARLY STAGES OF RHEUMATOID ARTHRITIS

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Аннотация*: Цель исследования — оценить эндотелиальную дисфункцию и изменения гемостаза у пациентов с очень ранним и ранним ревматоидным артритом. Обследованы 85 пациентов и 30 практически здоровых лиц. Определяли D-димер, антитромбин III, фактор фон Виллебранда, эндотелин-1 и sICAM-1. По мере увеличения длительности заболевания отмечались рост D-димера, фактора фон Виллебранда, эндотелина-1 и sICAM-1, а также снижение активности антитромбина III. Результаты свидетельствуют о раннем формировании эндотелиальной дисфункции и протромботического лабораторного профиля при ревматоидном артрите.*

Ключевые слова: *ревматоидный артрит, эндотелиальная дисфункция, гемостаз, D-димер, эндотелин-1, sICAM-1, фактор фон Виллебранда.*

Abstract*: Objective: to evaluate endothelial dysfunction and hemostatic alterations in very early and early rheumatoid arthritis. The study included 85 patients and 30 healthy controls. D-dimer, antithrombin III, von Willebrand factor, endothelin-1 and sICAM-1 were assessed. D-dimer increased from 210±60 ng/ml in controls to 420±110 and 680±160 ng/ml, while antithrombin III decreased from 102±6% to 94±7% and 88±8%. Endothelial markers also increased with disease duration. These findings indicate early endothelial dysfunction and a progressively unfavorable prothrombotic laboratory profile in rheumatoid arthritis.*

Keywords: *rheumatoid arthritis, endothelial dysfunction, hemostasis, D-dimer, endothelin-1, sICAM-1, von Willebrand factor.*

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic systemic autoimmune disease characterized by persistent synovial inflammation, progressive joint damage and extra-articular manifestations. Increasing evidence indicates that RA is also associated with vascular dysfunction and abnormalities of hemostasis, contributing to excess cardiovascular and thrombotic burden (Aletaha et al., 2010; Smolen et al., 2023).

Endothelial dysfunction is an important component of systemic inflammation in RA. Chronic inflammatory signaling promotes endothelial activation, expression of adhesion molecules, platelet activation and a shift toward a prothrombotic state (Yang et al., 2016; Anyfanti et al., 2020).

Endothelin-1, soluble intercellular adhesion molecule-1 (sICAM-1) and von Willebrand factor (vWF) are markers of endothelial activation and injury. D-dimer and antithrombin III characterize coagulation activation and natural anticoagulant protection.

The objective of this study was to evaluate endothelial dysfunction and hemostatic parameters in patients with very early and early RA and to determine whether laboratory abnormalities become more pronounced with disease duration.

MATERIALS AND METHODS

This clinical and laboratory study was conducted at the multidisciplinary clinic of Tashkent State Medical University during 2022–2025. The study included 85 patients diagnosed with RA and 30 practically healthy individuals who formed the control group.

The diagnosis of RA was established according to accepted classification criteria. Inclusion criteria were age over 18 years, confirmed RA, moderate disease activity according to DAS28 and written informed consent. Exclusion criteria included severe somatic disease, acute infection, uncontrolled arterial

hypertension, current use of antiplatelet agents, anticoagulants or statins, and refusal to participate.

Patients with RA were divided into two groups according to disease duration: very early RA (n=32) and early RA (n=53). D-dimer, antithrombin III, vWF, endothelin-1 and sICAM-1 were evaluated.

Quantitative data are presented as M±m. Differences were considered statistically significant at $p<0.05$. In Table 1, p1 denotes comparison between very early RA and controls, whereas p2 denotes comparison between early RA and controls. No unsupported p3 values were introduced because the available material did not contain a calculated direct comparison between the two RA groups.

The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants.

RESULTS

D-dimer concentration was 210±60 ng/ml in the control group, 420±110 ng/ml in very early RA ($p1<0.001$), and 680±160 ng/ml in early RA ($p2<0.001$).

Antithrombin III activity decreased from 102±6% in controls to 94±7% in very early RA ($p1<0.05$) and 88±8% in early RA ($p2<0.05$).

vWF increased from 98±9% in controls to 126±14% and 152±18% in very early and early RA, respectively. Endothelin-1 increased from 0.86±0.21 pg/ml to 1.42±0.33 and 1.87±0.41 pg/ml. sICAM-1 increased from 210±35 ng/ml to 325±50 and 412±70 ng/ml. All endothelial marker differences versus controls were statistically significant at $p<0.001$.

The direction of the changes was consistent across the analyzed markers: coagulation activation and endothelial injury were detectable in very early RA and became more pronounced in early RA.

Table 1. Endothelial dysfunction and hemostatic parameters in patients with early stages of rheumatoid arthritis

Parameter	Control group, n=30	Very early RA, n=32	p1	Early RA, n=53	p2
D-dimer, ng/ml	210±60	420±110	<0.001	680±160	<0.001
Antithrombin III, %	102±6	94±7	<0.05	88±8	<0.05
Von Willebrand factor, %	98±9	126±14	<0.001	152±18	<0.001
Endothelin-1, pg/ml	0.86±0.21	1.42±0.33	<0.001	1.87±0.41	<0.001
sICAM-1, ng/ml	210±35	325±50	<0.001	412±70	<0.001

Note: RA, rheumatoid arthritis; sICAM-1, soluble intercellular adhesion molecule-1; p1, comparison between very early RA and control group; p2, comparison between early RA and control group. Data are presented as M±m.

DISCUSSION

The results demonstrate that endothelial dysfunction and hemostatic abnormalities are present from the early stages of RA. The increase in D-dimer is consistent with enhanced fibrin turnover and a procoagulant laboratory profile, whereas the progressive decrease in antithrombin III suggests weakening of natural anticoagulant protection.

The increase in vWF indicates endothelial injury and enhanced platelet adhesion potential (Vischer, 2006; Manz et al., 2022). Elevated endothelin-1 reflects vasoconstrictor imbalance, whereas increased sICAM-1 indicates inflammatory endothelial activation and leukocyte-endothelial interaction (Yang et al., 2016; Anyfanti et al., 2020).

Taken together, the simultaneous increase in D-dimer and endothelial markers together with the decrease in antithrombin III suggests that endothelial injury, coagulation activation and impairment of anticoagulant mechanisms are interconnected components of early RA. This interpretation is consistent with epidemiological evidence of increased venous thromboembolism risk in RA (Molander et al., 2021; Hu et al., 2021).

The principal limitation of the present study is its cross-sectional laboratory design. The findings demonstrate group differences but do not establish causality or predictive accuracy for future thrombosis. Prospective studies are required to validate the combined marker panel.

CONCLUSIONS

1. Endothelial dysfunction and hemostatic abnormalities are detectable in the early stages of rheumatoid arthritis.

2. D-dimer progressively increased from 210±60 ng/ml in controls to 420±110 ng/ml in very early RA and 680±160 ng/ml in early RA.

3. Antithrombin III activity decreased from 102±6% in controls to 94±7% and 88±8% in the respective patient groups.

4. vWF, endothelin-1 and sICAM-1 increased with disease duration, indicating progressive endothelial injury and inflammatory endothelial activation.

5. Combined assessment of these markers may help characterize an unfavorable vascular and prothrombotic laboratory profile; prospective validation is required before use as predictive markers of clinical thrombosis.

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ТЕЧЕНИЕ БЕРЕМЕННОСТИ И ЧАСТОТА РАЗВИТИЯ ПРЕЭКЛАМПСИИ У ПАЦИЕНТОК С СОПУТСТВУЮЩЕЙ ЖЕЛЕЗОДЕФИЦИТНОЙ АНЕМИЕЙ

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Аннотация. *Железодефицитная анемия (ЖДА) и преэклампсия относятся к числу наиболее значимых осложнений беременности, а вопрос об их взаимосвязи сохраняет актуальность и дискуссионность. Цель обзора — обобщить современные данные об особенностях течения беременности и о частоте развития преэклампсии у пациенток с сопутствующей ЖДА. Проведён анализ литературы, посвящённой эпидемиологии и патогенезу обоих состояний. Показано, что ЖДА сопровождается тканевой гипоксией, окислительным стрессом и эндотелиальной дисфункцией — процессами, которые составляют важные звенья патогенеза преэклампсии. Течение беременности при ЖДА чаще осложняется плацентарной недостаточностью, задержкой роста плода и угрозой прерывания. Данные о влиянии анемии на частоту преэклампсии неоднородны, однако большинство работ указывает на увеличение риска при выраженном дефиците железа. Рациональная профилактика и коррекция ЖДА рассматриваются как элемент комплексной стратегии снижения акушерского риска.*

Ключевые слова: *железодефицитная анемия, беременность, преэклампсия, эндотелиальная дисфункция, окислительный стресс, плацентарная недостаточность, акушерские осложнения.*

Abstract. *Iron deficiency anemia (IDA) and preeclampsia are among the most significant complications of pregnancy, and the question of their interrelationship remains relevant and debatable. The aim of this review is to summarize current data on the features of the course of pregnancy and on the incidence of preeclampsia in patients with concomitant IDA. An analysis of the literature devoted to the epidemiology and pathogenesis of both conditions was performed. It has been shown that IDA is accompanied by tissue hypoxia, oxidative stress, and endothelial dysfunction — processes that constitute important links in the pathogenesis of preeclampsia. Pregnancy complicated by IDA is more often associated with placental insufficiency, fetal growth restriction, and threatened miscarriage. Data on the influence of anemia on the incidence of preeclampsia are heterogeneous; however, most studies indicate an increased risk in cases of pronounced iron deficiency. Rational prevention and correction of IDA are considered an element of a comprehensive strategy for reducing obstetric risk.*

Keywords: *iron deficiency anemia, pregnancy, preeclampsia, endothelial dysfunction, oxidative stress, placental insufficiency, obstetric complications.*

ВВЕДЕНИЕ

Преэклампсия представляет собой одно из наиболее тяжёлых и потенциально опасных осложнений беременности, занимающее ведущее место в структуре материнской и перинатальной заболеваемости и смертности. Это мультисистемное расстройство, характеризующееся артериальной гипертензией и полиорганной дисфункцией[15], в основе которого лежат нарушение плацентации, генерализованная эндотелиальная дисфункция и системная воспалительная реакция[16]. Несмотря на многолетнее изучение, этиология и патогенез преэклампсии остаются предметом активных научных дискуссий, а поиск модифицируемых факторов риска сохраняет высокую практическую значимость.

[15] Rana S., Lemoine E., Granger J.P., Karumanchi S.A. Преэклампсия: патофизиология, проблемы и перспективы // Circulation Research. — 2019. — Т. 124, № 7. — С. 1094–1112.

[16] Roberts J.M., Hubel C.A. Двухстадийная модель преэклампсии: вариации темы // Placenta. — 2009. — Т. 30, Прил. А. — С. S32–S37.

Железодефицитная анемия, в свою очередь, является самым распространённым экстрагенитальным заболеванием беременных. По данным Всемирной организации здравоохранения, анемия осложняет беременность приблизительно у 38–40 % женщин в мире[17], при этом абсолютное большинство случаев обусловлено дефицитом железа[18]. Высокая распространённость ЖДА делает закономерным её частое сочетание с другими осложнениями гестации, включая преэклампсию.

Вопрос о характере взаимосвязи между ЖДА и преэклампсией является сложным и неоднозначным. С одной стороны, дефицит железа приводит к тканевой гипоксии и активации окислительного стресса — процессам, которые рассматриваются в качестве важных механизмов повреждения эндотелия и, следовательно, могут способствовать развитию преэклампсии. С другой стороны, ряд эпидемиологических наблюдений указывает на неоднозначный характер этой связи и на роль сопутствующих факторов, что требует взвешенного анализа имеющихся данных.

Цель обзора — систематизировать современные представления об особенностях течения беременности и о частоте развития преэклампсии у пациенток с сопутствующей железодефицитной анемией, а также рассмотреть патогенетические механизмы, потенциально связывающие эти два состояния.

МАТЕРИАЛЫ И МЕТОДЫ

Настоящая работа выполнена в формате аналитического обзора литературы. Поиск публикаций осуществлялся в базах данных PubMed/MEDLINE, Cochrane Library, eLibrary и Google Scholar с использованием ключевых слов на русском и английском языках:

[17] Рекомендации ВОЗ по оказанию дородовой помощи для формирования положительного опыта беременности. — Женева: ВОЗ, 2016.

[18] Breymann C. Железодефицитная анемия при беременности // Seminars in Hematology. — 2015. — Т. 52, № 4. — С. 339–347.

«железодефицитная анемия», «беременность», «преэклампсия», «эндотелиальная дисфункция», «окислительный стресс», «плацентарная недостаточность», «iron deficiency anemia», «preeclampsia», «pregnancy outcomes», «oxidative stress».

В обзор включались оригинальные исследования, систематические обзоры, метаанализы, а также фундаментальные и клинические работы, освещающие эпидемиологию и патогенез железодефицитной анемии и преэклампсии. Из анализа исключались публикации, не соответствующие тематике или не содержащие достаточных методологических сведений. Отобранные материалы были структурированы по тематическим блокам и подвергнуты качественному сопоставительному анализу с акцентом на выявление патогенетических связей между рассматриваемыми состояниями.

РЕЗУЛЬТАТЫ

Эпидемиология ЖДА и преэклампсии

Анализ литературы демонстрирует высокую распространённость обоих состояний и их значительный вклад в структуру осложнений беременности[19]. Железодефицитная анемия чаще выявляется у женщин с недостаточным нутритивным статусом, коротким интергенетическим интервалом, многоплодной беременностью и низким социально-экономическим уровнем. Преэклампсия, в свою очередь, ассоциируется с первой беременностью, экстрагенитальной патологией, ожирением и отягощённым акушерским анамнезом. Частое сосуществование этих факторов создаёт условия для сочетанного течения анемии и преэклампсии у одной пациентки.

Особенности течения беременности при ЖДА

[19] Концентрации гемоглобина для диагностики анемии и оценки степени её тяжести. — Женева: ВОЗ, 2011.

Железодефицитная анемия оказывает системное неблагоприятное влияние на течение гестационного процесса[20]. Хроническая тканевая гипоксия, обусловленная снижением кислородной ёмкости крови, затрагивает в том числе маточно-плацентарный комплекс. Вследствие этого беременность при ЖДА чаще осложняется плацентарной недостаточностью, задержкой роста плода, угрозой прерывания и преждевременными родами[21]. Спектр наиболее характерных акушерских осложнений, ассоциированных с дефицитом железа, представлен на рисунке 1.



Рисунок 1. Спектр акушерских осложнений, ассоциированных с ЖДА.

Существенно, что многие из перечисленных осложнений имеют общие патогенетические корни с преэклампсией, в частности нарушение

[20] Milman N. Железо и беременность: тонкий баланс // Annals of Hematology. — 2006. — Т. 85, № 9. — С. 559–565.

[21] Cunningham F.G., Leveno K.J., Bloom S.L. et al. Акушерство Уильямса. — 25-е изд. — New York: McGraw-Hill Education, 2018.

формирования и функционирования плаценты. Это обстоятельство делает изучение связи ЖДА и преэклампсии особенно обоснованным и указывает на возможность общих механизмов повреждения.

Патогенетические связи ЖДА и преэклампсии

Ключевым звеном, объединяющим железодефицитную анемию и преэклампсию, считается эндотелиальная дисфункция. Дефицит железа сопровождается тканевой гипоксией и усилением окислительного стресса — избыточного образования активных форм кислорода на фоне снижения антиоксидантной защиты[22]. Активные формы кислорода повреждают эндотелий сосудов, снижают биодоступность оксида азота и нарушают вазодилатирующую функцию сосудистой стенки, что создаёт предпосылки для системного вазоспазма и артериальной гипертензии, характерных для преэклампсии.

Дополнительным механизмом является влияние гипоксии на процессы плацентации и ангиогенеза. Нарушение полноценной инвазии трофобласта и ремоделирования спиральных артерий приводит к хронической плацентарной гипоксии, которая, в свою очередь, стимулирует высвобождение антиангиогенных факторов и провоспалительных медиаторов в материнский кровоток. Дисбаланс ангиогенных факторов и генерализованная воспалительная реакция рассматриваются как центральные звенья патогенеза преэклампсии. Логическая последовательность этих процессов представлена на рисунке 2.

[22] Scholl T.O. Материнский статус железа: связь с ростом плода, длительностью гестации и запасами железа новорождённого // Nutrition Reviews. — 2011. — Т. 69, Прил. 1. — С. S23–S29.



Рисунок 2. Предполагаемые патогенетические звенья, связывающие ЖДА и преэклампсию.

Таким образом, дефицит железа потенциально способен воздействовать на несколько ключевых механизмов развития преэклампсии одновременно — через тканевую гипоксию, окислительный стресс, нарушение ангиогенеза и эндотелиальную дисфункцию. Это формирует патофизиологически обоснованную базу для представления о ЖДА как о факторе, способном модифицировать риск преэклампсии.

Клинико-эпидемиологические данные о частоте преэклампсии при ЖДА

Результаты клинико-эпидемиологических исследований в целом свидетельствуют о тенденции к увеличению частоты преэклампсии по мере нарастания степени тяжести анемии. Обобщённые ориентировочные данные, иллюстрирующие эту зависимость, приведены на рисунке 3.

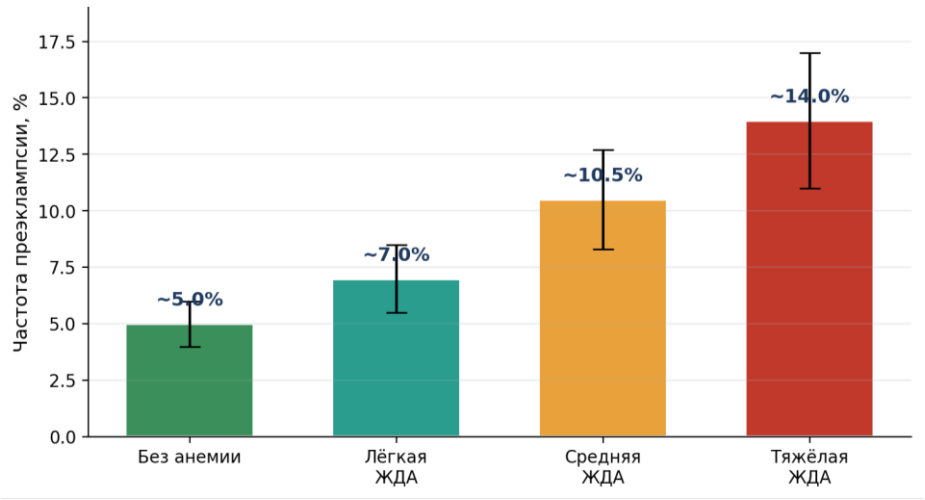

Рисунок 3. Ориентировочная частота преэклампсии в зависимости от наличия и степени ЖДА (обобщённые данные литературы).

Вместе с тем накопленные данные нельзя считать однозначными. В части исследований самостоятельный вклад анемии в развитие преэклампсии оказывался статистически незначимым после поправки на сопутствующие факторы риска. Кроме того, в литературе обсуждается нелинейный характер связи между уровнем гемоглобина и акушерским риском: неблагоприятные исходы описаны не только при низких, но и при аномально высоких значениях гемоглобина, что может отражать нарушение физиологической гемодилюции и повышенную вязкость крови. Эти наблюдения подчёркивают сложность взаимоотношений между показателями обмена железа и риском преэклампсии.

ОБСУЖДЕНИЕ

Обобщение представленных данных позволяет заключить, что железодефицитная анемия и преэклампсия связаны совокупностью общих патогенетических механизмов, центральное место среди которых занимают тканевая гипоксия, окислительный стресс и эндотелиальная дисфункция. Наличие этих общих звеньев делает патофизиологически правдоподобной гипотезу о том, что выраженный дефицит железа может

способствовать повышению риска преэклампсии, особенно при тяжёлых и длительно некорригированных формах анемии.

В то же время интерпретация клинических данных требует осторожности. Железодефицитная анемия и преэклампсия имеют ряд общих факторов риска и нередко сопутствуют друг другу, что затрудняет разграничение причинно-следственных связей и простой ассоциации. Неоднородность результатов исследований может быть обусловлена различиями в дизайне, критериях диагностики, сроках оценки гемоглобина и полноте учёта сопутствующих факторов.

Особого внимания заслуживает представление о нелинейном характере связи между уровнем гемоглобина и акушерским риском. С клинической точки зрения это означает, что целью ведения беременных должно быть не механическое повышение гемоглобина любой ценой, а поддержание его физиологически оптимального уровня посредством рациональной диагностики истинного дефицита железа и обоснованного назначения терапии. Такой подход позволяет избегать как последствий некорригированной анемии, так и потенциальных рисков, связанных с чрезмерно высокими значениями гемоглобина.

Практическая значимость рассмотренной проблемы состоит в том, что железодефицитная анемия является потенциально управляемым состоянием. Своевременное выявление и адекватная коррекция дефицита железа на прегравидарном этапе и в течение беременности могут способствовать улучшению течения гестации, снижению частоты плацентарной недостаточности и, возможно, уменьшению риска

преэклампсии[23], что требует подтверждения в дальнейших целенаправленных исследованиях[24].

Ограничения обзора связаны с преимущественно описательным характером анализа, гетерогенностью источников и различиями в методологии первичных исследований. Приведённые количественные показатели носят ориентировочный, иллюстративный характер и не предназначены для точной статистической оценки.

ЗАКЛЮЧЕНИЕ

Железодефицитная анемия оказывает многогранное неблагоприятное влияние на течение беременности и разделяет с преэклампсией ряд ключевых патогенетических механизмов — тканевую гипоксию, окислительный стресс, нарушение ангиогенеза и эндотелиальную дисфункцию. Течение беременности при ЖДА чаще осложняется плацентарной недостаточностью, задержкой роста плода и угрозой прерывания. Большинство исследований указывает на тенденцию к повышению частоты преэклампсии по мере нарастания тяжести анемии, хотя характер этой связи остаётся дискуссионным и, по-видимому, нелинейным.

Рациональную профилактику, своевременную диагностику и адекватную коррекцию железодефицитной анемии следует рассматривать как компонент комплексной стратегии снижения акушерского риска. Дальнейшие проспективные исследования, учитывающие сопутствующие факторы и нелинейный характер связи между уровнем гемоглобина и исходами, необходимы для окончательного уточнения роли ЖДА в развитии преэклампсии.

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5-SECTION

IMPROVING THE ORGANIZATIONAL-ECONOMIC MECHANISMS FOR ENHANCING THE COMPETITIVENESS OF SMALL BUSINESS ENTITIES

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Abstract. *This article examines the organizational-economic mechanisms for enhancing the competitiveness of small business entities. Competitiveness is interpreted as a three-level system: internal (firm resources), market, and institutional. Drawing on official statistics, the share of small business in Uzbekistan's GDP and its regional disparities are analyzed. The author proposes an approach grounded in a composite competitiveness index and a "weighted-gap" management rule that directs support resources toward the regions with the greatest potential impact. The findings highlight opportunities to reduce inter-regional differentiation and to raise policy efficiency through institutional support and digitalization.*

Keywords: *small business, competitiveness, organizational-economic mechanism, composite index, institutional environment, regional differentiation, state support.*

INTRODUCTION

Small business and private entrepreneurship form the structural foundation of a modern economy, playing a decisive role in generating employment, diffusing innovation, and stimulating regional development. For this reason, enhancing the competitiveness of small business entities has become one of the priority directions of economic policy.

In Uzbekistan, over the past decade the share of small business in gross domestic product has grown from 31.1% to 52.5%, while the level of employment in this sector has risen from 49.7% to 74.5% of total employment

in the economy (Decree of the President of the Republic of Uzbekistan, 2019). By the end of 2025, small business entities generated approximately 52.2% of the country's GDP, and as of 1 October 2025 more than 1.21 million active entities were registered (National Statistics Committee, 2025).

However, quantitative growth does not always coincide with qualitative change. The majority of small business entities are concentrated in retail and wholesale trade, while the export orientation and technological sophistication of their output remain low. Moreover, there is a substantial regional disparity in entity density: the indicator per 1,000 people reaches 43.5 in Khorezm region and 43.4 in Tashkent city, yet in a number of regions it remains below the national average of 32.1 (National Statistics Committee, 2025). This situation makes it necessary to raise competitiveness not only in quantitative terms but also from the standpoint of quality and institutional factors.

The aim of the study is to substantiate the theoretical and practical directions for improving the organizational-economic mechanisms aimed at enhancing the competitiveness of small business entities. As a scientific contribution, a composite index for the integral assessment of competitiveness and a "weighted-gap" management rule for the targeted allocation of resources are proposed.

MAIN BODY

Theoretical framework. In the economic literature, competitiveness is interpreted as a multi-layered concept. According to Porter's theory of competitive advantage, a firm's market position is determined by its efficiency along the value chain and its strategic positioning (Porter, 1990). The resource-based view (RBV) locates the source of competitive advantage in a firm's unique, hard-to-imitate resources, above all its human capital (Barney, 1991). The institutional approach, in turn, emphasizes that firm behavior and performance are shaped by the surrounding "rules of the game" — formal and

informal institutions (North, 1990). Peng and colleagues generalize these perspectives as a "strategy tripod," arguing that competitive strategy is formed at the intersection of industry-, resource-, and institution-based factors (Peng et al., 2009).

Building on these theoretical foundations, it is expedient to interpret the competitiveness of a small business entity as a three-level system: first, the internal level — the firm's resource, technological, and managerial potential; second, the market level — advantage manifested through price, quality, and market share; and third, the institutional level — the favorableness of the tax, credit, licensing, and administrative environment. An organizational-economic mechanism is a set of organizational forms, economic levers, and information tools that coordinate these three levels and channel resources through state and market institutions.

Methodology. For an integral assessment of competitiveness, a composite index approach is proposed. The composite competitiveness index (CCI) aggregates several indicators across regions — entity density, labor productivity, investment activity, export share, and employment level — through min–max normalization. The contribution of each indicator is determined on the basis of statistical and expert weights, yielding an integral score on a 0–100 scale. To study the dynamics of inter-regional change, an econometric model based on panel data (2010–2025, by region) is applied.

For the managerial application of the mechanism, a "weighted-gap" rule is proposed: for each region, the difference between its CCI value and the indicator of the leading (frontier) region is computed, and this gap is weighted by the region's share in the economy. In this way, support resources are directed toward the regions with the largest weighted gap — that is, those whose improvement would contribute most to the final outcome. This rule serves to increase the efficiency of limited public resources and to progressively reduce regional differentiation.

Results and discussion. Analysis of official statistics reveals three types of imbalance in the development of small business. First, a sectoral imbalance — a large share of entities is concentrated in trade and services, while the share of industry and high-value-added sectors is low. Second, a regional imbalance — the gap between regions in entity density and labor productivity persists. Third, an institutional imbalance — administrative barriers related to access to finance, licensing, and inspection procedures constrain entrepreneurial activity (Innovations in Science and Technologies, 2025).

In recent years, state policy has been directed at eliminating these imbalances. Within the framework of the documents “On improving the system of financial support for small and medium-sized business” (PD-193, 2023) and “On financial and institutional support for the development of small business” (Resolution PP-306, 2023), the system of preferential credit, guarantee funds, and advisory services has been expanded. In particular, preferential loans of up to 1.5 billion soums for small business entities and collateral-free funds of up to 50 million soums under the family entrepreneurship program have been made available (Norma.uz, 2024).

The package of administrative reforms adopted in 2025 provides for registering a business “in 15 minutes,” reducing bureaucratic costs, and introducing unified digital platforms; the reform is aimed at a significant reduction of the administrative costs of doing business (Invest Uzbekistan, 2025). The chain “family entrepreneur – microbusiness – small business – medium business” encourages the gradual scaling-up of entities. These measures strengthen the financial and institutional blocks of the organizational-economic mechanism; however, a mechanism for the targeted management of their regional distribution has not yet been fully formed.

On the basis of this analysis, it is substantiated that the organizational-economic mechanism for raising small business competitiveness should consist of four interrelated blocks. The institutional block comprises a three-tier

governance system that distributes CCI monitoring among existing agencies — the statistics committee, the ministry of economy and finance, and regional administrations — without creating a new institution. The financial block combines targeted lending, guarantee mechanisms, and alternative microfinance channels based on the weighted-gap rule. The digital block simplifies permits, reporting, and access to public procurement through a unified electronic platform, thereby reducing the administrative burden. The human-capital block strengthens firms' internal potential through entrepreneurship training, advisory centers, and cluster cooperation. Together, these blocks coordinate the three levels of competitiveness.

CONCLUSION

Enhancing the competitiveness of small business entities requires combining quantitative growth with qualitative and institutional development. Interpreting competitiveness as an integral system encompassing the internal, market, and institutional levels makes it possible to design the organizational-economic mechanism systematically. An approach based on a composite index (CCI) and a weighted-gap rule serves as a practical tool for directing support resources most efficiently, reducing regional imbalance, and increasing the targeting of state policy. In future research, it is expedient to compute the index fully on the basis of official statistical data and to empirically assess the effectiveness of the proposed mechanism.

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DUKKAKLI EKINLAR BOZORINING IQTISODIY MOHIYATI VA UNING BARQAROR AGRAR RIVOJLANISHDAGI ROLI

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Annotatsiya: *Maqolada dukkakli ekinlar bozorining barqaror agrar rivojlanish va aylanma iqtisodiyot tizimidagi ahamiyati tadqiq etilgan. Dukkakli ekinlarning oziq-ovqat xavfsizligini ta’minlash, resurs tejamkorlikni kuchaytirish va agroekologik barqarorlikni ta’minlashdagi o‘rni yoritilgan. Shuningdek, dukkakli ekinlar bozorining iqtisodiy mohiyatiga oid mualliflik yondashuvi taklif etilgan.*

Kalit so‘zlar: *dukkakli ekinlar bozori, barqaror agrar rivojlanish, aylanma iqtisodiyot, oziq-ovqat xavfsizligi, agroekologik barqarorlik, resurs tejamkorlik.*

Abstract: *This article examines the significance of the legume market in sustainable agricultural development and the system of a circular economy. The role of legumes in ensuring food security, enhancing resource conservation, and ensuring agro-ecological stability is highlighted. The author's approach to the economic essence of the market for legumes is also proposed.*

Keywords: *market of leguminous crops, sustainable agricultural development, circular economy, food security, agro-ecological sustainability, resource conservation.*

KIRISh

Jahon iqtisodiyoti sharoitida mamlakatlarning oziq-ovqat xavfsizligini ta’minlash, aholi sonining o‘sishi bilan birgalikda qishloq xo‘jaligida mavjud resurslardan samarali foydalanish hamda agrar ishlab chiqarishning ekologik barqarorligini saqlash masalalari dolzarb strategik vazifalardan biri hisoblanadi. Shu bilan birga, global iqlim o‘zgarishi, ekologik va siyosiy beqarorliklar, shuningdek tashqi savdodagi murakkabliklar, o‘z navbatida energetik resurslar

qiymatining oshishiga olib kelishi kabi jarayonlar ushbu sohadagi bosimni kuchaytirmoqda. Ushbu holat qishloq xo‘jaligini an’anaviy ekstensiv rivojlanish modelidan barqaror iqtisodiy o‘sishga asoslangan innovatsion modelga o‘tish zaruriyatini keltirib chiqarmoqda.

Zero, yuqorida qayd etilgan masalalarni hal qilishda qishloq xo‘jaligi mahsulotlari qatorida dukkakli ekinlarni yetishtirish muhim o‘rin tutadi. Chunki ular biologik xususiyatlariga ko‘ra aholini oziq-ovqat bilan ta’minlashda, chorvachilik uchun mustahkam yem-xashak bazasini shakllantirishda hamda tuproq unumdorligini saqlashda muhim ahamiyat kasb etadi. Shu sababli ularni yetishtirish barqaror agrar rivojlanish strategiyasining muhim tarkibiy qismi sifatida qaraladi.

ASOSIY QISM

Dukkakli ekinlarni yetishtirishning muhim xususiyatlaridan biri iqtisodiy samaradorlik bilan ekologik barqarorlikni uyg‘unlashtirish imkoniyati hisoblanadi. Dukkakli ekinlar atmosfera azotini fiksatsiya qilish xususiyati orqali tuproq unumdorligini saqlash va mineral o‘g‘itlarga bo‘lgan ehtiyojni qisqartirish imkonini beradi. Bu esa qishloq xo‘jaligida ekologik yuklamani kamaytirish va tabiiy resurslardan samarali foydalanishga xizmat qiladi [2].

Shu bilan birga, dukkakli ekinlarning mineral o‘g‘itlarga bo‘lgan talabni qisqartirish xususiyati ishlab chiqarish tannarxini pasaytirish va foyda darajasini oshirish imkonini beradi. Natijada mazkur ekin turlari resurs tejamkor va iqtisodiy jihatdan samarali ishlab chiqarishni ta’minlashga xizmat qiladi.

Xorijiy tadqiqotlarda barqaror qishloq xo‘jaligi konsepsiyasi doirasida dukkakli ekinlarning ahamiyati alohida ta’kidlanadi. Jumladan, Jules Pretty barqaror qishloq xo‘jaligini resurs samaradorligi va ekologik barqarorlikni ta’minlashga qaratilgan agroekologik yondashuv sifatida baholaydi. Uning fikricha, biologik jarayonlarga asoslangan agrar ishlab chiqarish usullari uzoq muddatli iqtisodiy barqarorlikni ta’minlash imkonini beradi [3].

Zamonaviy agrar iqtisodiyotda aylanma iqtisodiyot konsepsiyasi ham muhim nazariy asoslardan biri hisoblanadi. Mazkur yondashuv biologik resurslardan samarali foydalanish, chiqindilarni minimallashtirish va resurslar aylanishini ta’minlash orqali tabiiy kapitalni saqlashga qaratilgan. Corona va hammualliflar aylanma iqtisodiyotni resurslar aylanishini ta’minlash va ishlab chiqarish samaradorligini oshirishga xizmat qiluvchi iqtisodiy tizim sifatida talqin qiladilar [4].

Yuqoridagi nazariy yondashuvlar tahlili shuni ko‘rsatadiki, dukkakli ekinlar agrar iqtisodiyotda nafaqat ishlab chiqarish ob’ekti, balki iqtisodiy, ekologik va bozor munosabatlarini o‘zaro bog‘lovchi kompleks tizim sifatida namoyon bo‘ladi. Ularning ahamiyati resurs tejamkorlikni ta’minlash, tuproq unumdorligini saqlash va oziq-ovqat xavfsizligini mustahkamlash orqali agrar iqtisodiyotning barqaror rivojlanishiga xizmat qilishi bilan belgilanadi.

Yuqoridagi nazariy yondashuvlar va ilmiy qarashlarni umumlashtirgan holda, bizning fikrimizcha, dukkakli ekinlar bozori — dukkakli mahsulotlarni ishlab chiqarish, qayta ishlash, taqsimlash, ayirboshlash va iste’mol qilish jarayonida ishtirok etuvchi sub’ektlar o‘rtasida yuzaga keladigan, resurs tejamkorlik va agroekologik barqarorlikka asoslangan iqtisodiy munosabatlar tizimi hisoblanadi.

Mazkur ta’rif dukkakli ekinlar bozorini faqat mahsulot ayirboshlash munosabatlari doirasida emas, balki qo‘shilgan qiymat yaratish, resurslar aylanishini ta’minlash va agrar iqtisodiyot barqarorligini mustahkamlashga xizmat qiluvchi kompleks iqtisodiy tizim sifatida baholash imkonini beradi.

XULOSA

Shunday qilib, dukkakli ekinlar bozori agrar iqtisodiyotda resurs tejamkorlik, oziq-ovqat xavfsizligi va agroekologik barqarorlikni ta’minlashga xizmat qiluvchi muhim iqtisodiy tizim hisoblanadi. Uning rivojlanishi qishloq xo‘jaligi samaradorligini oshirish, tuproq unumdorligini saqlash hamda aylanma iqtisodiyot tamoyillarini keng joriy etish uchun muhim asos bo‘lib xizmat qiladi.

Bozorni rivojlantirish orqali agrar tarmoq raqobatbardoshligini oshirish va barqaror rivojlanish maqsadlariga erishish imkoniyatlari kengayadi.

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МЕВА-САБЗАВОТЧИЛИК ТАРМОҒИНИ МОДЕРНИЗАЦИЯЛАШНИНГ БАРҚАРОР РИВОЖЛАНИШДАГИ АҲАМИЯТИ

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Аннотация: *Тезисда мева-сабзавотчилик тармоғини модернизациялашнинг иқтисодий аҳамияти ва барқарор ривожланишдаги ўрни тадқиқ этилган. Тармоқ ривожланишининг асосий тенденциялари, маҳсулот ишлаб чиқариш, ҳосилдорлик ва экспорт кўрсаткичларидаги ўзгаришлар таҳлил қилинган. Шунингдек, тармоқ рақобатбардошлигини оширишга қаратилган модернизация жараёнларининг устувор йўналишлари асослаб берилган.*

Таянч сўзлар: *мева-сабзавотчилик, модернизация, рақобатбардошлик, ҳосилдорлик, экспорт, аграр тармоқ, барқарор ривожланиш.*

Abstract: *The thesis examines the economic significance of modernizing the fruit and vegetable industry and its role in sustainable development. The main trends in the development of the industry, changes in production, yield and export indicators are analyzed. The priority directions of modernization processes aimed at increasing the competitiveness of the industry are also substantiated..*

Keywords: *fruit and vegetable production, modernization, competitiveness, yield, export, agricultural sector, sustainable development.*

КИРИШ

Глобал иқлим ўзгариши, сув ресурслари тақчиллигининг кучайиши ва жаҳон бозорларида рақобатнинг ортиши шароитида қишлоқ хўжалиги тармоқларини модернизация қилиш муҳим аҳамият касб этмоқда. Айниқса, мева-сабзавотчилик тармоғи юқори қўшилган қиймат яратиш, аҳоли бандлигини таъминлаш ва экспорт салоҳиятини ошириш

имкониятлари билан миллий иқтисодиётда муҳим ўрин тутади. Шу боис мазкур тармоқни замонавий технологиялар асосида ривожлантириш ва ресурслардан самарали фойдаланиш механизмларини такомиллаштириш долзарб вазифалардан бири ҳисобланади.

Мазкур ҳолат мева-сабзавотчилик тармоғини модернизациялашнинг иқтисодий аҳамиятини назарий ва амалий жиҳатдан тадқиқ этиш заруратини белгилайди.

АСОСИЙ ҚИСМ

Иқтисодий адабиётларда модернизация иқтисодий тизимни инновациялар, технологик янгиланишлар ва институционал ўзгаришлар асосида такомиллаштириш жараёни сифатида талқин қилинади. Аграр соҳада модернизациянинг асосий мақсади ресурслардан фойдаланиш самарадорлигини ошириш, маҳсулот рақобатбардошлигини кучайтириш ҳамда қўшилган қиймат занжирини ривожлантиришдан иборат ҳисобланади [1;2;3].

Мева-сабзавотчилик тармоғи қишлоқ хўжалигининг юқори қўшилган қиймат яратувчи соҳаларидан бири бўлиб, унинг иқтисодий аҳамияти нафақат аҳолини озиқ-овқат маҳсулотлари билан таъминлаш, балки экспорт салоҳиятини ошириш ва қишлоқ аҳолиси даромадларини кўпайтириш билан ҳам белгиланади. Бироқ глобал иқлим ўзгариши, сув ресурслари тақчиллиги, ташқи бозорларда рақобатнинг кучайиши ҳамда маҳсулот йўқотишларининг сақланиб қолаётганлиги тармоқни модернизация қилиш заруратини янада оширмоқда.

Таҳлиллар кўрсатишича, сўнгги йилларда республикада мева-сабзавотчилик тармоғини ривожлантириш бўйича муҳим институционал ва технологик ўзгаришлар амалга оширилган. Хусусан, 2010–2025 йилларда мева ва резаворлар боғлари майдони 235,3 минг гектардан 379,5 минг гектаргача, сабзавот экинлари майдони эса 173,0 минг гектардан 289,0 минг гектаргача кенгайган. Шу даврда мева маҳсулотлари ишлаб

чиқариш ҳажми 1,68 млн тоннадан 3,37 млн тоннагача, сабзавот маҳсулотлари ишлаб чиқариш ҳажми эса 6,26 млн тоннадан 14,1 млн тоннагача ошган [4].

Мазкур натижалар тармоқ ривожланиши фақат ер майдонларини кенгайтириш ҳисобига эмас, балки интенсив иқтисодий омиллар таъсири остида кечаётганлигини кўрсатади. Жумладан, мевачиликда маҳсулот ишлаб чиқариш ўсиш суръати майдонлар ўсиш суръатидан 39,7 фоиз бандига, сабзавотчиликда эса 58,1 фоиз бандига юқори шаклланган. Бу юқори ҳосилли навлар, замонавий агротехнологиялар, сув тежамкор технологиялар ҳамда бошқарув тизимидаги ўзгаришларнинг иқтисодий самараси намоён бўлаётганлигини англатади.

Модернизация жараёнларининг натижаси ер ресурсларидан фойдаланиш самарадорлигида ҳам ўз аксини топган. Таҳлил қилинаётган даврда мева ҳосилдорлиги 71,2 ц/гадан 88,8 ц/гагача ёки 24,6 фоизга, сабзавот ҳосилдорлиги эса 362,0 ц/гадан 487,9 ц/гагача ёки 34,8 фоизга ошган [4]. Бу ҳолат маҳсулот ишлаб чиқариш ўсишининг муҳим қисми ер ресурсларидан самарали фойдаланиш ҳисобига таъминланганлигини кўрсатади.

Шу билан бирга, ҳосилдорлик кўрсаткичларининг ўсиши барча хўжалик юритувчи субъектлар бўйича бир хил даражада шаклланмаган. Айрим ҳудудларда замонавий агротехнологиялар, сув тежамкор суғориш тизимлари ва интенсив ишлаб чиқариш усулларининг жорий этилиши юқори самара берган бўлса, бошқа ҳудудларда ресурслардан фойдаланиш самарадорлиги нисбатан пастлигича қолмоқда. Бу эса тармоқни модернизациялаш жараёнларини ҳудудий хусусиятлардан келиб чиққан ҳолда ташкил этиш зарурлигини кўрсатади.

Мева-сабзавотчилик тармоғида амалга оширилаётган модернизация тадбирлари ташқи бозорлардаги иқтисодий натижаларга ҳам ижобий таъсир кўрсатган. Хусусан, 2010 йилда 341,4 минг тоннани ташкил этган

экспорт ҳажми 2025 йилга келиб 2036,2 минг тоннага етган ва қарийб 6 баробар ўсган [4]. Бу тармоқнинг экспорт салоҳияти кенгайиб бораётганлигини кўрсатади. Бироқ экспортнинг асосий қисми анъанавий бозорларга тўғри келаётганлиги юқори даромадли бозорларга чиқиш учун халқаро сифат ва хавфсизлик стандартларини кенг жорий этиш зарурлигини кўрсатади.

Шу нуқтаи назардан, тармоқни модернизациялашда маҳсулотни сақлаш, саралаш, қадоқлаш ва қайта ишлаш инфратузилмасини ривожлантириш алоҳида аҳамият касб этади. Чунки қиймат занжирининг мазкур бўғинларини такомиллаштириш маҳсулот йўқотишларини қисқартириш, экспортбоп маҳсулотлар улушини ошириш ҳамда ташқи бозорларда миллий маҳсулотлар рақобатбардошлигини кучайтириш имконини беради.

ХУЛОСА

Олиб борилган таҳлиллар Ўзбекистонда мева-сабзавотчилик тармоғи ривожланишида ижобий тенденциялар шаклланганлигини кўрсатди. 2010–2025 йилларда маҳсулот ишлаб чиқариш ҳажми, ҳосилдорлик кўрсаткичлари ва экспорт салоҳияти сезиларли даражада ошган. Бу тармоқда амалга оширилаётган модернизация жараёнларининг иқтисодий самарадорлигини тасдиқлайди.

Келгусида тармоқ рақобатбардошлигини ошириш учун ресурс-тежамкор технологияларни кенг жорий этиш, маҳсулотни сақлаш ва қайта ишлаш инфратузилмасини ривожлантириш, халқаро сертификатлаш тизимларини жорий қилиш ҳамда экспорт географиясини диверсификация қилиш мақсадга мувофиқ ҳисобланади. Шунингдек, тармоқда рақамли технологиялардан фойдаланиш даражасини ошириш ва инновацион ечимларни кенг жорий этиш модернизация жараёнларининг самарадорлигини янада кучайтиришга хизмат қилади. Бу чора-тадбирлар

мева-сабзавотчилик тармоғининг барқарор ривожланиши ва халқаро бозорлардаги позициясини мустаҳкамлашга хизмат қилади.

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ANALYSIS OF THE PRACTICE OF EXPANDING NON-INTEREST INCOME SOURCES IN COMMERCIAL BANKS

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Abstract: *This thesis analyzes the practice of expanding non-interest income sources in commercial banks. It highlights the role of commission services, digital payment platforms, acquiring, P2P and QR-payments in generating revenue independent of lending interest rates. The 2018-2024 dynamics indicate a steady increase in non-interest income, while the economic potential of digital services remains underutilized. The study concludes that diversification of commission services, development of digital banking infrastructure, foreign exchange operations and the acquiring segment are strategic drivers of income stability for banks.*

Keywords: *non-interest income, commission services, digital banking, acquiring, QR-payments, P2P, diversification, transactional revenue, bank profitability.*

Аннотация: *Тезисда тижорат банкларида фоизсиз даромад манбаларини кенгайтириш амалиёти таҳлил қилинган. Комиссион хизматлар, рақамли тўлов платформалари, эквайринг, P2P ва QR-тўловларининг банк даромадларини кредит фоизларига боғлиқ бўлмаган ҳолда шакллантиришдаги аҳамияти ёритилган. 2018-2024 йиллар динамикаси фоизсиз даромадлар улуши ўсиб бораётганини, аммо рақамли хизматларнинг иқтисодий салоҳияти тўлиқ ишга тушмаганини кўрсатган. Комиссион хизматлар диверсификацияси, рақамли банк инфратузилмаси, валюта операциялари ҳамда эквайринг сегментини ривожлантириш банклар учун даромад барқарорлигини таъминловчи стратегик йўналиш сифатида баҳоланган.*

Калит сўзлар: *Фоизсиз даромад, комиссион хизматлар, рақамли банкинг, эквайринг, QR-тўловлар, P2P, диверсификация, транзакцион даромад, банк рентабеллиги.*

INTRODUCTION

Commerce banks interest-free income share increase through income diversifies its sources. This is for the bank stable cash flow and risks reduction possible gives. The world in the experience commission services, digital payment platforms, acquiring, transaction services and currency transactions in banking interest-free of income main sources as is seen.

In 2018 - 2024 international practice bank from services coming commission the harvest strategic income to the model turned. Including in US and European banks interest-free income the share is around 30 - 55% shaped [1]. Developed in countries banks to loan interest does not rely They are transactions, digital services, online acquisition and mobile banking income takes This system is a bank business model of money circulation, customer turnover and digital to the infrastructure connects.

In Uzbekistan both last in years interest-free of income importance increase is going In banks payment services, plastic card infrastructure, P2P and QR- payments, acquiring and electronic payments services expanding. In the reports of the Central Bank of banks transactional income share year after year increasing going record [2] This change reflects the gradual shift of the banking business model from relying on interest rates to relying on revenues from services.

At the same time, interest-free income sources still complete not developed. Commission services spectrum limited, digital services economic from potential complete using did not receive, on acquisition in the corporate client segment competition is low. This is the case the subject research verb the need appearance does.

LITERATURE REVIEW

Interest-free income of the modern banking business model main from directions one is considered International Diversification of bank income in studies, ie interest-bearing from the proceeds outside to sources passage risks reducing as a financial strategy interpretation will be done. Commission

services, payment platforms, currency operations, acquiring and digital banking services the bank income not tied to loan interest in case shapes.

According to World Bank (2023) according to European and US banks the share of non-interest income is in the range of 30–55% shaped [1]. This indicator banks income in the structure services and transactions main to the driver that turns means Diversification model of banking risk reduces, financial my flow stabilizes, interest policy to vibrate dependency reduces.

In the studies of Mishkin (2022), Saunders & Cornett (2021) interest-free earnings for the bank strategic dominant direction as determined, his advantage as the following shown [3,4]:

• commission proceeds to credit risks related not;

• the revenue base expands as digital payments increase;

• transactional in the model the client turnover of the bank grows rapidly.

According to Rengasamy (2020), expanding interest-free services differentiates a bank from active competitors in the market and creates a value chain of banking products. In it, the bank is a lender not, but service indicator infrastructure as is positioned [5].

RESULTS AND DISCUSSION

Interest-free income in the modern banking model three main to the point relies on.

1. Commission services. Bank card transactions, acquiring, money transfers, payment reception to do service According to the theory, commission services client turnover and banking infrastructure proportional to the development grows. That's why mainly, Daripa & Kapur (2021) commission services of diversification the fastest return route because [6].

2. Currency and arbitrage operations. Currency exchange, conversion, export-import services interest-free of income important segment is considered According to KPMG Global Banking Review (2022). according to this segment of the world in banks general interest-free 18-26 % of the income [7].

3. Digital and mobile banking. Online payments, QR payments, P2P services, electronic invoicing, and human-less transactions are pushing the transaction threshold higher and scaling banking services. Accenture (2023) identified the digital model as a key driver in the strategic channel for non-interest income growth [8].

In Uzbekistan transactional services are developing rapidly. QR-payments share P2P services are growing Bank acquiring infrastructure is gaining popularity expands. However, without interest income share world below the level. Economical analyses mainly lending and interest-bearing to assets direction, commission services empirical studies on Local researchers have not conducted sufficient research in the following areas to expand the sources of income of commercial banks:

• Analysis across non-interest income segments is insufficient;

• digital banking services financial return not rated;

• to bank profitability of acquiring and transaction services effect not studied;

• business model diversification practice statistical information about less

The analysis of the data showed that commission services, digital payment infrastructure, foreign exchange transactions and acquiring services constitute the main non-interest portion of the bank's income. At the same time, it was revealed that the service portfolio is limited, the level of competition is low, and the potential of digital banking is not fully realized.

1. Dynamics and structure of non-interest income.

According to available data, banks are increasing the share of non-interest income year after year. Commission services and payment platforms have emerged as the main drivers. Transaction and acquiring revenues have grown rapidly in some banks, but the level of the overall banking sector is still low. Thus, there is a wide opportunity for development in the direction of income diversification.

2. Effect of commission services.

Commission services - interest-free income in development to the largest share segment with Plastic card operations, transfers, added valuable services for bank lending related not stable income gives Discussion to the results according to:

• commission income in most cases the client turnover and related to transaction numbers;

• the wider the range of services, the higher the rate of income;

• tariff models in the corporate and retail segment optimal not.

If banks revise their service tariff policy and product diversification, commission income can grow rapidly.

3. Digital banking and payment services place.

The research shows that digital banking is becoming a key driver of non-interest income growth. QR payments, P2P transfers, online invoicing and acquiring services are constantly connecting customers to the banking infrastructure. At the same time:

• market competition in digital services is increasing;

• The practice of segmenting products and tariffs is insufficient;

• from services user active customers low share.

If banks expand the range of digital services, the mobile payment ecosystem can evolve dramatically.

4. Currency services and market opportunities.

Currency exchange, export-import settlements, conversion services are also important as a source of interest-free income. The analysis showed the following cases:

• corporate demand for currency services is stable;

• there is an opportunity to recalibrate the tariff and margin policy;

• as the volume of foreign trade increases, interest-free income can also increase.

this segment regulatory requirements and risk control important importance profession will.

5. Practical conclusions and discussion results.

Taken results following general conclusions to the surface produces:

• interest-free income bank stability for strategic to the source is spinning;

• digital services, acquiring and commissions as the main driver shaped;

• corporate and retail services segmentation through income increase possible;

• diversification of tariff policy demand will be allowed;

• digital ecosystem and P2P payment services in large quantities to the potential owner

The analysis shows that the top priority for increasing the share of non-interest income in the future is to expand the digital banking infrastructure and the commission services segment.

Data analysis showed that commission services, digital payment platforms, acquiring and foreign exchange operations are the main segments that form banks' income independent of loan interest. This diversification is an important basis for ensuring bank stability, reducing risks and transitioning to a long-term financial model.

The growth rate of non-interest income is positive, but the potential is not fully realized. The range of commission services is limited, the use of digital banking opportunities is low, and service tariffs are not competitive. Thus, the bank's business model interest-free income segment reinforcement for wide opportunity exists.

Based on the results of the research, we developed the following suggestions and recommendations:

1. Expansion of diversification of commission services.

• offering cards, transfers, acquiring, settlement and invoicing services in the form of various tariff packages;

for retail and corporate segment separate tariff and service products work exit;

• public payment integration with platforms expansion.

2. Digital banking infrastructure deep development

• mobile banking services many functional in format update;

• Expand QR-payment, P2P, and online invoicing;

• introduction of bonus and cashback programs when connecting to digital services.

3. Expansion of the acquiring market.

• Increasing the network of POS devices in the retail segment;

• national payment to systems fast connection mechanisms simplification;

• terminals service for the money marginal competition calibration based on.

4. Currency and calculation services improvement

• export-import operations according to service expansion;

• corporate clients for currency exchange A dynamic tariff model is in place for payments verb;

• currency hedging and arbitration services product as shaping.

5. Income diversification strategic dominant to the direction rotation

• interest-free income share annual KPI and strategic integration into the plan;

• in the bank portfolio interest-bearing and interest-free income balance sheet systematic monitoring;

• digital banking income drivers as central to the position to put

Commercial banks have the opportunity to transition to a sustainable, risk-reducing and competitive business model by expanding their sources of non-interest income. The faster the commission and digital services infrastructure develops, the more diversified, long-term and sustainable the bank's income can grow.

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DAVLAT ISHTIROKIDAGI AKSIYADORLIK JAMIYATLARIDA ESG HISOBOTINI MONITORING QILISH MEXANIZMINI SHAKLLANTIRISH

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Annotatsiya. *Ushbu maqolada O‘zbekistonda ESG hisobotdorligining shakllanishi, uning normativ-huquqiy asoslari hamda amaliy joriy etilish holati tahlil qilinadi. Tadqiqot natijalari shuni ko‘rsatadiki, davlat ishtirokidagi korxonalarda ESG tamoyillarini joriy etish bo‘yicha huquqiy asos yaratilgan bo‘lsa-da, yagona hisobot formati, monitoring va tasdiqlash mexanizmlari hali to‘liq shakllanmagan.*

Kalit so‘zlar: *ESG, CSR, korporativ boshqaruv, davlat ishtirokidagi korxonalar, hisobotdorlik, monitoring, O‘zbekiston.*

Abstract. *This article examines the formation of ESG reporting in Uzbekistan, its legal basis, and current implementation practice. The study shows that although a regulatory framework for introducing ESG principles in state-owned enterprises has been formed, a unified reporting format, monitoring, and verification mechanisms are still not fully developed.*

Keywords: *ESG, CSR, corporate governance, state-owned enterprises, reporting, monitoring, Uzbekistan.*

KIRISH

So‘nggi yillarda ESG yondashuvi korporativ boshqaruvning muhim tarkibiy qismiga aylandi. Investorlar va xalqaro moliya institutlari

kompaniyalarni nafaqat moliyaviy natijalari, balki ekologik, ijtimoiy va boshqaruv ko‘rsatkichlari asosida ham baholamoqda [1–3, 8, 9]. O‘zbekistonda ham bu yo‘nalishda muayyan normativ-huquqiy asos shakllanmoqda. Xususan, davlat ishtirokidagi korxonalarda shaffoflikni oshirish, xalqaro boshqaruv standartlarini joriy etish va barqaror rivojlanish tamoyillarini integratsiya qilishga qaratilgan hujjatlar qabul qilindi [4–7].

Shu bilan birga, amaliyot shuni ko‘rsatmoqdaki, ESG hisobotdorligi bo‘yicha mavjud tashabbuslar hali yagona metodika va institutsional monitoring tizimi asosida rivojlanmayapti. Shu bois maqolaning maqsadi O‘zbekistonda ESG bo‘yicha qabul qilingan hujjatlar, ular asosida olib borilayotgan amaliy ishlar va ayrim kompaniyalarning mustaqil ESG hisobotlari amaliyotini tahlil qilishdan iborat [4–7, 10–13].

METODOLOGIYA

Tadqiqotda normativ-huquqiy tahlil, qiyosiy tahlil, kontent-tahlil hamda tahlil va sintez usullaridan foydalanildi. Normativ-huquqiy tahlil orqali O‘zbekistonda ESG va korporativ boshqaruvga oid hujjatlar o‘rganildi, qiyosiy tahlil yordamida milliy yondashuv xalqaro amaliyot bilan solishtirildi, kontent-tahlil asosida esa ayrim kompaniyalarning ESG va CSR hisobotlari mazmuni baholandi [1–10].

ASOSIY QISM

O‘zbekistonda ESG va korporativ boshqaruvga oid huquqiy asos so‘nggi yillarda bosqichma-bosqich shakllanmoqda. Xususan, PQ-436-son qarori bilan “yashil” iqtisodiyotga o‘tish bo‘yicha chora-tadbirlar belgilandi, PF-37-son Farmoni korporativ shaffoflik va hisobdorlikni kuchaytirishga xizmat qildi, PQ-163-son qarori esa davlat ishtirokidagi yirik korxonalarni transformatsiya qilish jarayonida xalqaro boshqaruv standartlarini joriy etish masalasini dolzarblashtirdi. Shuningdek, PF-6079-son Farmoni raqamli infratuzilmani rivojlantirish uchun umumiy strategik asos yaratdi [4–7]. O‘zbekistonda ESG

bo‘yicha qabul qilingan asosiy normativ hujjatlar va ular asosida amalga oshirilayotgan ishlarni quyidagi jadval orqali umumlashtirish mumkin.

1-jadval.

O‘zbekistonda ESG bo‘yicha normativ hujjatlar asosida amalga oshirilayotgan ishlar

Normativ hujjat	Asosiy yo‘nalish	Amalga oshirilayotgan ishlar	Amaliy ahamiyati
PQ-436 (2022)	“Yashil” iqtisodiyotga o‘tish va barqaror rivojlanish choralarini belgilash	“Yashil” iqtisodiyot onlayn platformasini takomillashtirish, ekologik va tarmoq ko‘rsatkichlarini yig‘ish hamda tahlil qilish ishlari olib borilmoqda	ESGning, ayniqsa ekologik komponenti bo‘yicha institutsional va raqamli asos yaratmoqda
PF-37 (2024)	“O‘zbekiston — 2030” strategiyasi doirasida zamonaviy boshqaruv va shaffoflikni kuchaytirish	Korporativ boshqaruv, hisobdorlik va ochiqlikni oshirishga qaratilgan chora-tadbirlar faollashdi	ESG hisobotdorligini rivojlantirish uchun umumiy siyosiy-huquqiy muhitni mustahkamlaydi
PQ-163 (2024)	Davlat ishtirokidagi yirik korxonalarni transformatsiya qilish	Davlat ishtirokidagi korxonalarda ESG diagnostika, ESG rejalari, ISSB va ESRS standartlari asosidagi hisobot tizimlarini joriy etish ishlari boshlandi	ESGni korporativ transformatsiya va xalqaro standartlar bilan bog‘laydi
PQ-213 (2024)	Milliy shaffoflik tizimi va MRV infratuzilmasini joriy etish	Issiqxona gazlari hisobi, milliy reyestr, MRV tizimi va onlayn platforma bo‘yicha amaliy ishlar olib borilmoqda	ESGning ekologik ko‘rsatkichlarini monitoring qilish uchun texnik baza yaratadi
Davlat korxonalari va yirik kompaniyalar amaliyoti	Ixtiyoriy va yarim institutsional ESG hisobotdorligi	Ayrim kompaniyalarda ESG bo‘limlari tashkil etilgan, barqaror rivojlanish hisobotlari e’lon qilinmoqda, ESG reyting va diagnostika amaliyoti joriy etilmoqda	Kelgusida yagona milliy ESG hisobot tizimini shakllantirish uchun amaliy tajriba bazasini yaratadi

Mazkur hujjatlar asosida amaliy faoliyat ham faollashmoqda. Iqtisodiyot va moliya vazirligi materiallariga ko‘ra, “Yashil” iqtisodiyot onlayn platformasini takomillashtirish, ekologik ko‘rsatkichlarni yig‘ish va tahlil qilish, shuningdek davlat ishtirokidagi yirik korxonalarda ESG diagnostika va hisobot tizimlarini joriy etish bo‘yicha ishlar olib borilmoqda. 2025-yil 9 oy yakunlari bo‘yicha hisobotda 22 ta korxonada umumiy tahlil o‘tkazilgani, 17 ta korxona uchun ESG rejalari ishlab chiqilgani, ayrim yirik korxonalarda tashqi konsultantlar bilan batafsil diagnostika boshlanganligi qayd etilgan [5–7].

Shu bilan birga, ESG hisobotdorligi ayrim yirik kompaniyalarda mustaqil korporativ tashabbus sifatida ham rivojlanmoqda. Masalan, “O‘zbekneftgaz”

AJda ESG bo‘limi tashkil etilgan va kompaniya saytida 2021–2025-yillar uchun barqaror rivojlanish hisobotlari joylashtirilgan [10]. SQBda ham ESG hisobotdorligi va yashil moliyalashtirish institutsional asosda rivojlantirilmoqda, 2024-yil yillik hisobotida ESG bo‘limi alohida ajratilgan [11].

Biroq mavjud hisobotlarning mazmuni va formati bir xil emas. Ayrim subyektlar GRI, ISSB, ESRS yoki SASB yondashuvlariga murojaat qilayotgan bo‘lsa-da, mamlakat miqyosida yagona formatning yo‘qligi ularni o‘zaro taqqoslashni murakkablashtiradi [2, 3, 8, 9]. Shu sababli O‘zbekistonda ESG hisobotdorligi bo‘yicha normativ va amaliy asos shakllanayotgan bo‘lsada, jarayon hozircha fragmentar xarakterga ega [4–7].

XULOSA

Tadqiqot natijalari O‘zbekistonda ESG va korporativ boshqaruv sohasida normativ-huquqiy asos shakllanayotganini ko‘rsatdi. Xususan, PQ-436, PF-37, PQ-163 va PQ-213 kabi hujjatlar orqali “yashil” iqtisodiyotga o‘tish, korporativ shaffoflikni oshirish, davlat ishtirokidagi yirik korxonalarni transformatsiya qilish hamda ekologik monitoring infratuzilmasini rivojlantirishga qaratilgan chora-tadbirlar belgilangan. Shu bilan birga, davlat ishtirokidagi ayrim yirik korxonalarda ESG diagnostika, reyting va hisobot tizimlarini joriy etish bo‘yicha amaliy ishlar boshlangan.

Tahlil shuni ko‘rsatdiki, O‘zbekistonda ESG hisobotdorligi nafaqat normativ talablar, balki ayrim yirik kompaniyalarning mustaqil korporativ tashabbuslari orqali ham shakllanmoqda. Biroq mavjud amaliyot hozircha yagona metodika, standart hisobot formati va mustaqil tasdiqlash mexanizmlarining yetarli darajada rivojlanmaganligi bilan tavsiflanadi. Shu sababli mamlakatda ESG bo‘yicha huquqiy va amaliy asos mavjud bo‘lsa-da, ularni yaxlit milliy hisobotdorlik tizimiga birlashtirish dolzarb vazifa bo‘lib qolmoqda.

TAVSIYALAR

1. Yagona milliy ESG hisobot metodikasini ishlab chiqish zarur.

2. Davlat ishtirokidagi yirik korxonalar uchun bosqichma-bosqich standartlashgan hisobot formatini joriy etish maqsadga muvofiq.
3. ESG hisobotlarini tashqi assurance yoki verifikatsiya tizimi bilan bog‘lash lozim.
4. Raqamli monitoring platformalari va MRV tizimini ESG hisobotdorligi bilan integratsiya qilish kerak.
5. Ilg‘or korporativ amaliyotni ommalashtirish va keyingi empirik tadqiqotlarni kengaytirish maqsadga muvofiq.

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HISTORICAL EVOLUTION AND KEY MILESTONES OF CHINA'S DIGITAL ECONOMY

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Annotation. Drawing on the development timeline of the digital economy in China since the early 1990s, this paper develops a four-stage periodization of the Chinese digital economy: Beginning, Preliminary Development, High-speed Growth and Intelligence-led, which outlines the evolution of digital economy infrastructure construction, institutional policy and market behavior on three parallel tracks – the consumer digital economy, e-government and industrial digitization. Based on secondary data and policy documents, the study concludes that digital transformation in China is not only market-driven, but a result of deliberate investment in infrastructure by the government, with digital economic activity contributing more than 40 per cent of the nation's GDP. The analysis provides a systematic overview of the past, which forms a basis for comparative policy analysis for developing economies.

Keywords: *China, digital economy, digital transformation, e-government, periodization, industrial digitization, artificial intelligence policy.*

INTRADUCTION

The rise of one of the worlds largest digital economies has been one of the biggest shifts in the last 30 years in China. To gain insight into the process of this change, researchers and policy makers need to understand how it took place and the institutional and technological steps involved, as this is not a one-off phenomenon, but a series of overlapping steps. This paper does so by outlining a four-stage periodization of the development of China's digital economy, discussing the evidence collected from infrastructure investment, e-government progress, and industrial digitization, from 1990 to present. This analysis is intended to offer a structured historical context that can then be used for

comparative policy analysis, with a focus on the applicability of China's experience in other country contexts.

The digital economy in China did not simply appear in one moment, but rather through four distinct phases, which are characterised by different mixes of technological infrastructure, institutional policy and market behaviour (Kong, 2022). It is useful, but too tidy, as it will appear that the periodization completely ignores a more complex reality where infrastructure development, industrial digitization and e-government development often overlapped and, in some cases, pre-dated the public internet itself.

Beginning Stage (early 1990s – early 2000s). China has been undergoing digital transformation, but not with the internet as the first milestone; in fact, the industrial and governmental digitalization efforts have been done long before the country became connected to the global internet. The government started its first of 12 "Golden Projects" (金字工程), a set of informatization projects to be coordinated by various sectors, as early as 1990, four years before the first true internet connection in China (Golden Projects, n.d.; Zhang, 2024). The first three were designed for a national electronic payment system, digitisation of customs and trade data and VAT collection reform, respectively, while the Golden Tax project alone led to an increase in national tax collection of over 30 per cent from 2000 to 2002, and by 2003 the government had spent more than 10 billion RMB on the Golden Projects, and total demand for IT in the Golden Projects exceeded 100 billion RMB (Golden Projects, n.d.). The establishment of institutional bases of e-government was put in place by the Joint Committee of National Economic Informatization (1993) and the State Council Information Work Leading Group (1996) (Zhang, 2024). The connection of China to the global internet was made via the American carrier Sprint on 20 April 1994, soon followed by the creation of the country's first backbone networks, CERNET, CHINANET, CSTNET and CHINAGBN (Yang, Gu & Lv, 2024; Zhang, 2024). A commercial site was

established shortly after, in 1995, by Jack Ma, the founder of China's first commercial website, Alibaba.com, and two more, Sina.com & Sohu.com, came after in 1996 (Yang, Gu & Lv, 2024). At this stage, Chinese digital trade is characterized by deliberate, infrastructure-first, and state-led approach, ending with China's accession to WTO in 2001, bringing the country into playing by international norms in digital trade (Zhang, 2024).

Preliminary Development (early 2000s – early 2010s). The most significant milestone is when consumer e-commerce took shape, represented by the establishment of Alibaba in 2003 and Alipay in 2004 (Kong, 2022). Taobao's first-mover advantage proved decisive: eBay China introduced its own escrow tool a year later than Alipay and further confused users by adding a parallel PayPal option in 2005. By 2006, Taobao held 67.3 percent of the C2C e-commerce market in major cities against eBay's 29.1 percent, and by 2013 China had become the world's largest online retail market overall (Ouyang et al., 2024). Meanwhile, e-government development advanced in parallel with the Government Online Project in 1999, the 48 central departments (E-Government in China, n.d.), and ICT investment was over 32 billion US dollars by 2005, telecom subscribers had reached over 1.2 billion by 2008, and a rural-urban digital divide remained (China's Emerging Informatization Strategy, n.d.). Internet penetration increased from 1.78 per cent in 2001 and was trending upward towards a longer path to reach 64.54 per cent in 2019 (Jiang & Murmann, 2022).

High-speed Growth (early-mid 2010s). This stage is characterized by China's shift to the mobile-first digital economy. While the number of Chinese people using mobile payments rose from 1.91 percent of the population in 2010 to 60.71 percent in 2019, which is a growth rate of 30 times in just about a decade, the mobile payment transactions in China in 2018 amounted to 414 billion USD, which is six times the number of transactions made on mobile payment services in the United States of America (US). In 2016, the digital

economy of China accounted for 22.58 trillion RMB or 30.3 percent of GDP, and there were 467 million online persons, as well as a 3.45 trillion RMB market for the sharing economy (Report on China Internet Development 2017). The concept of "Internet + e-government" has been incorporated into the Thirteenth Five-Year Plan, and by 2016, the broadband connection rate has reached 93.5 percent in administrative villages and 890 million 4G subscribers (Report on China Internet Development, 2017). This phase is now over, having been formally ended through the 2015 “Made in China 2025” initiative aimed at boosting China’s self-sufficiency in strategic technologies to 70 percent (Brookings, 2023).

Intelligence-led Stage (mid-2010s – present). The current stage features a formal governance law for data, the combination of artificial intelligence, big data, and the Internet of Things. By 2022, China’s digital economy reached 41.5 percent of GDP; by 2023, this share had risen to 42.8 percent, contributing 66.45 percent of that year’s total GDP growth (Kong, 2022; Zhou & Lang, 2024). The State Council’s New Generation Artificial Intelligence Development Plan for 2017 outlined a three-step roadmap to achieving global AI leadership by 2030 (NBR, 2025), with ethics requirements for AI governance to come next in 2021, then generative-AI regulation in 2023, and the 2024 "AI+" initiative (Carnegie Endowment, 2025) to follow. In addition to AI policy, China also developed its first comprehensive data-governance system, culminating in the 2023 National Data Bureau (Zhang, 2024), which was based on the Cybersecurity Law (2016), Data Security Law (2021), and Personal Information Protection Law (2021). The relationship between digital and growth has been causally confirmed based on econometric evidence from the 2016 Big Data Comprehensive Pilot Zone policy, which has been analyzed as a quasi-natural experiment: Yu et al. (2022) find that the policy increased the quality of development by 0.0197 units, while Yang (2023) finds that the policy boosted the upgrading of industrial structure by around 17.46 percent, with 69 percent of the effect attributable to financial

deepening. Despite these strides, China's R&D intensity was only 46.2 percent as much as in the US, science-and-technology commercialization was still less than 60-70 percent of the US and EU, and only 42 percent of Chinese companies were at an entry level stage of digital transition (Zhou & Lang, 2024).

Table 1.

Synthesizes the periodization across three parallel tracks.

Stage	Period	Consumer/AI	E-Government	Industrial/Data
Beginning	1990s–early 2000s	-	Golden Tax (1990); 1993 Joint Committee	Golden Card/Customs (1990)
Preliminary Development	Early 2000s–early 2010s	Alibaba (2003); Alipay (2003–04)	Government Online Project (1999); Golden Tax +30% efficiency (2002)	$32B ICT investment (2005)
High-speed Growth	Early–mid 2010s	Mobile payment 1.91%→60.71% (2010–19)	13th FYP "Internet+e-government" priority	IoT 0.67B connections (2015); Made in China 2025
Intelligence-led	Mid-2010s–present	AI Development Plan (2017); DeepSeek (2025)	National Data Bureau (2023)	CSL/DSL/PIPL (2016–21); 41.5–42.8% of GDP

CONCLUSION

China's digital transformation unfolded across four institutionally distinct stages, each combining infrastructure investment, policy design, and market response in a different configuration. The analysis shows that state-led infrastructure construction consistently preceded and enabled market-driven digital growth, from the pre-internet Golden Projects to the present AI governance framework. This sequencing institutional groundwork followed by market adoption, followed in turn by formal regulatory consolidation, offers a structured historical reference point for other transitional economies considering

how to sequence digital economy policy. Further research should examine how directly transferable this sequencing is to smaller, trade-dependent economies such as Uzbekistan, given differences in market scale, institutional capacity, and international economic integration.

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KICHIK BIZNES SUBYEKTLARI FAOLIYATINI INNOVATSION YONDASHUVLAR ASOSIDA TAKOMILLASHTIRISH (NODAVLAT O‘QUV MUASSASALARI FAOLIYATI MISOLIDA)

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Annotatsiya. *Ushbu maqolada kichik biznes subyektlari, xususan, nodavlat o‘quv muassasalari faoliyatini innovatsion yondashuvlar asosida takomillashtirish masalalari ilmiy jihatdan tahlil qilingan. Tadqiqotning dolzarbligi mamlakatimizda nodavlat ta’lim xizmatlari bozorining tez sur’atlar bilan kengayib borayotgani, ayni paytda ko‘pchilik subyektlarning an’anaviy boshqaruv va marketing usullaridan foydalanayotgani bilan izohlanadi. Tadqiqotda kuzatish, so‘rovnoma, statistik tahlil va qiyosiy tahlil metodlaridan foydalanilgan bo‘lib, innovatsion yondashuvlarni – raqamli marketing vositalarini, moslashuvchan narx siyosatini, mijozlar bilan ishlashning zamonaviy tizimlarini hamda xodimlarni rag‘batlantirishning innovatsion modellarini – joriy etish nodavlat o‘quv muassasalarining daromadlilik, mijozlar bazasi va xodimlar faolligi ko‘rsatkichlarini sezilarli darajada oshirishi ilmiy jihatdan isbotlangan. Natijalar kichik biznes subyektlari rahbarlari, ta’lim menejerlari va tegishli davlat boshqaruvi organlari uchun amaliy ahamiyat kasb etadi.*

Kalit so‘zlar: *kichik biznes, innovatsion yondashuv, nodavlat ta’lim muassasasi, raqobatbardoshlik, raqamli marketing, boshqaruv samaradorligi, tadbirkorlik.*

Annotation. *This article provides a scientific analysis of improving the activity of small business entities, specifically private educational institutions, based on innovative approaches. The relevance of the study is explained by the rapid expansion of the private education services market in the country, while most entities still rely on traditional management and marketing methods. The study employed observation, questionnaire, statistical analysis and comparative analysis methods, through which it was scientifically proven that implementing innovative approaches — digital marketing tools, flexible pricing policy, modern customer relationship systems and innovative staff motivation models — significantly improves the profitability, customer base and staff engagement indicators of*

private educational institutions. The findings have practical significance for small business leaders, education managers and relevant state administration bodies.

Keywords: *small business, innovative approach, private educational institution,*

Аннотация. *В данной статье представлен научный анализ вопросов совершенствования деятельности субъектов малого бизнеса, в частности негосударственных образовательных учреждений, на основе инновационных подходов. Актуальность исследования обусловлена стремительным расширением рынка негосударственных образовательных услуг в стране, тогда как большинство субъектов по-прежнему пользуются традиционными методами управления и маркетинга. В исследовании использованы методы наблюдения, анкетирования, статистического и сравнительного анализа, в ходе которых научно доказано, что внедрение инновационных подходов — инструментов цифрового маркетинга, гибкой ценовой политики, современных систем работы с клиентами и инновационных моделей мотивации персонала — значительно повышает показатели доходности, клиентской базы и вовлечённости персонала негосударственных образовательных учреждений. Результаты имеют практическое значение для руководителей субъектов малого бизнеса, менеджеров образования и соответствующих органов государственного управления.*

Ключевые слова: *малый бизнес, инновационный подход, негосударственное образовательное учреждение, конкурентоспособность, цифровой маркетинг, эффективность управления, предпринимательство.*

KIRISH

Bozor iqtisodiyoti sharoitida kichik biznes subyektlarining barqaror rivojlanishi mamlakat iqtisodiy o‘sishini ta’minlovchi eng muhim omillardan biri hisoblanadi. O‘zbekiston Respublikasi Prezidentining kichik biznes va xususiy tadbirkorlikni yanada rivojlantirishga qaratilgan qarorlari, shuningdek, “Yangi O‘zbekiston taraqqiyot strategiyasi” (2022–2026) doirasida tadbirkorlik muhitini yaxshilash va raqobatbardosh xizmatlar sohasini rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biriga aylangan. Ushbu vazifalarni amalga oshirishda kichik biznes subyektlarining innovatsion faolligini oshirish alohida ahamiyat kasb etadi.

Ta’lim xizmatlari bozorida faoliyat yurituvchi nodavlat o‘quv muassasalari – til o‘rgatish markazlari, repetitorlik markazlari, kasb-hunar va axborot texnologiyalari akademiyalari – so‘nggi yillarda sonining tez sur’atlarda o‘sishi kuzatilmoqda. Biroq amaliyot shuni ko‘rsatadiki, bunday subyektlarning aksariyati hali-hamon an’anaviy boshqaruv va marketing usullariga tayanib faoliyat yuritmoqda. Natijada raqobat kuchayib borayotgan sharoitda ularning bozordagi barqarorligi va daromadliligi pasayish xavfiga duch kelmoqda. Bu holat kichik biznes subyektlari faoliyatiga innovatsion yondashuvlarni izchil joriy etish zaruratini yuzaga keltiradi.

Innovatsion yondashuv kichik biznes subyektini nafaqat xizmat sifatini oshirish vositasi sifatida, balki mijozlar bilan ishlash, boshqaruv va raqobatbardoshlikni ta’minlashning yaxlit tizimi sifatida ko‘rib chiqishni taqozo etadi. Ushbu tizim tashkiliy, marketing, texnologik va kadrlar salohiyatiga oid innovatsiyalarni o‘zaro uzviy bog‘liq holda qamrab oladi. Shu sababli innovatsion yondashuvni nodavlat o‘quv muassasalari faoliyatiga tatbiq etish nafaqat ilmiy, balki amaliy jihatdan ham muhim ahamiyat kasb etadi.

Tadqiqotning maqsadi innovatsion yondashuvlar asosida kichik biznes subyektlari, xususan, nodavlat o‘quv muassasalari faoliyatini takomillashtiruvchi metodikani ishlab chiqish va uning ilmiy-amaliy samaradorligini asoslashdan iborat. Ushbu maqsadga erishish uchun quyidagi vazifalar belgilangan: kichik biznesda innovatsion boshqaruvning nazariy-uslubiy asoslarini tahlil qilish; nodavlat o‘quv muassasalarida innovatsion yondashuvlarni qo‘llash shart-sharoitlari va omillarini aniqlash; ishlab chiqilgan metodikani amaliyotda tajriba-sinovdan o‘tkazish va uning samaradorligini statistik jihatdan asoslash. Tadqiqotning ob’ekti nodavlat o‘quv muassasalarining xo‘jalik faoliyati bo‘lib, predmeti esa innovatsion yondashuvlar asosida ularning raqobatbardoshligi va iqtisodiy samaradorligini oshiruvchi usullar, vositalar va mexanizmlar tizimidan iborat.

Kichik biznes subyektlari faoliyatini innovatsion yondashuvlar asosida takomillashtirish masalasi mahalliy tadqiqotchilar tomonidan turli jihatlardan chuqur o‘rganilgan. Ushbu bo‘limda mavzu doirasidagi asosiy nazariy va amaliy manbalar tahlil qilinadi.

Sh.Norqulov o‘zining “Kichik biznesda innovatsion menejment” asarida kichik tadbirkorlik subyektlarida innovatsion boshqaruvning uslubiy asoslarini keng yoritib bergan [1: 22]. Muallif kichik biznes sharoitida innovatsiyani nafaqat texnologik, balki tashkiliy va marketing innovatsiyasi sifatida talqin etib, resurslari cheklangan subyektlar uchun arzon va tez amalga oshiriladigan innovatsion yechimlar ustuvor ahamiyat kasb etishini ta’kidlaydi [1: 26]. Asar kichik biznes rahbarlarida innovatsion tafakkurni shakllantirish bo‘yicha amaliy tavsiyalarni ham o‘z ichiga oladi [1: 29].

M.Yusupova (2024) nodavlat ta’lim muassasalari misolida xizmatlar marketingini tadqiq etib, mijozlarni jalb qilish va ular bilan uzoq muddatli hamkorlik o‘rnatish strategiyalariga alohida e’tibor qaratgan [2: 41]. Muallifning ta’kidlashicha, ta’lim xizmatlari bozorida raqobat kuchayib borayotgan sharoitda mijozlarning shaxsiy ehtiyojlariga moslashtirilgan o‘quv dasturlari va moslashuvchan narx siyosati muassasaning bozordagi barqarorligini ta’minlovchi asosiy omillardan biri hisoblanadi [2: 45]. Mazkur manba mijozlar sodiqligini shakllantirish jarayonlarini kichik biznes boshqaruvi bilan bog‘lash nuqtayi nazaridan muhim nazariy zamin yaratadi [2: 48].

R.Qodirov va D.Islomova (2022) tomonidan yaratilgan “Raqamli iqtisodiyot va tadbirkorlik” o‘quv qo‘llanmasi kichik biznes subyektlarida raqamli o‘zgarishlarning iqtisodiy jihatlarini – mijozlar bilan ishlashning zamonaviy elektron tizimlarini, onlayn to‘lov platformalarini va ma’lumotlarga asoslangan boshqaruv qarorlarini – tadbirkorlik konteksti asosida o‘rganishga metodologik asos beradi [3: 34]. Mualliflar kichik biznesni faqat mahalliy bozor ishtirokchisi sifatida emas, balki raqamli iqtisodiyotning to‘liq huquqli subyekti sifatida talqin etib, uning raqamli innovatsiyalarni o‘zlashtirish darajasi

raqobatbardoshlikning asosiy ko‘rsatkichi ekanligini ilmiy jihatdan asoslaydilar [3: 39].

A.Tursunov (2023) o‘zining “O‘zbekistonda kichik biznesning innovatsion salohiyati” nomli tadqiqotida mamlakatimizdagi kichik tadbirkorlik subyektlarining innovatsion faollik darajasini mintaqalar kesimida tahlil qilgan [4: 57]. Muallif kichik biznes subyektlarining innovatsion salohiyatini oshirishda davlat tomonidan ko‘rsatilayotgan qo‘llab-quvvatlash choralari bilan bir qatorda, subyektlarning o‘zida innovatsion madaniyatni shakllantirish muhim rol o‘ynashini ta’kidlaydi [4: 61]. Tadqiqotda, xususan, ta’lim va maslahat xizmatlari sohasidagi kichik biznes subyektlarining innovatsion faolligi boshqa tarmoqlarga nisbatan yuqori sur’atlar bilan o‘sib borayotgani statistik ma’lumotlar asosida asoslangan [4: 64].

D.Rashidova (2023) “Ta’lim xizmatlari sifatini boshqarishning zamonaviy modellari” nomli ishida nodavlat ta’lim muassasalarida xizmat sifatini boshqarishning innovatsion modellarini tadqiq etgan [5: 73]. Muallifning fikricha, xizmat sifatini boshqarishda mijozlarning fikr-mulohazalarini muntazam o‘rganish va ularni operativ tarzda o‘quv jarayoniga tatbiq etish muassasaning uzoq muddatli raqobatbardoshligini ta’minlovchi asosiy mexanizm hisoblanadi [5: 76]. Ushbu manba xodimlarni rag‘batlantirishning innovatsion modellari bilan xizmat sifati o‘rtasidagi bog‘liqlikni ochib berishi bilan ham ahamiyatlidir [5: 80].

Yuqoridagi manbalarning umumiy tahlili shuni ko‘rsatadiki, kichik biznes subyektlari, jumladan, nodavlat o‘quv muassasalari faoliyatini takomillashtirish uchun innovatsion boshqaruv, mijozlar bilan ishlash strategiyalari, raqamli iqtisodiyot vositalari va xizmat sifatini boshqarish mexanizmlarini o‘zaro uyg‘unlashtiradigan yaxlit metodika ishlab chiqish ilmiy jihatdan zarur va amaliy jihatdan dolzarb masala hisoblanadi.

Ushbu tadqiqotda kichik biznes subyektlari, xususan, nodavlat o‘quv muassasalari faoliyatini innovatsion yondashuvlar asosida takomillashtirish

metodikasining samaradorligini aniqlash maqsadida bir-birini to‘ldiruvchi ilmiy-tadqiqot metodlarining majmuasidan foydalanilgan.

Tadqiqotning nazariy qismida ilmiy adabiyotlarni o‘rganish va qiyosiy tahlil metodi qo‘llanilgan. Xususan, Sh.Norqulov, M.Yusupova, R.Qodirov va D.Islomova, A.Tursunov hamda D.Rashidovaning asarlari asosida innovatsion yondashuv, kichik biznes boshqaruvi, raqamli iqtisodiyot va xizmat sifatini boshqarishga oid ilmiy tushunchalar tizimlashtirilgan. Bu metod orqali mavzuning nazariy-metodologik bazasi shakllantirilib, tadqiqotning konseptual doirasi belgilangan.

Empirik ma’lumotlarni to‘plash bosqichida kuzatish va so‘rovnoma metodlaridan foydalanilgan. Kuzatish metodi nodavlat o‘quv muassasalarining kundalik xo‘jalik faoliyatidagi boshqaruv va marketing amaliyotlarini bevosita o‘rganish imkonini bergan. So‘rovnoma metodi esa muassasa rahbarlari va mijozlarining innovatsion yondashuvlarga – raqamli marketing, moslashuvchan narx siyosati va mijozlarga individual yondashuv kabi omillarga – bo‘lgan munosabatini aniqlashga xizmat qilgan.

Tadqiqotning asosiy amaliy qismini tajriba-sinov ishi tashkil etgan. Ushbu metod doirasida Toshkent shahridagi nodavlat o‘quv markazlari ikki guruhga ajratilgan: nazorat guruhi – an’anaviy boshqaruv va marketing usullarini qo‘llovchi o‘n ikkita muassasa, hamda tajriba guruhi – innovatsion yondashuvlarga asoslangan ishlab chiqilgan metodikani qo‘llovchi o‘n ikkita muassasa. Tajriba-sinov ishining boshlang‘ich va yakuniy bosqichlarida, bir o‘quv yili davomida, muassasalarning moliyaviy-iqtisodiy ko‘rsatkichlari qayd etilib, olingan natijalar qiyosiy tahlil qilingan.

Olingan miqdoriy ma’lumotlar statistik tahlil metodi yordamida qayta ishlangan. Tajriba va nazorat guruhlarining boshlang‘ich hamda yakuniy natijalari o‘rtasidagi farqni aniqlashda o‘rtacha arifmetik ko‘rsatkich va foiz nisbatlaridan foydalanilgan. Bu esa ishlab chiqilgan metodikaning kichik biznes

subyektlari faoliyatini takomillashtirishdagi samaradorligini ob’ektiv va ishonchli tarzda asoslash imkonini bergan.

Tadqiqot doirasida olib borilgan tajriba-sinov ishi natijalari innovatsion yondashuvlar asosida ishlab chiqilgan metodikaning nodavlat o‘quv muassasalari faoliyatini takomillashtirishda yuqori samaradorlikka ega ekanligini tasdiqladi.

Boshlang‘ich bosqich natijalariga ko‘ra, tajriba va nazorat guruhlari o‘rtasida moliyaviy-iqtisodiy ko‘rsatkichlar bo‘yicha statistik jihatdan sezilarli farq kuzatilmadi. Tajriba guruhidagi muassasalarning o‘rtacha oylik daromadi shartli birlikda yuz foiz qilib olinganda, nazorat guruhiniki to‘qson sakkiz foizni tashkil etdi. Bu esa ikkala guruh boshlang‘ich darajasi taxminan teng ekanligini ko‘rsatdi va tajribaning toza sharoitda o‘tkazilganligini tasdiqladi.

Yakuniy bosqich natijalariga ko‘ra esa ikkala guruh o‘rtasida keskin farq qayd etildi. Innovatsion yondashuvga asoslangan metodika qo‘llanilgan tajriba guruhida o‘rtacha oylik daromad yuz foizdan bir yuz ellik olti foizga ko‘tarildi, ya’ni o‘sish ellik olti foiz punktni tashkil etdi. An’anaviy usulda faoliyat yuritgan nazorat guruhida esa ko‘rsatkich to‘qson sakkiz foizdan bir yuz o‘n to‘rt foizga, ya’ni atigi o‘n olti foiz punktga oshdi. Ushbu qiyosiy tahlil tajriba guruhidagi o‘sish sur’ati nazorat guruhiga nisbatan uch yarim barobar yuqori ekanligini ko‘rsatdi.

Faoliyatning alohida ko‘rsatkichlari bo‘yicha ham ijobiy dinamika kuzatildi. Mijozlar bazasining kengayishi bo‘yicha tajriba guruhida o‘rtacha o‘ttiz sakkiz foizga o‘sish qayd etildi, nazorat guruhida esa bu ko‘rsatkich atigi o‘n bir foizni tashkil etdi. Mijozlarni ushlab qolish darajasi bo‘yicha esa tajriba guruhidagi muassasalar sakson ikki foizga, nazorat guruhidagilar esa oltmish bir foizga erishdi. Raqamli marketing vositalari orqali kelgan mijozlar ulushi tajriba guruhida oltmish to‘rt foizni tashkil etib, bu ko‘rsatkich nazorat guruhida atigi yigirma yetti foizga teng bo‘ldi.

So‘rovnoma natijalari ham olingan miqdoriy ko‘rsatkichlarni sifat jihatidan tasdiqladi. Tajriba guruhidagi muassasa rahbarlarining sakson yetti foizi innovatsion yondashuvlarni joriy etish muassasaning bozordagi raqobatbardoshligini oshirganligini ta’kidladi. Shuningdek, mijozlarning yetmish olti foizi individual yondashuv va moslashuvchan narx siyosati ularning muassasani tanlashiga ijobiy ta’sir ko‘rsatganligini qayd etdi.

Kuzatuv natijalari esa tajriba guruhidagi muassasalarda xodimlarning mehnat unumdorligi va ish faoliyatidan qoniqish darajasida ham sezilarli o‘zgarishni tasdiqladi. Innovatsion rag‘batlantirish modellari – moslashuvchan ish grafigi, natijaga asoslangan mukofotlash tizimi – qo‘llanilgan muassasalarda xodimlarning ishdan qoniqish darajasi nazorat guruhiga nisbatan ancha yuqori natija ko‘rsatdi. Ushbu natijalar majmuasi ishlab chiqilgan metodikaning ilmiy asosliligi va amaliy samaradorligini to‘liq tasdiqlaydi.

Tadqiqot davomida olingan natijalar innovatsion yondashuvlar asosida ishlab chiqilgan metodikaning kichik biznes subyektlari, xususan, nodavlat o‘quv muassasalari faoliyatini takomillashtirishdagi samaradorligini ilmiy jihatdan asoslab berdi. Ushbu bo‘limda natijalar mavjud nazariy qarashlar va ilmiy adabiyotlar bilan qiyosiy muhokama qilinadi.

Birinchidan, tajriba guruhida kuzatilgan daromadlilik va mijozlar bazasi ko‘rsatkichlarining sezilarli o‘sishi Sh.Norqulovning asosiy metodologik xulosalarini tasdiqlaydi. Muallif kichik biznes sharoitida arzon va tez amalga oshiriladigan innovatsion yechimlarning ustuvor ahamiyat kasb etishini ta’kidlagan edi. Tadqiqot natijalari aynan shu xulosani amaliy jihatdan isbotlab, an’anaviy marketing usullarining raqobatbardoshlikni ta’minlashda cheklangan ekanligini ko‘rsatdi.

Ikkinchidan, mijozlarni ushlab qolish darajasi va individual yondashuv bo‘yicha kuzatilgan ijobiy dinamika M.Yusupovaning mijozlarga moslashtirilgan xizmatlar va moslashuvchan narx siyosati tamoyillariga oid ilmiy qarashlarini qo‘llab-quvvatlaydi. Muallif mijozlarning shaxsiy

ehtiyojlariga moslashtirilgan yondashuvning muassasa barqarorligini ta’minlashdagi ahamiyatini ilmiy jihatdan asoslagan edi. Tadqiqotimizda tajriba guruhidagi muassasalarning mijozlarni ushlab qolish bo‘yicha yuqori ko‘rsatkichga erishishi aynan ushbu nazariy qarashning amaliy tasdig‘i bo‘lib xizmat qildi.

Uchinchidan, raqamli marketing vositalari orqali jalb qilingan mijozlar ulushining o‘sishi R.Qodirov va D.Islomovaning raqamli o‘zgarishlar va ma’lumotlarga asoslangan boshqaruv qarorlariga oid ilmiy xulosalarini mustahkamlaydi [3: 39]. Mualliflar kichik biznesning raqamli innovatsiyalarni o‘zlashtirish darajasi raqobatbardoshlikning asosiy ko‘rsatkichi ekanligini ta’kidlagan edi. Tajriba guruhidagi muassasalarning raqamli vositalar orqali mijozlar jalb qilishdagi yuqori natijasi ushbu xulosaning to‘g‘riligini amalda isbotladi.

To‘rtinchidan, tajriba guruhidagi muassasalarning innovatsion faoliyati bo‘yicha kuzatilgan yuqori ko‘rsatkichlar A.Tursunovning ta’lim va maslahat xizmatlari sohasidagi kichik biznes subyektlarining innovatsion faolligi yuqori ekanligiga oid xulosasini tasdiqladi [4: 64]. Bundan tashqari, xizmat sifatini boshqarish bo‘yicha erishilgan natijalar D.Rashidovaning mijozlar fikr-mulohazalarini o‘quv jarayoniga operativ tatbiq etish muassasa raqobatbardoshligini ta’minlovchi asosiy mexanizm ekanligiga oid xulosasini amaliy jihatdan mustahkamladi [5: 76].

Shu bilan birga, tadqiqot davomida bir qator cheklovlar ham aniqlandi. Tajriba-sinov ishi nisbatan qisqa muddat – bir o‘quv yili davomida – o‘tkazilganligi sababli innovatsion yondashuvlarning uzoq muddatli barqarorlikka ta’sirini to‘liq baholash imkoni bo‘lmadi. Bundan tashqari, tadqiqot faqat Toshkent shahridagi nodavlat o‘quv muassasalari misolida o‘tkazilganligi natijalarni umumlashtirish masalasida ehtiyotkorlik talab etadi. Kelajakdagi tadqiqotlarda namuna hajmini kengaytirish, turli mintaqalardagi

kichik biznes subyektlarini qamrab olish va uzoq muddatli kuzatuv o‘tkazish orqali olingan natijalarning ishonchliligi yanada mustahkamlanishi mumkin.

Ushbu tadqiqot innovatsion yondashuvlar asosida kichik biznes subyektlari, xususan, nodavlat o‘quv muassasalari faoliyatini takomillashtirish metodikasini ishlab chiqish va uning samaradorligini ilmiy-amaliy jihatdan asoslashga bag‘ishlangan. Tadqiqot davomida qo‘yilgan maqsad va vazifalar to‘liq amalga oshirildi hamda quyidagi ilmiy xulosalarga kelindi.

Birinchidan, kichik biznes subyektlari faoliyatini takomillashtirish uchun innovatsion yondashuv nafaqat texnologik, balki tashkiliy, marketing va boshqaruv innovatsiyalarini o‘z ichiga olgan murakkab tizim sifatida talqin etilishi lozim. Ushbu komponentlarni alohida emas, balki yaxlit tizim doirasida bir-biri bilan uzviy bog‘liq holda rivojlantirish nodavlat o‘quv muassasalarining bozordagi barqarorligini tubdan yuksaltiradi.

Ikkinchidan, tajriba-sinov ishi natijalari ishlab chiqilgan metodikaning yuqori iqtisodiy samaradorligini raqamli ko‘rsatkichlar orqali tasdiqladi. Tajriba guruhidagi muassasalarning o‘rtacha oylik daromadi ellik olti foiz punktga oshgan bo‘lsa, nazorat guruhida bu ko‘rsatkich atigi o‘n olti foiz punktni tashkil etdi. Bu farq innovatsion yondashuvning an’anaviy usullarga nisbatan samaradorligi uch yarim barobar yuqori ekanligini ko‘rsatadi.

Uchinchidan, raqamli marketing vositalarini va mijozlar bilan ishlashning zamonaviy tizimlarini joriy etish nodavlat o‘quv muassasalarida nafaqat moliyaviy ko‘rsatkichlarni, balki mijozlar sodiqligi va xodimlarning ish faoliyatidan qoniqish darajasini ham sezilarli darajada oshirishi ilmiy jihatdan isbotlandi.

Tadqiqot natijalarining amaliy ahamiyati shundaki, ishlab chiqilgan metodika O‘zbekistondagi nodavlat ta’lim muassasalarida, shuningdek, boshqa xizmat ko‘rsatish sohasidagi kichik biznes subyektlarida bevosita qo‘llanilishi mumkin. Kelajakdagi tadqiqotlar uchun esa namuna hajmini kengaytirish, turli mintaqalardagi kichik biznes subyektlarini qamrab olish va uzoq muddatli

kuzatuv o‘tkazish orqali olingan natijalarni yanada mustahkamlash tavsiya etiladi. Umuman olganda, innovatsion yondashuvlarni kichik biznes subyektlari faoliyatiga tizimli joriy etish zamonaviy O‘zbekiston iqtisodiyotining raqobatbardosh va barqaror tadbirkorlik muhitini shakllantirish uchun muhim metodologik asos bo‘lib xizmat qiladi.

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TIJORAT BANKLARIDA KREDIT PORTFELINI SUG‘URTALASH ORQALI KREDIT TAVAKKALCHILIGINI KAMAYTIRISH: O‘ZBEKISTON BANK TIZIMI MISOLIDA

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Annotatsiya:*Ushbu maqolada tijorat banklarida kredit portfelini sug‘urtalash mexanizmlarining kredit tavakkalchiligini kamaytirishdagi o‘rni tahlil qilinadi. Tadqiqot O‘zbekiston Respublikasi Markaziy bankining rasmiy statistik ma’lumotlari, sug‘urta bozori indikatorlari va ilmiy adabiyotlar asosida amalga oshirildi. Natijalar shuni ko‘rsatadiki,*

kredit sug‘urtasi mahsulotlarining rivojlanishi bank sektorida muammoli kreditlar (NPL) ulushining pasayishiga bevosita ta’sir ko‘rsatmoqda, biroq mavjud sug‘urta qamrovi hali ham xalqaro amaliyotdan orqada qolmoqda. Maqola oxirida kredit-sug‘urta hamkorligini kuchaytirish bo‘yicha amaliy tavsiyalar ishlab chiqilgan.

Annotation: *This article analyzes the role of loan portfolio insurance mechanisms in commercial banks in reducing credit risk. The study was conducted based on official statistical data from the Central Bank of the Republic of Uzbekistan, insurance market indicators, and scientific literature. The results show that the development of credit insurance products has a direct impact on reducing the share of non-performing loans (NPL) in the banking sector, but the existing insurance coverage still lags behind international practice. At the end of the article, practical recommendations have been developed to strengthen credit and insurance cooperation.*

Kalit so‘zlar: *kredit tavakkalchiligi, kredit sug‘urtasi, tijorat banklari, muammoli kreditlar (NPL), sug‘urta bozori, garov sug‘urtasi, risk-menejment, Bazel III.*

Keywords: *credit risk, credit insurance, commercial banks, non-performing loans (NPL), insurance market, collateral insurance, risk management, Basel III.*

KIRISH

Kredit tavakkalchiligi tijorat banklari faoliyatida eng muhim va eng ko‘p yo‘qotishlarga sabab bo‘luvchi tavakkalchilik turi hisoblanadi, chunki bank aktivlarining asosiy qismini kredit portfeli tashkil etadi va qarz oluvchining majburiyatlarini bajarmasligi bankning kapital yetarliligiga bevosita ta’sir ko‘rsatadi [1].

Xalqaro amaliyotda kredit tavakkalchiligini boshqarishning uchta asosiy yo‘nalishi mavjud: dastlabki baholash (skoring va reyting tizimlari), diversifikatsiya (portfelni tarmoqlar va mijozlar bo‘yicha taqsimlash) hamda tavakkalchilikni uchinchi tomonga o‘tkazish, jumladan garov, kafolat va sug‘urta orqali himoyalash [2]. Ushbu uchinchi yo‘nalish — kredit sug‘urtasi — so‘nggi yillarda rivojlanayotgan bozorlarda, jumladan O‘zbekistonda, tobora ahamiyat kasb etmoqda.

O‘zbekiston Respublikasi Markaziy bankining ma’lumotlariga ko‘ra, 2025-yil 1-mart holatiga tijorat banklarining muammoli kreditlari (NPL) hajmi

24 trln 348 mlrd so‘mni, jami kreditlardagi ulushi esa 4,5 foizni tashkil etgan; bir oy ichida bu ko‘rsatkich 580 mlrd so‘mga oshgan [4, 5].[25]

Shu bilan birga, 2025-yil IV chorak yakunlariga ko‘ra bank tizimida ijobiy dinamika ham kuzatilgan: NPL ulushi 4,3 foizdan 3,5 foizgacha pasaygan, bu esa risk-menejment tizimlarining takomillashayotganidan dalolat beradi [8]. Bunga qaramay, davlat ulushi mavjud banklarda muammoli qarzdorlik darajasi xususiy banklarga nisbatan sezilarli darajada yuqoriligicha qolmoqda [4].

Mavzuning dolzarbligi shundaki, an’anaviy kredit ta’minoti vositalari (garov, kafolat) real iqtisodiy inqirozlar davrida to‘liq himoya bera olmaydi, chunki garov qiymati bozor sharoitiga bog‘liq holda kamayishi mumkin. Aynan shu sababli kredit sug‘urtasi — bank va sug‘urta kompaniyasi o‘rtasidagi shartnoma asosida qarz oluvchining to‘lovga layoqatsizligi natijasida yuzagan zararni qoplash mexanizmi — muqobil va qo‘shimcha himoya vositasi sifatida katta ahamiyat kasb etadi [3].

O‘zbekiston sug‘urta bozori so‘nggi yillarda jadal sur’atlarda rivojlanmoqda: 2025-yilning birinchi yarmida sug‘urta kompaniyalari 6,23 trln so‘m mukofot yig‘gan bo‘lib, bu o‘tgan yilning mos davriga nisbatan 46 foizga ko‘pdir [10]. Shuningdek, 2023-yil davomida kredit sug‘urtasi toifasi bo‘yicha mutlaq o‘sish 587,9 mlrd so‘mni tashkil etgan, bu — avtosug‘urtadan keyingi ikkinchi eng yuqori o‘sish ko‘rsatkichi [9]. Ushbu tendensiyalar kredit sug‘urtasi mexanizmlarining bank-sug‘urta hamkorligida tobora muhim rol o‘ynay boshlaganini tasdiqlaydi.

TADQIQOTNING MAQSADI

Tadqiqotning asosiy maqsadi — tijorat banklarida kredit tavakkalchiligini boshqarish samaradorligini oshirishda sug‘urta mexanizmlarining rolini nazariy va amaliy jihatdan tahlil qilish, O‘zbekiston bank va sug‘urta bozorlari

[25]NPL (Non-Performing Loans) — to‘lov muddati 90 kundan ortiq kechiktirilgan va qaytarilmayotgan kreditlar; xalqaro amaliyotda bank aktivlari sifatining asosiy indikatori sifatida qo‘llaniladi.

statistikasi asosida ularning o‘zaro bog‘liqligini baholash hamda kredit-sug‘urta hamkorligini rivojlantirish bo‘yicha ilmiy asoslangan tavsiyalar ishlab chiqishdan iborat.

Tadqiqot vazifalari quyidagilardan iborat: (1) kredit tavakkalchiligi va sug‘urta mexanizmlarining nazariy asoslarini tizimlashtirish; (2) O‘zbekiston bank sektorida NPL dinamikasini tahlil qilish; (3) sug‘urta bozorining kredit tavakkalchiligini qoplashdagi hozirgi holatini baholash; (4) xalqaro tajriba bilan qiyosiy tahlil o‘tkazish; (5) amaliy tavsiyalar ishlab chiqish.

TADQIQOT METODOLOGIYASI

Tadqiqotda ikkilamchi ma’lumotlarga asoslangan miqdoriy va sifat tahlili uslubi qo‘llanildi. Asosiy ma’lumot manbalari sifatida O‘zbekiston Respublikasi Markaziy bankining rasmiy statistik byulletenlari (2025-yil yanvar–may oylari bo‘yicha NPL ko‘rsatkichlari), Istiqbolli loyihalar milliy agentligi (NAPP) hamda sug‘urta bozori tahlilchilarining ma’lumotlari qo‘llanildi [4, 5, 6, 7, 8, 9, 10, 11].

Tahlilda quyidagi metodlardan foydalanildi: statistik-taqqoslash usuli (banklararo va davr bo‘yicha NPL dinamikasini solishtirish), tizimli tahlil (kredit va sug‘urta bozorlari o‘rtasidagi o‘zaro bog‘liqlikni aniqlash), hamda monografik usul (xalqaro va mahalliy ilmiy adabiyotlarni umumlashtirish) [1, 2, 15].

Tadqiqot davri sifatida 2023–2026-yillar oralig‘i tanlab olindi, chunki aynan shu davrda O‘zbekistonda sug‘urta bozorini isloh qilish bo‘yicha faol chora-tadbirlar amalga oshirilgan, jumladan 2025-yilda “O‘zbekiston qayta sug‘urta kompaniyasi”ning tashkil etilishi kredit va investitsiya tavakkalchiliklarini qayta sug‘urtalash imkoniyatlarini kengaytirdi [12].

TADQIQOT MODELI

Tadqiqotda kredit tavakkalchiligi va sug‘urta qamrovi o‘rtasidagi bog‘liqlikni ifodalovchi quyidagi kontseptual model asos qilib olindi: bank kredit tavakkalchiligi darajasi (NPL ulushi) → sug‘urta mexanizmlarining

qo‘llanilish darajasi (kredit sug‘urtasi mukofotlari hajmi) → bank kapitalining zaxira qilish yuki → bank barqarorligi. Ushbu model orqali sug‘urta mexanizmlarining bilvosita ta’siri baholandi.

NATIJALAR

1. O‘zbekiston bank sektorida muammoli kreditlar dinamikasi

2025-yil davomida O‘zbekiston tijorat banklarining muammoli kreditlari hajmi barqaror o‘sish tendensiyasini namoyon etdi, biroq yil oxiriga kelib NPL ulushining nisbiy pasayishi kuzatildi. Quyidagi 1-jadvalda Markaziy bank ma’lumotlari asosida NPL ko‘rsatkichlarining oylik dinamikasi keltirilgan [4, 5, 8].

Sana	NPL hajmi (trln so‘m)	Jami kreditlardagi ulush (%)	Oylik o‘zgarish
01.01.2025	≈ 21,2	4,3	—
01.02.2025	23,77	4,4	+2,6 trln so‘m
01.03.2025	24,35	4,5	+0,58 trln so‘m
01.05.2025	≈ 25,1	4,4	barqaror
31.12.2025 (IV chorak)	≈ 26,0*	3,5	nisbiy pasayish

*1-jadval. O‘zbekiston tijorat banklarida NPL dinamikasi, 2025-yil (Markaziy bank ma’lumotlari asosida muallif tahlili [4, 5, 8]). *taxminiy qiymat, jami aktivlar va foiz ulushi asosida hisoblangan.*

Jadvaldan ko‘rinib turibdiki, NPL ulushining foizdagi pasayishi (4,5 foizdan 3,5 foizgacha) kredit portfelining umumiy hajmi kengayishi hisobiga ham yuzaga kelgan bo‘lishi mumkin, biroq bank tizimining sof foydasi 57,1 foizga o‘sib 13,5 trln so‘mga yetgani risk-menejment samaradorligining oshganini ko‘rsatadi [8].

Davlat ulushi mavjud banklar va xususiy banklar o‘rtasidagi farq alohida e’tiborga loyiq: davlat banklarining muammoli qarzdorligi 17 trln so‘mdan

oshgan bo‘lsa, xususiy banklarda bu ko‘rsatkich 7,3 trln so‘mni tashkil etgan [4]. Bu institutsional egalik tuzilmasi kredit tavakkalchiligini boshqarish sifatiga bevosita ta’sir ko‘rsatishini tasdiqlaydi.

2. Sug‘urta bozorining kredit tavakkalchiligini qoplashdagi o‘rni

O‘zbekiston sug‘urta bozori 2023–2025-yillar davomida yuqori o‘sish sur’atlarini namoyon etdi. Xususan, umumiy sug‘urta segmentida kredit sug‘urtasi toifasi bo‘yicha mutlaq o‘sish 587,9 mlrd so‘mni tashkil etib, bu avtosug‘urtadan (603,6 mlrd so‘m) keyingi eng yuqori ko‘rsatkich bo‘ldi [9].

Ko‘rsatkich	2023-yil	2024-yil	2025-yil (I yarim yillik)
Sug‘urta mukofotlari hajmi	≈ 4,3 trln so‘m	≈ 8,5 trln so‘m*	6,23 trln so‘m
O‘sish sur’ati (yiliga)	—	≈ 37,8%	46%
Kredit sug‘urtasi (mutlaq o‘sish)	587,9 mlrd so‘m	—	—
Sug‘urta tashkilotlari soni	38 ta	35 ta	35 ta atrofida
Umumiy ustav kapitali	2,3 trln so‘m	o‘sish davom etmoqda	—

*2-jadval. O‘zbekiston sug‘urta bozorining asosiy ko‘rsatkichlari (NAPP, Kursiv reytingi, Frank Media ma’lumotlari asosida [9, 10, 11, 14]). *taxminiy, 37,8% o‘sish sur’ati asosida hisoblangan.*

Ushbu ma’lumotlar sug‘urta bozorining bank sektoriga nisbatan tezroq sur’atda o‘sayotganini ko‘rsatadi, biroq mutlaq qiymatda sug‘urta bozori hajmi (yillik ≈ 8–10 trln so‘m) bank tizimining jami kredit portfeli (yuzlab trln so‘m)ga nisbatan hali ham juda kichik bo‘lib qolmoqda, bu esa kredit sug‘urtasi qamrovining cheklanganligidan dalolat beradi.

3. Kredit tavakkalchiligini qoplashning asosiy mexanizmlari: qiyosiy tahlil

Amaliyotda tijorat banklari kredit tavakkalchiligini kamaytirish uchun bir nechta mexanizmdan foydalanadi. Quyidagi 3-jadvalda ularning afzallik va kamchiliklari qiyosiy tarzda keltirilgan [1, 2, 15].

Mexanizm	Tavakkalchilikni qoplash darajasi	Afzalligi	Kamchiligi
Garov ta’minoti	Qisman (garov qiymatiga bog‘liq)	Amalga oshirish qulay, keng tarqalgan	Bozor tanazzulida qiymati pasayadi
Kafolat (uchinchi tomon)	Kafil moliyaviy holatiga bog‘liq	Qo‘shimcha ishonch beradi	Kafilning to‘lov qobiliyati tavakkalchiligi
Kredit sug‘urtasi	Yuqori (shartnoma bo‘yicha to‘liq yoki qisman)	Zararni tizimli qoplaydi, kapitalni bo‘shatadi	Sug‘urta mukofoti xarajati, anderrayting murakkabligi
Zaxira (rezerv) shakllantirish	Ichki, bankning o‘z mablag‘i hisobidan	Tezkor, tashqi tomonga bog‘liq emas	Bank foydasi va kapitalini kamaytiradi
Kredit derivativlari (CDS)	Yuqori, lekin rivojlangan bozorda	Moslashuvchan tavakkalchilikni o‘tkazish	O‘zbekistonda bozor hali shakllanmagan

3-jadval. Kredit tavakkalchiligini qoplash mexanizmlarining qiyosiy tahlili (muallif tuzmasi, [1, 2, 15] asosida).

Jadvaldan ko‘rinadiki, kredit sug‘urtasi boshqa mexanizmlarga nisbatan tavakkalchilikni eng yuqori darajada qoplash imkoniyatiga ega, biroq uning samaradorligi sug‘urta kompaniyasining moliyaviy barqarorligi va qayta sug‘urtalash imkoniyatlariga bog‘liq bo‘ladi [3, 14].

4. Kredit sug‘urtasining bank moliyaviy barqarorligiga ta’siri

Bazel III talablariga ko‘ra, banklar kredit tavakkalchiligi bo‘yicha kapitalni zaxiralashda tan olingan tavakkalchilikni kamaytiruvchi vositalardan

(credit risk mitigation) foydalanishlari mumkin, jumladan sifatli kafolat va sug‘urta himoyasi kapital talabini pasaytirishga xizmat qiladi [3]. Bu — banklar uchun kredit sug‘urtasidan foydalanishning to‘g‘ridan-to‘g‘ri iqtisodiy rag‘bati hisoblanadi.

«O‘zbekinvest» eksport-import sug‘urta kompaniyasi misolida ko‘rish mumkinki, xalqaro reyting agentliklari (Moody‘s) tomonidan kompaniyaning moliyaviy barqarorlik reytingi 2024–2025-yillarda ketma-ket oshirilgan, bu esa mahalliy sug‘urtalovchilarning xalqaro standartlarga muvofiqlashuvi va ularning kredit sug‘urtasi bo‘yicha ishonchliligini kuchaytirmoqda [14].

Shuningdek, 2025-yilda “O‘zbekiston qayta sug‘urta kompaniyasi” AJ tashkil etilishi (kamida 300 mlrd so‘mlik ustav kapitali bilan) kredit va investitsiya tavakkalchiliklarini qayta sug‘urtalash imkoniyatlarini kengaytirib, yirik kredit operatsiyalarini sug‘urta himoyasi bilan qoplash salohiyatini oshirmoqda [12].

5. Ipoteka kreditlash misolida sug‘urta-kredit bog‘liqligi

Ipoteka kreditlash segmenti kredit sug‘urtasi ahamiyatini yaqqol namoyish etadi: 2025-yilning birinchi yarmida 9,44 trln so‘mlik ipoteka krediti berilgan bo‘lib, bu o‘tgan yilga nisbatan 37,1 foizga ko‘pdir, kredit oluvchilar soni esa 20,6 foizga oshgan [13]. Ipoteka kreditlarining hajmi va sonining tez o‘sishi mulk va hayotni sug‘urtalash mahsulotlariga bo‘lgan talabni proportsional ravishda oshiradi, chunki aksariyat bank ipoteka dasturlari garov mulkini majburiy sug‘urtalashni talab qiladi.

MUHOKAMA

Olingan natijalar shuni ko‘rsatadiki, O‘zbekistonda kredit va sug‘urta bozorlari o‘rtasidagi o‘zaro ta’sir kuchayib bormoqda, biroq bu jarayon hali tizimli xarakter kasb etmagan. Xususan, NPL ulushining 2025-yil davomida 4,5 foizdan 3,5 foizgacha pasayishi [4, 8] bir qator omillar — jumladan makroiqtisodiy barqarorlik, kredit monitoringining kuchayishi va qisman sug‘urta qamrovining ortishi — natijasi bo‘lishi mumkin, biroq faqat statistik

ma’lumotlar asosida sug‘urtaning aniq hissasini ajratib ko‘rsatish murakkab, bu esa keyingi tadqiqotlar uchun ekonometrik modellashtirishni taqozo etadi.

Xalqaro tajriba bilan solishtirganda (masalan, rivojlangan bozorlarda kredit sug‘urtasi va kredit derivativlari bank kapitalini boshqarishning ajralmas qismi hisoblanadi [1, 2]), O‘zbekistonda bu bozor segmenti hali dastlabki rivojlanish bosqichida turibdi: 35 ta sug‘urta tashkiloti faoliyat yuritsa-da [9], ularning aksariyati kredit sug‘urtasi bo‘yicha ixtisoslashmagan va anderrayting salohiyati cheklangan.

Yana bir muhim jihat — davlat ulushi mavjud banklarda muammoli qarzdorlikning yuqoriligi [4] shuni ko‘rsatadiki, bunday banklarda kredit berish qarorlari ko‘pincha bozor mexanizmlaridan ko‘ra ma’muriy omillarga asoslanadi, bu esa sug‘urta kompaniyalari uchun tavakkalchilikni to‘g‘ri baholashni murakkablashtiradi va tarif siyosatiga ta’sir qiladi.

Tadqiqot natijalari sug‘urta-kredit hamkorligini rivojlantirish uchun institutsional islohotlar (masalan, qayta sug‘urtalash infratuzilmasini kuchaytirish [12]) hamda raqamli anderrayting tizimlarini joriy etish zarurligini ko‘rsatadi, bu esa kredit tavakkalchiligini real vaqt rejimida baholash imkonini beradi.

XULOSA VA TAVSIYALAR

O‘tkazilgan tadqiqot natijalariga ko‘ra quyidagi xulosalarga kelindi:

1) Kredit sug‘urtasi tijorat banklarida kredit tavakkalchiligini kamaytirishning eng samarali tashqi mexanizmlaridan biri bo‘lib, u bank kapitalini bo‘shatish va zararlarni tizimli qoplash imkonini beradi;

2) O‘zbekiston bank sektorida NPL ulushi 2025-yil davomida 4,5 foizdan 3,5 foizgacha pasaygan bo‘lsa-da, davlat ulushi mavjud banklarda muammoli qarzdorlik darajasi hamon yuqori bo‘lib qolmoqda;

3) Sug‘urta bozori yuqori sur’atlarda (2025-yil birinchi yarmida 46 foiz) o‘smoqda, biroq uning bank kredit portfeliga nisbatan mutlaq hajmi hali ham cheklangan;

4) Qayta sug‘urtalash infratuzilmasining rivojlanishi (2025-yilda milliy qayta sug‘urta kompaniyasining tashkil etilishi) yirik kredit tavakkalchiliklarini qoplash salohiyatini oshirmoqda.

Yuqoridagilardan kelib chiqib, quyidagi amaliy tavsiyalar taklif etiladi:

1) Tijorat banklari va sug‘urta kompaniyalari o‘rtasida kredit portfelini majburiy bo‘lmagan tarzda qisman sug‘urtalash bo‘yicha standart shartnoma shakllarini ishlab chiqish;

2) Markaziy bank tomonidan sug‘urta himoyasi bilan qoplangan kreditlar uchun zaxira normalarini tabaqalashtirish (risk-og‘irlik koeffitsientini kamaytirish) orqali banklarni sug‘urtadan foydalanishga rag‘batlantirish;

3) Kichik va o‘rta biznes segmentida kredit kafolati va sug‘urtasini uyg‘unlashtirgan gibrid mahsulotlarni joriy etish;

4) Sug‘urta kompaniyalarining anderrayting va risk-baholash salohiyatini raqamli kredit byurolari ma’lumotlari bilan integratsiya qilish;

5) Kredit-sug‘urta bozori bo‘yicha yagona statistik hisobot tizimini yo‘lga qo‘yish, bu sohadagi shaffoflik va tahlil sifatini oshiradi.

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XORAZM VILOYATIDA AGRAR SOHA KO'RSATKICHLARINING IQTISODIY STATISTIK TAHLILI

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Annotatsiya. *Mazkur maqolada Xorazm viloyati qishloq xo'jaligi sohasining rivojlanish dinamikalari, agrar salohiyati va iqtisodiy ko'rsatkichlari tahlil qilingan. Viloyatda agrar sektorni isloh qilish va qo'llab-quvvatlashga qaratilgan davlat qarorlari va farmonlarining amaliy samarasi aks ettirilgan. Maqolada 2010-yildan 2026-yilgacha bo'lgan davrda qishloq xo'jaligi mahsulotlari, jumladan dehqonchilik va chorvachilik hajmini o'sish dinamikasi hamda tumanlar kesimidagi ishlab chiqarish ko'rsatkichlari, zamonaviy intensiv agrotexnologiyalarning joriy etilishi ko'rib chiqilgan.*

Kalit so'zlar: *qisjloq xo'jaligi, agrariqtisodiyot, iqtisodiy ko'rsatkichlar, dehqonchilik, chorvachilik, agrotexnologiya.*

Abstract*. This article features a comprehensive analysis of development trends, agricultural potential, and economic metrics within the agricultural sector of the Khorezm region. It highlights the practical outcomes of state decrees and resolutions aimed at reforming and reinforcing the regional agrarian economy. Furthermore, the study evaluates the growth dynamics of agricultural production, specifically focusing on crop cultivation and livestock breeding from 2010 to 2026. It also examines production efficiency across individual districts alongside the deployment of modern intensive agrotechnologies in the region.*

Keywords: *agriculture, agrarian economy, economic indicators, crop production, livestock farming, agrotechnology.*

KIRISH

Xorazm viloyati O'zbekistonning qishloq xo'jaligi sohasidagi asosiy agrar hududlaridan biri bo'lib, boy resurslari orqali mamlakatimizning agrar iqtisodiyoti rivojlanishida muhim ro'lga ega hisoblanadi. Qishloq xo'jaligi sohasini tubdan rivojlantirish bo'yicha 2017-2021-yillarda O'zbekiston

Respublikasini rivojlantirishning beshta ustuvor yo'nalishi bo'yicha Harakatlar strategiyasida, O'zbekiston Respublikasi Prezidentining 2019-yil 23-oktabrdagi 5853-son "O'zbekiston Respublikasi qishloq xo'jaligini rivojlantirishning 2020–2030-yillarga mo'ljallangan strategiyasini tasdiqlash to'g'risida", 2022-yil 28-yanvardagi 60-son "2022–2026-yillarga mo'ljallangan Yangi O'zbekistonning taraqqiyot strategiyasi to'g'risida"gi Farmonlari, 2023-yil 29-martdagi 103-son "Agrar sektorni zamonaviy qishloq xo'jaligi texnikalari bilan ta'minlashni rag'batlantirishning qo'shimcha chora-tadbirlari to'g'risida"gi va 2023-yil 5 43 apreldagi 113-son "2023-yilda qishloq xo'jaligi mahsulotlari ishlab chiqarish, qayta ishlashni kengaytirish va qo'llab-quvvatlashning qo'shimcha chora-tadbirlari to'g'risida"gi Qarorlari va sohaga oid boshqa normativ-huquqiy hujjatlar Xorazm viloyatida agrar sohani rivojlanishdagi yana bir qadamdir.(2)

ASOSIY QISM

Dastlabki ma'lumotlarga ko'ra, 2025-yilning yanvar- sentabr oylarida qishloq, o'rmon va baliqchilik xo'jaligi mahsulot (xizmat) larining umumiy hajmi 24 352,2 mlrd so'mni, shu jumladan, dehqonchilik va chorvachilik, ovchilik va ushbu sohalarda ko'rsatilgan xizmatlar – 23 774,0 mlrd so'mni, o'rmon xo'jaligi – 196,7 mlrd so'mni, baliqchilik xo'jaligi – 381,5 mlrd so'mni tashkil qildi.[3]

1-jadval.

Xorazm viloyatida qishloq xo'jaligining asosiy ko'rsatkichlari[4]

Ko'rsatkichlar	2010 yil	2015 yil	2020 yil	2024 yil	2025 yil yanvar-dekabr 2)	2026 yil yanvar-mart 2)
Qishloq xo'jaligi ekinlari ekin maydoni, ming gektar	228,5	232,5	216,8	260,9	x	x
Qishloq xo'jaligi mahsuloti, mlrd. so'm	1932,2	6215,7	16258,9	28415,7	32545,8	4793,6
shu jumladan:						
dehqonchilik	995,4	3134,5	7306,7	12875,6	14160,8	185,9
Chorvachilik	936,8	3081,2	8952,2	15540,1	18385,0	4607,7

Qishloq xo'jaligi mahsulotlari ishlab chiqarishning o'sish sur'ati, o'tgan yilga nisbatan foizda	102,5	105,5	101,7	103,1	104,9	104,6
shu jumladan:						
Dehqonchilik	101,0	104,7	101,0	102,6	109,7	103,0
Chorvachilik	104,4	106,2	102,3	103,5	100,9	104,7

Yuqoridagi jadvalda tasvirlangan ko’rsatkichlardan ko’rinib turibdiki, 2010-yildan 2024-yilgacha qishloq xo’jaligi ekinlari ekin maydonlari 260,9 ming gektarni tashkil qiladi. Bunga asosiy sabab qilib yillar davomida mamlakatimizda modernizatsiyalash to’g’risida joriy qilinayotgan qaror va farmoyishlar, fermer xo’jaliklariga davlatimiz tomonidan berilayotgan subsidiya va imtiyozlar mahsulidir. Jumladan, O‘zbekiston Respublikasi Prezidentining PF-18-sonli “Qishloq xo‘jaligi ekin maydonlari unumdorligini oshirish, tarmoqqa investitsiyalar jalb qilish uchun qulay shart-sharoit yaratish bo‘yicha navbatdagi chora-tadbirlar to‘g‘risida” Farmoni misol qilib ko’rsatishimiz mumkin[1].

Qishloq xo’jaligi mahsulotlarini hajmini tahlil qiladigan bo’lsak, 2010-yilda 1932,2 mlrd so’mni tashkil qilib, 2025-yil 32545,8 mlrd so’mga oshgan bo’lsa 2026-yilning yanvar-mart oylarida esa 4793,6 mlrd so’mga yetgan. Ushbu o’sish qishloq xo’jaligiga yangi agrotexnologiyalarini joriy etish shuningdek, davlat tomonidan ko’rsatilayotgan qo’llab- quvvatlashning natijasidir.

Qishloq xo’jaligi mahsulotlarini ishlab chiqarish sur’atlarini ko’rib chiqadigan bo’lsak, bu ko’rsatkich yillar davomida ijobiy dinamika namoyon qilib kelmoqda. 2010-yilda o’sish 102,5%, 2025-yilda 105,5%, 2020-yilda 101,7%, 2024-yilda 103,1%, 2025-yilda 104,9% va 2026-yil yanvar-mart oylarida esa 104,6% ni egallagan. Bu ko’rsatkich tarmoqlarning har yili barqaror rivojlanayotganligini anglatadi. Dehqonchilik mahsulotlari ishlab chiqarish sur’ati 101,0-109,7%, chorvachilik mahsulotlari esa 104,4-100,9% oralig’ini tashkil etadi.

2025-yilda hududlar kesimida qishloq xo‘jaligi mahsulotlarining eng yuqori hajmi Urganch (2 908,0 mlrd so‘m), Qo‘shko‘pir (2 443,8 mlrd so‘m), Bogot (2 316,2 mlrd so‘m) va Gurlan (2 314,0 mlrd so‘m) tumanlarida qayd etildi. Aksincha kam hajmga ega hududlarga Yangiariq tumani (1 971,0 mlrd so‘m), Shovot tumani (1 942,5 mlrd so‘m), Xiva tumani (1 872,4 mlrd so‘m) va Tuproqqal’a tumanini (579,5 mlrd so‘m) keltirib o‘tish mumkin. Yuqori o‘sish sur’atlari Shovot (108,0 %), Gurlan va Yangibozor (107,4 %), Yangiariq (105,5 %), Tuproqqal’a (105,3 %) va Xiva (105,1 %) tumanlarida qayd etildi. Xonqa (102,8 %) va Hazorasp (102,9 %) tumanlarida esa aksincha o‘sish sur’atlari pastligi kuzatildi.[5]

2025-yilning yanvar- sentabr oylarida barcha toifadagi xo‘jaliklar tomonidan 577,8 ming tonna donli ekinlar (2024-yilning yanvar- sentabrga nisbatan 19,8 % ga ko‘p), 140,7 ming tonna kartoshka (3,3 % ga ko‘p), 126,8 ming tonna sabzavotlar (4,9 % ga ko‘p), 13,4 ming tonna poliz ekinlari (2,4 % ga ko‘p), 143,2 ming tonna meva va rezavorlar (5,6 % ga ko‘p), 36,2 ming tonna uzum (4,5 % ga ko‘p) yetishtirildi.[6]

2026-yil hosili uchun viloyatda 33,2 ming gektar maydonda kuzgi boshoqli don ekinlari parvarishlandi. G‘alla yetishtirishda zamonaviy intensiv agrotexnologiyalarni keng joriy etish, ilm-fan va innovatsiyalarga asoslangan yondashuvlarni qo‘llash, tuproq-iqlim sharoitiga mos navlarni tanlash, urug‘larni yarovizatsiya qilib ekish hamda barcha agrotexnik tadbirlarni o‘z vaqtida amalga oshirish yuqori natijalarga zamin yaratdi. Natijada joriy yilda viloyatda 320 ming tonna boshoqli don yetishtirilishi kutilmoqda. Davlat ehtiyojlari uchun 110,7 ming tonna don sotish belgilangan bo‘lsa, amalda 118 ming tonna don topshirilib, ko‘rsatkich 106,6 foizga ta’minlandi.[7]

Xorazm viloyatida chorvachilik sohasida bir qancha yangilanish va innovatsiyalar joriy qilinmoqda, Bugungi chet el mamlakatlari bilan amalga oshiriyotgan kelishuvlar asosida zamonaviy texnologiyalar kiritish orqali eksport bob mahsulotlar ishlab chiqarishga qaratilmoqda. Jumladan, Parranda

Investment” korxonasi va Daniyaning DLG Vilofoss Group kompaniyasi hamkorligida amalga oshirilayotgan loyiha doirasida yillik quvvati 20 ming tonna bo‘lgan zamonaviy korxona barpo etiladi. Korxonaga Germaniyaning Wagner kompaniyasi texnologiya va uskunalari o‘rnatiladi. Korxonada Vilofoss brendi ostida parrandalar, qoramollar va baliqlar uchun xalqaro sifat standartlariga javob beradigan yuqori sifatli premikslar ishlab chiqariladi. Ushbu ozuqa qo‘shimchalari hayvonlarning sog‘lom o‘sishi, mahsuldorligi va ozuqadan foydalanish samaradorligini oshirishga xizmat qiladi. Loyihaning amalga oshirilishi natijasida mamlakatimizda premiks ishlab chiqarish bo‘yicha mahalliy quvvatlar shakllantiriladi, import o‘rnini bosuvchi mahsulotlar ishlab chiqarish kengayadi hamda Qozog‘iston, Qirg‘iziston, Tojikiston, Turkmaniston va Afg‘oniston bozorlariga eksport qilish imkoniyatlari yaratiladi.[8]

XULOSA

Xorazm viloyatining barqaror iqtisodiy rivojlanishida qishloq xo’jaligi katta ro’l o’ynaydi. Shuning uchun oxirgi yillarda mamlakatimiz qishloq xo’jaligiga alohida urg’u berib kelmoqda. Buning natijasida viloyatimizda import o’rnini bosuvchi va eksportbob mahsulotlar ishlab chiqilmoqda, shuningdek, aholini bandligini ta’minlash, raqobatbardoshligini oshirish va oziq-ovqat xavfsizligini ta‘minlash choralari ham yo’lga qo’yilgan.

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РАЗВИТИЕ МАЛОГО БИЗНЕСА И ЧАСТНОГО ПРЕДПРИНИМАТЕЛЬСТВА: МЕХАНИЗМЫ ГОСУДАРСТВЕННОГО РЕГУЛИРОВАНИЯ И РЕГИОНАЛЬНЫЕ РАЗЛИЧИЯ: НА ПРИМЕРЕ УЗБЕКИСТАНА

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Аннотация: *В данной статье рассматривается роль экономической политики государства и регулирующих механизмов в поддержке развития малого бизнеса и частного предпринимательства в Узбекистане. В исследовании описательно изучаются основные инструменты поддержки субъектов малого бизнеса, включая упрощённые процедуры регистрации, льготные кредиты, субсидии и институциональные реформы. Также анализируются региональные различия и влияние государственного регулирования на предпринимательскую деятельность. На основании результатов исследования предложены практические рекомендации по повышению конкурентоспособности малого бизнеса, обеспечению его устойчивого развития и расширению вклада в национальную экономику.*

Ключевые слова: *малый бизнес, предпринимательство, государственное регулирование, экономическая политика, региональное развитие, финансовая поддержка.*

Annotation: *This article examines the role of state economic policy and regulatory mechanisms in supporting the development of small business and private entrepreneurship in Uzbekistan. The study descriptively explores key support instruments for small business entities, including simplified registration procedures, preferential loans, subsidies, and institutional reforms. The analysis also considers regional disparities and the impact of state regulation on entrepreneurial activity. Based on the findings, practical recommendations are proposed to enhance the competitiveness of small businesses, ensure their sustainable growth, and expand their contribution to the national economy.*

Keywords: *small business, entrepreneurship, state regulation, economic policy, regional development, financial support.*

Annotatsiya: *Mazkur maqolada O‘zbekistonda kichik biznes va xususiy tadbirkorlikni rivojlantirishda davlatning iqtisodiy siyosati va tartibga solish mexanizmlarining roli tahlil qilinadi. Tadqiqot jarayonida kichik biznes subyektlarini qo‘llab-quvvatlashning asosiy vositalari, jumladan soddalashtirilgan ro‘yxatdan o‘tkazish tartiblari, imtiyozli kreditlar, subsidiyalar va institutsional islohotlar tavsifiy tarzda o‘rganildi. Shuningdek, hududiy farqlar, davlat tartibga solish mexanizmlarining tadbirkorlik faoliyatiga ta’siri ham tahlil qilinadi. Tadqiqot natijalariga asoslanib, kichik biznesning raqobatbardoshligini oshirish, barqaror rivojlanishini ta’minlash va iqtisodiyotdagi ulushini kengaytirishga qaratilgan amaliy tavsiyalar ishlab chiqildi.*

Kalit so‘zlar: *kichik biznes, tadbirkorlik, davlat tartibga solishi, iqtisodiy siyosat, hududiy rivojlanish, moliyaviy qo‘llab-quvvatlash.*

ВВЕДЕНИЕ

В современной экономической системе малый бизнес и частное предпринимательство являются одними из важнейших драйверов экономического развития. Данный сектор играет значительную роль в ускорении темпов экономического роста, создании новых рабочих мест, формировании конкурентной среды, а также в стимулировании инновационной деятельности. Особенно в развивающихся странах малый бизнес способствует обеспечению занятости населения и укреплению экономической стабильности. Мировой опыт показывает, что эффективное функционирование малого бизнеса во многом зависит от экономических и институциональных условий, создаваемых государством. Государство посредством экономической политики стимулирует предпринимательскую деятельность, расширяет возможности доступа к финансовым ресурсам и обеспечивает развитие рыночной инфраструктуры. Вместе с тем, через функции регулирования экономики государство обеспечивает сбалансированное развитие рыночных отношений. В данном процессе важное значение имеют налоговая политика, кредитная политика,

инвестиционная политика, а также правовые механизмы регулирования предпринимательской деятельности.

Целью данной статьи является изучение теоретических основ экономической политики государства и его регулирующих функций в поддержке малого бизнеса, а также анализ их практического значения.

Степень изученности проблемы. Вопросы развития малого бизнеса и частного предпринимательства, а также их государственной поддержки являются одним из важных научных направлений, широко изучаемых в экономической теории и практике. Теоретические основы данной проблемы исследованы многими зарубежными и отечественными экономистами.

Представители классической экономической школы, такие как Adam Smith, обосновали роль предпринимательской деятельности в экономическом развитии, подчеркнув, что свободное функционирование рыночных механизмов является важным условием для развития предпринимательства.[26] Также Jean-Baptiste Say рассматривал предпринимательство как важный экономический процесс, эффективно объединяющий факторы производства.[27] Экономическая сущность предпринимательской деятельности и её роль в рыночной экономике были глубоко изучены такими учёными, как Richard Cantillon[28], Alfred Marshall[29] и Joseph Schumpeter[30]. В частности, Шумпетер рассматривал предпринимательство как основную силу внедрения инноваций и подчёркивал важную роль предпринимателей в экономическом развитии. Роль государства в регулировании экономики и необходимость поддержки предпринимательской деятельности подробно освещены в теоретических

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[30] Шумпетер Й. The Theory of Economic Development. — Harvard University Press, 1934.

взглядах John Maynard Keynes[31]. По его мнению, государство посредством экономической политики способно координировать экономические процессы и стимулировать предпринимательскую деятельность.

Отечественные экономисты также активно исследуют вопросы развития малого бизнеса и частного предпринимательства, совершенствования механизмов государственной поддержки и улучшения институциональной среды. В современных исследованиях особое внимание уделяется финансовой поддержке малого бизнеса, совершенствованию налоговой политики и развитию предпринимательской инфраструктуры. Вместе с тем, в условиях модернизации экономики вопросы повышения эффективности государственной экономической политики в развитии малого бизнеса, а также совершенствования механизмов регулирования требуют более глубоких научных исследований.

Анализ и результаты. Малый бизнес и частное предпринимательство являются важной составной частью экономики и играют значительную роль в экономическом развитии страны. Данный сектор способствует обеспечению экономического роста, созданию новых рабочих мест и повышению доходов населения. В связи с этим во многих странах поддержка малого бизнеса рассматривается как одно из приоритетных направлений государственной экономической политики.

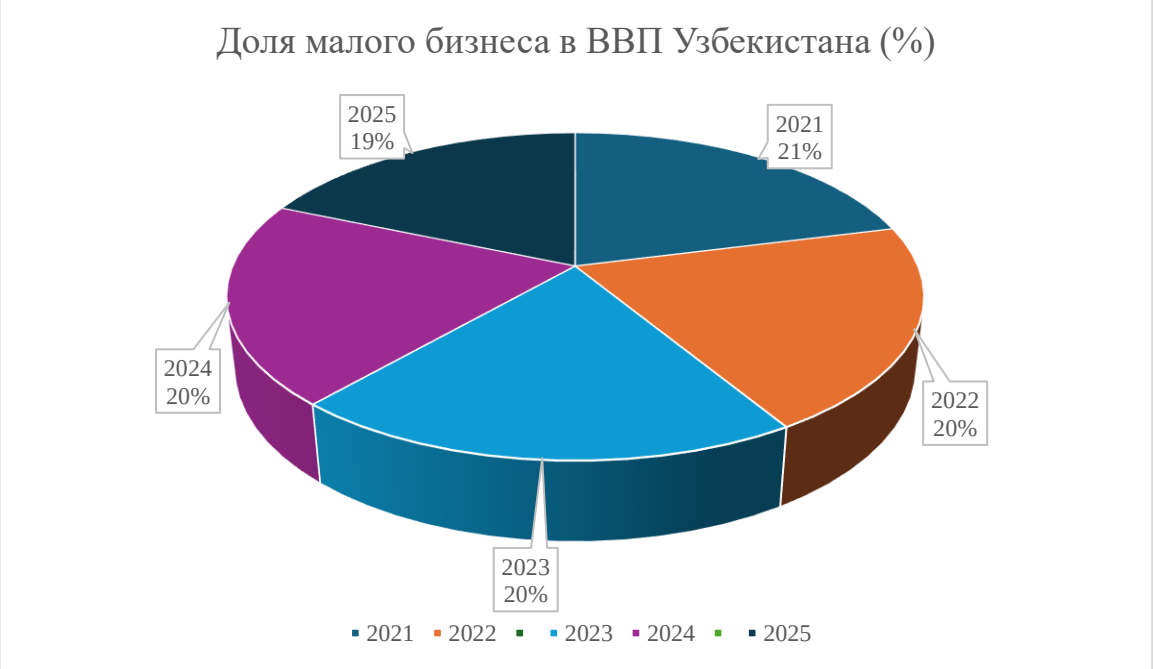
В последние годы в Узбекистане также уделяется особое внимание развитию малого бизнеса и частного предпринимательства. Государством реализуются масштабные экономические реформы, направленные на поддержку предпринимательской деятельности. В частности, внедряются механизмы поддержки субъектов малого бизнеса посредством упрощения налоговой системы, облегчения процедур регистрации

[31] Кейнс Дж. М. The General Theory of Employment, Interest and Money. — Лондон, 1936.

предпринимательской деятельности, а также предоставления льготных кредитов.

Согласно статистическим данным, доля малого бизнеса в ВВП Узбекистана в 2021–2024 годах постепенно снижается. Несмотря на это, данный сектор продолжает играть важную роль в экономике и вносит значительный вклад в обеспечение занятости населения. Большинство действующих предприятий в стране составляют именно субъекты малого бизнеса.

Диаграмма 1[32]



Доля малого бизнеса в ВВП Узбекистана (%)

В 2021–2025 годах доля малого бизнеса в ВВП Республики Узбекистан постепенно снижается. Если в 2021 году данный показатель составлял 56,3%, то в 2022 году он снизился до 54,3%, в 2023 году — до 53,8%, а в 2024 году — до 53,5%. Прогнозируемое среднее значение на 2025 год составляет 49,7%.

[32] Государственный комитет Республики Узбекистан по статистике. — stat.uz, данные за 2021–2025 гг.

Данная тенденция снижения свидетельствует о том, что доля малого бизнеса в экономике страны несколько уменьшается, что может быть связано с ростом крупного бизнеса и других секторов экономики. Вместе с тем сектор малого бизнеса продолжает оставаться основой экономики: он не только обеспечивает занятость населения, но и стимулирует местную экономическую активность.

Анализ по регионам показывает, что в одних областях его доля относительно высокая, тогда как в других — ниже. Эти региональные различия обусловлены уровнем развития местных экономических возможностей, промышленности и сферы услуг.

Диаграмма 2[33]



Динамика доли малого бизнеса в ВВП Узбекистана (в разрезе регионов)

Общенациональный показатель составил 56% в 2021 году и снизился до 50% в 2025 году, что свидетельствует о некотором сокращении доли

[33] Источник: Государственный комитет Республики Узбекистан по статистике (stat.uz), данные за 2021–2025 гг.

малого бизнеса в ВВП страны. Это отражает общую тенденцию на уровне государства. Анализ по регионам показывает следующее:

• В Республике Каракалпакстан доля малого бизнеса в ВВП демонстрировала устойчивый рост. Показатель увеличился с 62% в 2021 году до 66% в 2024 году, однако в 2025 году несколько снизился и составил 63%. Это свидетельствует о стабильности и относительно устойчивом развитии малого бизнеса в данном регионе.

• Андижанская, Бухарская, Джизакская, Наманганская и Самаркандская области характеризуются общей тенденцией снижения. Например, в Джизакской области показатель снизился с 81% в 2021 году до 69% в 2025 году. Это свидетельствует о замедлении доли субъектов малого бизнеса в ВВП данных регионов.

• Навоийская область выделяется низкими показателями: 27% в 2021 году и 21% в 2025 году, что свидетельствует о сравнительно слабой роли малого бизнеса в экономике региона.

• В городе Ташкенте и Ташкентской области доля малого бизнеса демонстрирует изменчивую динамику. В Ташкентской области показатель увеличился с 48% в 2021 году до 55% в 2024 году, затем снизился до 53% в 2025 году, тогда как в городе Ташкенте наблюдается снижение с 52% до 50%. Это отражает влияние конкуренции между субъектами малого бизнеса и крупными предприятиями.

• Сурхандарьинская, Кашкадарьинская и Ферганская области демонстрируют относительно стабильную динамику и отражают региональные различия. В Сурхандарьинской области показатель составил 78% в 2021 году и 75% в 2025 году, что не свидетельствует о значительном снижении. В Ферганской области наблюдается минимальное изменение — с 72% до 71%, что указывает на сохранение стабильности малого бизнеса в регионе.

Кроме того, субъекты малого бизнеса играют важную роль в обеспечении занятости населения. Большинство действующих предприятий в стране составляют именно субъекты малого бизнеса.

Выводы и предложения. Государственная экономическая политика и функции регулирования играют ключевую роль в развитии малого бизнеса. Законодательная база, налоговые льготы, субсидии и льготное кредитование являются основными инструментами поддержки малых предприятий. В то же время регулирующие функции — лицензирование, нормативно-правовое обеспечение и мониторинг — способствуют обеспечению прозрачности и эффективности предпринимательской деятельности. Исследования показывают, что чёткая и системная государственная политика, а также учёт региональных особенностей способствуют устойчивому развитию и повышению экономической эффективности субъектов малого бизнеса.

В Республике Узбекистан доля субъектов малого бизнеса в ВВП демонстрирует значительные региональные различия. Согласно статистическим данным, в 2021–2025 годах общий показатель по стране несколько снизился, однако в отдельных регионах (Каракалпакстан, Сурхандарьинская область) наблюдаются рост и устойчивость малого бизнеса. В то же время в таких регионах, как Навоийская область, роль малого бизнеса остаётся низкой, что требует принятия специальных мер по увеличению его доли.

Подобные изменения особенно ярко проявляются в региональном разрезе, что свидетельствует о зависимости от эффективности региональной экономической политики, уровня развития инфраструктуры и механизмов государственной поддержки. Данная тенденция снижения также указывает на то, что в отдельных областях конкурентоспособность и финансовые возможности субъектов малого бизнеса остаются ограниченными.

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QISHLOQ XO‘JALIGI KREDITLARIDA TAVAKKALCHILIKNI BOSHQARISH: AGROSUG‘URTA MEXANIZMLARINING TIJORAT BANKLARI FAOLIYATIDAGI O‘RNI

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Annotatsiya*: Ushbu maqolada qishloq xo‘jaligi tarmog‘ini kreditlashda yuzaga keladigan o‘ziga xos tavakkalchiliklar va ularni agrosug‘urta mexanizmlari orqali kamaytirish imkoniyatlari tahlil qilinadi. Qishloq xo‘jaligi kreditlari ob-havo, tabiiy ofatlar va bozor narxlari o‘zgaruvchanligi kabi tizimli tavakkalchiliklarga yuqori darajada moyil bo‘lganligi sababli, an’anaviy kredit ta’minoti vositalari (garov, kafolat) yetarli himoya bera olmaydi. O‘zbekiston Respublikasi Markaziy banki, Qishloq xo‘jaligi vazirligi va BMT Taraqqiyot Dasturi (BMTTD) ma’lumotlari asosida o‘tkazilgan tahlil shuni ko‘rsatadiki, agrosug‘urta tizimining institutsional shakllanishi hali dastlabki bosqichda bo‘lib, uni rivojlantirish tijorat banklarining agrar sektorga kredit berish salohiyatini sezilarli darajada oshirishi mumkin.*

Annotation: *This article analyzes the specific risks arising in lending to the agricultural sector and the possibilities for mitigating them through agro-insurance mechanisms. Since agricultural loans are highly susceptible to systemic risks such as weather, natural disasters, and market price volatility, traditional loan collateral (pledge, guarantee) cannot provide adequate protection. An analysis conducted based on data from the Central Bank of the Republic of Uzbekistan, the Ministry of Agriculture, and the United Nations Development Program (UNDP) shows that the institutional formation of the agro-insurance system is still in its early stages, and its development can significantly increase the lending capacity of commercial banks to the agricultural sector.*

Kalit so‘zlar: *agrosug‘urta, qishloq xo‘jaligi krediti, kredit tavakkalchiligi, tijorat banklari, fermer xo‘jaligi, subsidiyalash, tabiiy ofat tavakkalchiligi, kredit kafolati.*

Keywords: *agricultural insurance, agricultural credit, credit risk, commercial banks, farming, subsidization, natural disaster risk, credit guarantee.*

KIRISH

Qishloq xo‘jaligi O‘zbekiston iqtisodiyotining strategik tarmog‘i bo‘lib, mamlakat aholisining oziq-ovqat xavfsizligini ta’minlash va eksport salohiyatini oshirishda muhim rol o‘ynaydi. Shu bilan birga, ushbu tarmoqni kreditlash tijorat banklari uchun boshqa sohalarga nisbatan yuqori tavakkalchilik darajasiga ega hisoblanadi, chunki fermer xo‘jaliklarining daromadliligi ob-havo sharoitlari, tabiiy ofatlar, zararkunandalar va jahon bozoridagi narx tebranishlariga bevosita bog‘liqdir [1, 2].

2025-yilda qishloq xo‘jaligini moliyalashtirishga 29 trln so‘m yo‘naltirilgan, shundan 2,35 trln so‘mi subsidiya tariqasida ajratilgan bo‘lib, bu tarmoqning davlat tomonidan qo‘llab-quvvatlanish darajasi yuqoriligini ko‘rsatadi [7].[34]

An’anaviy kredit ta’minoti vositalari — garov mulki yoki uchinchi shaxs kafolati — agrar sohada tabiiy ofatlar yuz berganda samarasiz bo‘lib qolishi mumkin, chunki garov sifatida qo‘yilgan hosil yoki chorva mollari halokatga uchrashi natijasida ta’minot qiymati nolga tushishi mumkin. Aynan shu sababli agrosug‘urta — ekinlar, chorvachilik va boshqa qishloq xo‘jaligi aktivlarini tabiiy va iqtisodiy tavakkalchiliklardan sug‘urta qilish — kredit tavakkalchiligini kamaytirishning muqobil vositasi sifatida xalqaro amaliyotda keng qo‘llaniladi [3].

O‘zbekistonda 2025-yil mart oyida qishloq xo‘jaligi mahsulotlarini yetishtirishda sug‘urtalash tizimini joriy etish bo‘yicha qonunchilik asoslari yaratilmoqda, bu esa ekinlarga tabiiy xavf-xatarlar tufayli yetgan zararni

[34]Subsidiya — davlat byudjetidan qishloq xo‘jaligi ishlab chiqaruvchilarining xarajatlarini qisman qoplash yoki foiz stavkalarini kamaytirish maqsadida ajratiladigan qaytarilmaydigan mablag‘.

qoplashning huquqiy mexanizmini shakllantiradi [6]. Bundan tashqari, 2025-yil oktabr oyida qabul qilingan me’yoriy hujjatga ko‘ra, davlat qishloq xo‘jaligi kreditlarining ma’lum qismiga (10 mlrd so‘mgacha) kafillik taqdim etish orqali tavakkalchilikni bo‘lishishga kirishmoqda [8].

Tadqiqotning maqsad va vazifalari

Tadqiqotning maqsadi — qishloq xo‘jaligi kreditlarida yuzaga keladigan o‘ziga xos tavakkalchiliklarni tizimlashtirish, agrosug‘urta mexanizmlarining ushbu tavakkalchiliklarni kamaytirishdagi salohiyatini baholash hamda tijorat banklari va sug‘urta kompaniyalari o‘rtasidagi hamkorlikni rivojlantirish bo‘yicha tavsiyalar ishlab chiqishdan iborat. Vazifalar: agrar kredit tavakkalchiligining tarkibiy tahlili; mavjud davlat qo‘llab-quvvatlash va kafillik mexanizmlarini o‘rganish; agrosug‘urta tizimining institutsional holatini baholash; xalqaro tajriba bilan qiyoslash; amaliy takliflar ishlab chiqish.

TADQIQOT METODOLOGIYASI

Tadqiqotda O‘zbekiston Respublikasi Prezidenti va Vazirlar Mahkamasining qishloq xo‘jaligini moliyalashtirish va sug‘urtalashga oid me’yoriy-huquqiy hujjatlari, Qishloq xo‘jaligi vazirligining rasmiy ma’lumotlari, BMT Taraqqiyot Dasturi (BMTTD) tomonidan tayyorlangan agrosug‘urta tizimi tahlili hamda ilmiy adabiyotlar tahlil qilindi [1, 2, 6, 7, 8, 9].

Qo‘llanilgan metodlar: normativ-huquqiy tahlil (qonunchilik bazasini o‘rganish), qiyosiy tahlil (xalqaro agrosug‘urta modellari bilan solishtirish), hamda tizimli yondashuv (kredit, subsidiya va sug‘urta mexanizmlarining o‘zaro bog‘liqligini aniqlash) [1, 4, 5].

Tadqiqot chegaralari

Tadqiqot 2019–2026-yillar oralig‘idagi me’yoriy-huquqiy va statistik ma’lumotlarni qamrab oladi, chunki aynan shu davrda «O‘zbekiston Respublikasi qishloq xo‘jaligini rivojlantirishning 2020–2030-yillarga mo‘ljallangan strategiyasi» qabul qilingan bo‘lib, unda kreditlash va

sug‘urtalash mexanizmlarini takomillashtirish alohida vazifa sifatida belgilangan [9].

NATIJALAR

1. Qishloq xo‘jaligi kreditlashdagi tavakkalchilik turlari

Qishloq xo‘jaligi kreditlarining o‘ziga xos xususiyati shundaki, ularda bir nechta tavakkalchilik turi bir vaqtning o‘zida namoyon bo‘ladi. Quyidagi 1-jadvalda ushbu tavakkalchiliklar va ularga qarshi qo‘llaniladigan an’anaviy hamda sug‘urta asosidagi himoya vositalari keltirilgan [1, 2, 3].

Tavakkalchilik turi	Manbasi	An’anaviy himoya vositasi	Sug‘urta asosidagi yechim
Ob-havo tavakkalchiligi	Qurg‘oqchilik, do‘l, sovuq	Deyarli mavjud emas	Indeksga asoslangan ekin sug‘urtasi
Biologik tavakkalchilik	Kasallik, zararkunandalar	Zaxira mablag‘lar	Chorvachilik/ekin sug‘urtasi
Bozor (narx) tavakkalchiligi	Jahon narxlari tebranishi	Forvard shartnomalar (cheklangan)	Narx sug‘urtasi, hosildorlik sug‘urtasi
Kredit (to‘lov) tavakkalchiligi	Fermer to‘lov qobiliyatsizligi	Garov, kafolat	Kredit sug‘urtasi, davlat kafilligi
Likvidlik tavakkalchiligi	Mavsumiy daromad tsikli	Kredit grafigini moslashtirish	Kompleks agrosug‘urta

1-jadval. Qishloq xo‘jaligi kreditlashdagi tavakkalchilik turlari va ularni qoplash vositalari (muallif tuzmasi, [1, 2, 3] asosida).

2. Davlat qo‘llab-quvvatlash va kafillik mexanizmlari

O‘zbekistonda qishloq xo‘jaligi kreditlarining tavakkalchiligini kamaytirishda davlat sezilarli rol o‘ynaydi. 2025-yil yakunlariga ko‘ra qishloq xo‘jaligini moliyalashtirishga 29 trln so‘m yo‘naltirilgan bo‘lib, shundan 2,35 trln so‘mi to‘g‘ridan-to‘g‘ri subsidiyalar tariqasida taqdim etilgan [7]. Bundan tashqari, kredit reytingiga ega fermer xo‘jaliklari uchun differensiyalangan foiz

stavkalari joriy etilmoqda: “A” toifadagi xo‘jaliklarga 2 foiz, “B” toifadagilarga 1 foizga pasaytirilgan stavkalar taklif etilgan, bu esa intizomli qarz oluvchilarni rag‘batlantirish orqali portfel sifatini yaxshilashga qaratilgan [7].

Yo‘nalish	Mexanizm	Miqyosi / shartlari
Kreditlash	Paxta va g‘alla yetishtirishni moliyalashtirish	29 trln so‘m (2025-yil)
Subsidiyalash	Xarajatlarni qisman qoplash	2,35 trln so‘m; 52 turdagi subsidiya
Kredit kafilligi	Davlat kafilligi (Agrar to‘lovlar agentligi)	Kredit summasining 50%igacha, 10 mlrd so‘mgacha
Kooperativ kreditlash	4 bank orqali maqsadli kredit liniyalari	500 mlrd so‘m, 30 tuman
Foiz subsidiyasi	Kredit reytingiga bog‘liq stavka pasaytirish	“A” toifa: −2%; “B” toifa: −1%

2-jadval. Qishloq xo‘jaligi kreditlarini davlat tomonidan qo‘llab-quvvatlash mexanizmlari, 2025–2026 (Gazeta.uz, Lex.uz ma’lumotlari asosida [7, 8, 10]).

Ushbu ma’lumotlar davlatning kredit tavakkalchiligini bevosita subsidiyalash va kafillik orqali bo‘lishishga faol yondashayotganini ko‘rsatadi, biroq bu yondashuv byudjetga doimiy yuk tushiradi va uzoq muddatda barqaror bo‘lmasligi mumkin — bu esa bozor asosidagi sug‘urta mexanizmlarini rivojlantirish zarurligini kuchaytiradi [3].

3. Agrosug‘urta tizimining institutsional holati

BMT Taraqqiyot Dasturi (BMTTD) tomonidan “Swiss Re” va “Europe Re” xalqaro sug‘urta tashkilotlari bilan hamkorlikda O‘zbekistonda agrosug‘urta sohasi mutaxassislarini tayyorlash bo‘yicha o‘quv dasturlari tashkil etilgan, bu sohaning institutsional rivojlanishi uchun xalqaro ko‘maklashuv faol davom etayotganini ko‘rsatadi [4, 5]. Shuningdek, Istiqbolli loyihalar milliy agentligi

(ILMA) bilan hamkorlikda agrosug‘urta amaliyotchilari hamjamiyati tashkil etilib, tavakkalchilikni moliyalashtirish mexanizmlarini joriy etish bo‘yicha tajriba almashinuv platformasi yaratilgan [5].

2025-yil mart oyida qishloq xo‘jaligi mahsulotlarini yetishtirishda sug‘urtalash tizimini joriy etish bo‘yicha qonunchilik ishlari boshlangan bo‘lib, bu ekinlarga xavf-xatarlar tufayli yetgan zararni qoplashning huquqiy asosini yaratadi [6]. Biroq amaldagi holatda agrosug‘urta mahsulotlari hali keng tarqalmagan va asosan pilot loyihalar darajasida qolmoqda, bu esa oldingi maqolada ko‘rib chiqilgan umumiy kredit sug‘urtasi bozoridagi tendensiyalarga [9, 10, 14 — avvalgi tadqiqot ma’lumotlari] mos ravishda, ixtisoslashgan agrar sug‘urta mahsulotlarining rivojlanish sur’ati umumiy sug‘urta bozoridan orqada qolayotganini ko‘rsatadi.

4. Xalqaro tajriba: indeksga asoslangan sug‘urta modeli

Xalqaro amaliyotda rivojlanayotgan bozorlarda eng samarali agrosug‘urta modeli sifatida ob-havo indeksiga asoslangan sug‘urta (weather-index insurance) qo‘llaniladi, unda to‘lov aniq bir fermaning zararini emas, balki meteorologik stansiya ma’lumotlari asosida hisoblangan ob-havo ko‘rsatkichini asos qilib oladi. Bu yondashuv moral xavf (moral hazard) va noto‘g‘ri tanlov (adverse selection) muammolarini sezilarli darajada kamaytiradi, chunki to‘lov summasi fermerning individual xatti-harakatiga bog‘liq emas [1, 2, 3].

Model	Tavakkalchilik baholash usuli	Afzalligi	O‘zbekiston uchun qo‘llanilishi
An’anaviy zarar sug‘urtasi	Har bir fermaning individual zarari	Aniq, adolatli to‘lov	Ma’muriy xarajat yuqori, anderrayting murakkab
Indeksga asoslangan sug‘urta	Meteorologik/hosildorlik indeksi	Tez to‘lov, moral xavf past	Meteo-tarmoq infratuzilmasini talab qiladi

Model	Tavakkalchilik baholash usuli	Afzalligi	O‘zbekiston uchun qo‘llanilishi
Davlat-xususiy sherikligi (PPP)	Davlat qisman qayta sug‘urtalovchi	Bozorni ishga tushirish rag‘bati	Qayta sug‘urta kompaniyasi orqali mumkin [8]

3-jadval. Agrosug‘urta modellarining qiyosiy tahlili (muallif tuzmasi, [1, 2, 3, 5] asosida).

MUHOKAMA

Tadqiqot natijalari shuni ko‘rsatadiki, O‘zbekistonda qishloq xo‘jaligi kreditlarining tavakkalchiligini kamaytirishda hozircha davlat subsidiyalari va kafillik mexanizmlari ustuvor rol o‘ynamoqda [7, 8], bozor asosidagi agrosug‘urta esa hali institutsional shakllanish bosqichida turibdi [4, 5, 6]. Bu holat qisqa muddatda fermerlar va banklar uchun qo‘shimcha himoya yaratsada, uzoq muddatli istiqbolda byudjet resurslariga bog‘liqlikni kuchaytiradi.

Oldingi tadqiqotda ko‘rib chiqilgan umumiy kredit sug‘urtasi bozori tendensiyalari bilan taqqoslaganda, agrar sug‘urta segmentining o‘ziga xos murakkabligi — ya’ni tavakkalchilikning geografik korrelyatsiyalashganligi (bir mintaqada barcha fermalar bir vaqtda zarar ko‘rishi mumkinligi) — sug‘urta kompaniyalari uchun qayta sug‘urtalash zarurligini oshiradi. Shu nuqtai nazardan, 2025-yilda tashkil etilgan milliy qayta sug‘urta kompaniyasi [8] agrosug‘urta bozorini rivojlantirish uchun muhim institutsional zamin yaratishi mumkin.

Shu bilan birga, indeksga asoslangan sug‘urta modelini joriy etish uchun O‘zbekistonda meteorologik monitoring infratuzilmasini kengaytirish va tarixiy hosildorlik ma’lumotlar bazasini raqamlashtirish zarur, aks holda sug‘urta tariflari noaniq va bozor ishonchsiz bo‘lib qolaveradi [1, 4].

XULOSA VA TAVSIYALAR

O‘tkazilgan tadqiqot natijalariga ko‘ra quyidagi xulosalarga kelindi:

1) Qishloq xo‘jaligi kreditlari o‘ziga xos, ko‘p qatlamli tavakkalchiliklarga (ob-havo, biologik, bozor, kredit) ega bo‘lib, an’anaviy garov-kafolat vositalari ularni to‘liq qoplay olmaydi;

2) Davlat hozirgi kunda subsidiya va kafillik orqali agrar kredit tavakkalchiligining muhim qismini o‘z zimmasiga olmoqda, bu esa byudjetga uzoq muddatli yukni kuchaytiradi;

3) Bozor asosidagi agrosug‘urta tizimi (xususan, indeksga asoslangan modellar) hali dastlabki institutsional shakllanish bosqichida bo‘lib, xalqaro tashkilotlar (BMTTD) ko‘magida rivojlantirilmoqda;

4) Milliy qayta sug‘urta kompaniyasining tashkil etilishi agrar tavakkalchiliklarni yirik miqyosda qoplash imkoniyatini yaratadi.

Amaliy tavsiyalar:

1) Tijorat banklari va agrosug‘urta kompaniyalari o‘rtasida qishloq xo‘jaligi kreditlarini kompleks himoyalash bo‘yicha maxsus dasturlarni ishlab chiqish;

2) Indeksga asoslangan ob-havo sug‘urtasini pilot hududlarda (masalan, paxta va g‘alla yetishtiriladigan tumanlarda) sinovdan o‘tkazish;

3) Meteorologik monitoring va hosildorlik statistikasi bazasini raqamlashtirib, sug‘urta tariflarini ilmiy asoslash;

4) Davlat kafilligi va xususiy agrosug‘urtani uyg‘unlashtirgan davlat-xususiy sheriklik (PPP) modelini joriy etish;

5) Kredit reytingiga ega, sug‘urta polisi bilan ta’minlangan fermer xo‘jaliklari uchun qo‘shimcha foiz stavkasi chegirmalarini nazarda tutish.

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QURILISH MATERIALLARI SANOATI KORXONALARI BOSHQARUV STRATEGIYALARINI TAKOMILLASHTIRISHDA XORIJ TAJRIBALARI.

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Annotatsiya: *Mazkur maqolada qurilish materiallari sanoati korxonalarida boshqaruv strategiyalarini takomillashtirishning nazariy va amaliy jihatlari hamda rivojlangan davlatlar tajribasi tahlil qilingan. Xususan, Germaniya, Yaponiya, Xitoy va AQSh qurilish materiallari sanoati korxonalarida qo‘llanilayotgan zamonaviy boshqaruv usullari, raqamli texnologiyalar, innovatsion yondashuvlar va strategik rejalashtirish mexanizmlari o‘rganilgan. Tadqiqot natijasida xorijiy tajribalarni O‘zbekiston qurilish materiallari sanoati korxonalariga moslashtirish bo‘yicha amaliy tavsiyalar ishlab chiqilgan.*

Kalit so‘zlar: *qurilish materiallari sanoati, strategik boshqaruv, xorij tajribasi, innovatsion boshqaruv, raqamli transformatsiya, raqobatbardoshlik, sanoat korxonalari, samaradorlik.*

Abstract: *This article examines theoretical and practical aspects of improving management strategies in construction materials industry enterprises and analyzes the*

experiences of developed countries. In particular, modern management methods, digital technologies, innovative approaches, and strategic planning mechanisms applied in Germany, Japan, China, and the United States are studied. Based on the findings, practical recommendations are proposed for adapting foreign experiences to construction materials enterprises in Uzbekistan.

Keywords: *construction materials industry, strategic management, foreign experience, innovative management, digital transformation, competitiveness, industrial enterprises, efficiency.*

KIRISH (INTRODUCTION)

Jahon iqtisodiyotida qurilish materiallari sanoati iqtisodiy o‘sishni ta’minlovchi strategik tarmoqlardan biri hisoblanadi. Urbanizatsiya jarayonlarining jadallashuvi, infratuzilma loyihalarining kengayishi va ekologik talablarning ortishi mazkur tarmoq korxonalaridan samarali boshqaruv tizimlarini joriy etishni talab etmoqda.

Bugungi kunda rivojlangan davlatlar qurilish materiallari sanoati korxonalarida innovatsion boshqaruv, raqamlashtirish, yashil iqtisodiyot tamoyillari va strategik rejalashtirish asosida yuqori samaradorlikka erishmoqda. O‘zbekiston qurilish materiallari sanoati ham modernizatsiya jarayonini boshdan kechirayotgan bir paytda ushbu tajribalarni o‘rganish va amaliyotga tatbiq etish muhim ahamiyat kasb etadi.

Mazkur tadqiqotning maqsadi xorijiy tajribalarni tahlil qilish hamda ularni O‘zbekiston qurilish materiallari sanoati korxonalarida boshqaruv strategiyalarini takomillashtirishda qo‘llash imkoniyatlarini aniqlashdan iborat.

ADABIYOTLAR SHARHI (LITERATURE REVIEW)

Strategik boshqaruv nazariyasi rivojiga katta hissa qo‘shgan olimlar orasida Michael Porter, Peter Drucker va Henry Mintzberg alohida o‘rin tutadi. Ularning tadqiqotlarida korxonalarning uzoq muddatli raqobatbardoshligini ta’minlashda strategik boshqaruvning ahamiyati asoslab berilgan.

So‘nggi yillarda qurilish materiallari sanoatida raqamli transformatsiya, "Industry 4.0", sun’iy intellekt, BIM texnologiyalari va ekologik boshqaruv

tizimlari bo‘yicha ko‘plab ilmiy izlanishlar olib borilgan. Tadqiqotlar korxonalarning innovatsion rivojlanishi va boshqaruv samaradorligi o‘rtasida kuchli bog‘liqlik mavjudligini ko‘rsatmoqda.

TADQIQOT METODOLOGIYASI (METHODS)

Tadqiqot davomida quyidagi ilmiy usullardan foydalanildi:

- qiyosiy tahlil;
- statistik ma’lumotlarni tahlil qilish;
- SWOT tahlil;
- PEST tahlil;
- xorijiy tajribalarni o‘rganish;
- iqtisodiy va strategik baholash usullari.

Tadqiqot obyekti sifatida rivojlangan davlatlarning qurilish materiallari ishlab chiqaruvchi korxonalari faoliyati tanlandi.

NATIJALAR (RESULTS)

Xorijiy davlatlar tajribasi

Germaniya tajribasi

Germaniya qurilish materiallari sanoati korxonalari sanoatni avtomatlashtirish va energiya tejamkor texnologiyalarni keng joriy etishi bilan ajralib turadi. Korxonalarda ERP tizimlari, raqamli monitoring va ekologik menejment standartlari qo‘llaniladi.

Yaponiya tajribasi

Yaponiyada "Kaizen" falsafasi asosida uzluksiz takomillashtirish tizimi joriy etilgan. Korxonalar ishlab chiqarish jarayonlaridagi yo‘qotishlarni minimallashtirish va sifatni oshirishga alohida e’tibor qaratadi.

Xitoy tajribasi

Xitoy qurilish materiallari sanoatida davlat va xususiy sektor hamkorligi asosida innovatsion klasterlar shakllantirilgan. Raqamlashtirish va eksportga yo‘naltirilgan strategiyalar korxonalarning jahon bozoridagi ulushini oshirishga xizmat qilmoqda.

AQSh tajribasi

AQSh korxonalarida strategik boshqaruvning asosiy yo‘nalishlari innovatsiyalar, marketing strategiyalari va ilmiy-tadqiqot faoliyatiga investitsiyalarni ko‘paytirish hisoblanadi.

1-jadval

Xorijiy tajribalarning asosiy xususiyatlari

Mamlakat	Boshqaruv modeli	Asosiy ustunlik
Germaniya	Industry 4.0	Avtomatlashtirish
Yaponiya	Kaizen	Uzluksiz takomillashtirish
Xitoy	Innovatsion klasterlar	Eksport va investitsiyalar
AQSh	Innovatsion menejment	Ilmiy tadqiqotlar

SWOT tahlil

O‘zbekiston qurilish materiallari sanoati korxonalari uchun

Kuchli tomonlar	Zaif tomonlar
Xomashyo bazasining mavjudligi	Texnologik eskirish
Ichki bozor talabining yuqoriligi	Raqamlashtirish darajasining pastligi
Davlat qo‘llab-quvvatlashi	Malakali mutaxassislar yetishmasligi

Imkoniyatlar	Tahdidlar
Xorijiy investitsiyalar	Kuchli xalqaro raqobat
Yashil iqtisodiyot	Energiya narxlarining oshishi
Eksport bozorlarining kengayishi	Logistika muammolari

MUHOKAMA (DISCUSSION)

Tahlillar shuni ko‘rsatadiki, qurilish materiallari sanoati korxonalarining muvaffaqiyati zamonaviy boshqaruv tizimlarini joriy etish bilan chambarchas bog‘liq. Xususan:

- ERP va CRM tizimlaridan foydalanish;
- sun’iy intellekt asosidagi prognozlash;
- ishlab chiqarishni avtomatlashtirish;
- energiya samaradorligini oshirish;
- ekologik boshqaruv standartlarini joriy etish.

O‘zbekiston korxonalarida mazkur yo‘nalishlarni rivojlantirish ishlab chiqarish xarajatlarini kamaytirish, mahsulot sifatini oshirish va eksport salohiyatini kengaytirishga xizmat qiladi.

XULOSA (CONCLUSION)

Tadqiqot natijalari asosida quyidagi xulosalarga kelindi:

1. Xorijiy davlatlar tajribasi qurilish materiallari sanoati korxonalarida strategik boshqaruv samaradorligini oshirishda muhim ahamiyatga ega.

2. Germaniya tajribasidagi Industry 4.0 texnologiyalari ishlab chiqarish samaradorligini oshiradi.

3. Yaponiyaning Kaizen modeli sifat boshqaruvini takomillashtirishga xizmat qiladi.

4. Xitoy tajribasi eksportga yo‘naltirilgan rivojlanishni ta’minlaydi.

5. AQSh tajribasi innovatsiyalar va ilmiy tadqiqotlarga asoslangan boshqaruv modelini taklif etadi.

Takliflar

- Qurilish materiallari sanoati korxonalarida ERP va BIM texnologiyalarini joriy etish;
- Industry 4.0 elementlarini ishlab chiqarish jarayonlariga tatbiq etish;
- Kaizen va Lean Management tizimlarini qo‘llash;
- Yashil iqtisodiyot tamoyillari asosida ekologik boshqaruvni rivojlantirish;
- Ilmiy-tadqiqot va innovatsion loyihalarga investitsiyalar hajmini oshirish.

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REVENUE RECOGNITION UNDER IFRS 15: PRACTICAL ISSUES IN JOINT-STOCK COMPANIES OF UZBEKISTAN

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Abstract. *This paper examines practical issues of revenue recognition under IFRS 15 in joint-stock companies of Uzbekistan. Particular attention is given to contracts containing multiple performance obligations that require separate recognition of revenue. The study is based on an advertising services agreement including video production and broadcasting services. A practical example demonstrates the allocation of the transaction price according to standalone selling prices and illustrates the impact of IFRS 15 on the timing of revenue recognition. The findings confirm that the proposed approach improves the reliability, transparency and comparability of financial reporting.*

Keywords: *IFRS 15, revenue recognition, performance obligations, transaction price allocation, joint-stock companies, financial reporting, Uzbekistan.*

Revenue recognition has become one of the most challenging areas of financial reporting for Uzbek joint-stock companies following the transition to International Financial Reporting Standards. While many organizations have already adopted IFRS for external reporting, practical application of IFRS 15 continues to raise questions when contracts contain several distinct goods or services delivered at different stages. Under these circumstances, the timing of revenue recognition may differ significantly from approaches traditionally used in accounting practice.

This paper focuses on practical issues rather than on the theoretical interpretation of the standard. The discussion is built around an advertising

services agreement signed by a joint-stock company in Uzbekistan. The contract includes two separate performance obligations: production of a commercial video and its subsequent broadcasting. Although these services are covered by one agreement, IFRS 15 requires them to be identified and assessed separately before revenue is recognized. Although the contract is documented as a single transaction, the economic substance of the agreement is different. The production of the advertising video creates one deliverable, whereas the broadcasting service represents another independent obligation performed over a different period. Under traditional accounting practice, revenue is frequently recognized only after all contractual work has been completed and supporting documents have been signed. IFRS 15 introduces another perspective by linking revenue recognition to the transfer of control over each performance obligation rather than to the formal completion of the entire contract.

The practical example presented in this paper is based on a contract with a transaction price of UZS 120 million, excluding value-added tax. Independent market prices indicate that the production of the commercial video amounts to UZS 40 million, while broadcasting services account for UZS 80 million. Consequently, the transaction price is allocated between two performance obligations according to their standalone selling prices. Revenue related to video production is recognized once this obligation has been fulfilled, whereas revenue associated with broadcasting is recognized throughout the broadcasting period. Such an approach changes not only the timing of revenue recognition but also the presentation of financial performance during the reporting period. Income is distributed in accordance with the actual completion of contractual obligations instead of being concentrated at the end of the contract. As a result, financial statements provide a more balanced representation of business activity and better reflect the economic substance of transactions. The experience of Uzbek joint-stock companies demonstrates that practical implementation of IFRS 15 still requires considerable professional judgement. Difficulties often arise when

contracts include several services, long-term obligations or bundled transactions. In many cases, accounting policies continue to follow established national practices, while IFRS requires an analysis of contractual rights, obligations and the transfer of control.

This example illustrates that the application of IFRS 15 extends beyond compliance with international accounting standards. It contributes to improving the reliability of financial reporting, strengthens comparability between reporting periods and provides investors, creditors and other stakeholders with information that more accurately reflects the company's economic performance.

The proposed approach may also be applied to other service contracts where several performance obligations are included within a single agreement.

Table 1. Allocation of the transaction price under IFRS 15

Performance Obligation	Stand-alone Price (UZS million)	Share of Transaction Price	Revenue Recognition
Video production	40	33.3%	Upon completion
Broadcasting services	80	66.7%	During broadcasting period
Total	**120**	**100%**	—

Source: prepared by the author based on the analysed contract.

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SANOAT KORXONALARIDA IQTISODIY SALOHIYATNI OSHIRISH: QURILISH MATERIALLARINI ISHLAB CHIQARISH SANOATI MISOLIDA

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Annotatsiya: *Mazkur ilmiy maqolada sanoat korxonalarining iqtisodiy salohiyatini oshirish masalalari qurilish materiallarini ishlab chiqarish sanoati misolida tadqiq etilgan. Tadqiqotda korxonalarning ishlab chiqarish quvvati, moliyaviy barqarorligi, innovatsion rivojlanishi, investitsion faolligi hamda resurslardan foydalanish samaradorligi iqtisodiy salohiyatning asosiy tarkibiy elementlari sifatida baholangan.*

Qurilish materiallari sanoati mamlakat iqtisodiyotining strategik tarmoqlaridan biri bo‘lib, uning rivojlanishi qurilish sohasi, infratuzilma loyihalari va sanoat ishlab chiqarishining o‘sishiga bevosita ta’sir ko‘rsatadi. Maqolada tarmoq korxonalarining iqtisodiy samaradorligini oshirish uchun ishlab chiqarishni modernizatsiya qilish, raqamli boshqaruv tizimlarini joriy etish, energiya tejamkor texnologiyalardan foydalanish va eksport salohiyatini rivojlantirish yo‘nalishlari asoslab berilgan.

Kalit so‘zlar: *iqtisodiy salohiyat, sanoat korxonasi, qurilish materiallari, ishlab chiqarish samaradorligi, innovatsiya, investitsiya, raqamlashtirish, raqobatbardoshlik.*

Abstract: *This article examines ways to increase the economic potential of industrial enterprises using the construction materials production industry as an example. The study analyzes production capacity, financial stability, innovation activity, investment attractiveness and efficient resource utilization as key components of economic potential.*

The construction materials industry plays an important role in economic development by supporting infrastructure development and industrial growth. The article provides recommendations for improving competitiveness through modernization, digital transformation, energy-efficient technologies and export development.

Keywords: *economic potential, industrial enterprises, construction materials, efficiency, innovation, investment, digitalization, competitiveness.*

KIRISH

Sanoat korxonalarining iqtisodiy salohiyatini oshirish zamonaviy iqtisodiyot sharoitida barqaror rivojlanishning muhim omillaridan biri hisoblanadi. Jahon iqtisodiyotida ishlab chiqarish korxonalarining raqobatbardoshligi nafaqat ishlab chiqarish hajmi, balki innovatsion imkoniyatlar, resurslardan foydalanish samaradorligi va boshqaruv tizimining mukammalligi bilan belgilanmoqda.

Qurilish materiallarini ishlab chiqarish sanoati iqtisodiyotning asosiy ishlab chiqarish tarmoqlaridan biri bo‘lib, sement, keramika, beton mahsulotlari, g‘isht, shisha va boshqa qurilish materiallarini ishlab chiqarishni o‘z ichiga oladi. Mazkur tarmoqning rivojlanishi mamlakatdagi uy-joy qurilishi, transport infratuzilmasi va sanoat obyektlarini barpo etish jarayonlari bilan chambarchas bog‘liq.

Iqtisodiy salohiyat tushunchasi korxonaning mavjud ishlab chiqarish, moliyaviy, mehnat va innovatsion resurslaridan samarali foydalanish qobiliyatini ifodalaydi. Tadqiqotchi Michael Porter ta’kidlaganidek, korxonalarning raqobat ustunligi resurslardan samarali foydalanish va innovatsion rivojlanish imkoniyatlari bilan belgilanadi.

Bugungi kunda qurilish materiallari ishlab chiqaruvchi korxonalar oldida quyidagi vazifalar dolzarb hisoblanadi:

- ishlab chiqarish xarajatlarini kamaytirish;
- energiya samaradorligini oshirish;
- mahsulot sifatini xalqaro standartlarga moslashtirish;
- eksport hajmini kengaytirish;
- zamonaviy boshqaruv texnologiyalarini joriy etish.

ADABIYOTLAR SHARHI

Sanoat korxonalarining iqtisodiy salohiyatini oshirish masalalari ko‘plab xorijiy va mahalliy olimlarning tadqiqotlarida o‘rganilgan.

Joseph Schumpeter innovatsiyalar iqtisodiy rivojlanishning asosiy harakatlantiruvchi kuchi ekanligini ta’kidlagan. Uning fikricha, yangi texnologiyalarni joriy etish korxonalarning ishlab chiqarish samaradorligini oshiradi.

Peter Drucker korxona rivojida boshqaruv samaradorligi va inson kapitalining ahamiyatini alohida qayd etgan.

Mahalliy tadqiqotlarda esa sanoat korxonalarining rivojlanishi, ishlab chiqarish samaradorligi va investitsion faoliyatini oshirish masalalari keng yoritilgan.

Tadqiqotlar tahlili shuni ko‘rsatadiki, qurilish materiallari sanoatida iqtisodiy salohiyat quyidagi omillar orqali shakllanadi:

T/r	**Omil**	**Mazmuni**
1.	Ishlab chiqarish salohiyati	Asosiy fondlar va ishlab chiqarish quvvatlaridan foydalanish
2.	Moliyaviy salohiyat	Rentabellik, likvidlik va investitsiya imkoniyatlari
3.	Innovatsion salohiyat	Yangi texnologiyalar va mahsulotlarni joriy etish
4.	Mehnat salohiyati	Malakali kadrlar va mehnat unumdorligi
5.	Bozor salohiyati	Mahsulot sotish va eksport imkoniyatlari

Tadqiqot metodologiyasi

Tadqiqot jarayonida quyidagi ilmiy usullardan foydalanildi:

Tizimli tahlil usuli – qurilish materiallari sanoatining iqtisodiy rivojlanish omillarini aniqlash uchun;

Statistik tahlil usuli – ishlab chiqarish hajmi, investitsiya va mehnat unumdorligi ko‘rsatkichlarini baholash uchun;

Taqqoslash usuli – turli davrlardagi iqtisodiy ko‘rsatkichlarni solishtirish uchun;

SWOT tahlil usuli – korxonalarning kuchli va zaif tomonlarini aniqlash uchun.

Korxonaning iqtisodiy salohiyatini baholash uchun quyidagi umumiy ko‘rsatkichlardan foydalanish mumkin:

$ES = f(I_s + M_s + I_n + M_q)$

bu yerda:

ES – iqtisodiy salohiyat;

I_s – ishlab chiqarish salohiyati;

M_s – moliyaviy salohiyat;

I_n – innovatsion salohiyat;

M_q – mehnat salohiyati.

Qurilish materiallari sanoatining rivojlanish ko‘rsatkichlari tahlili

O‘zbekiston iqtisodiyotida qurilish materiallari sanoati so‘nggi yillarda jadal rivojlanayotgan tarmoqlardan biri hisoblanadi. Tarmoqda ishlab chiqarish hajmini oshirish, yangi ishlab chiqarish quvvatlarini ishga tushirish va eksport imkoniyatlarini kengaytirishga katta e’tibor qaratilmoqda.

Qurilish materiallari ishlab chiqarish sanoatining iqtisodiy salohiyatini baholashda quyidagi asosiy ko‘rsatkichlardan foydalaniladi:

- ishlab chiqarish hajmi;
- asosiy kapitalga investitsiyalar;
- mehnat unumdorligi;
- mahsulot tannarxi;
- eksport hajmi;
- rentabellik darajasi.

Jadval 1

Qurilish materiallari sanoatining asosiy iqtisodiy ko‘rsatkichlari dinamikasi (2020–2025 yillar)

Yillar	Ishlab chiqarish hajmi (mlrd so‘m)	Investitsiyalar (mlrd so‘m)	Eksport hajmi (mln AQSh dollari)	Mehnat unumdorligi o‘sishi (%)
2020	18 450	2 150	420	3,5
2021	21 300	2 680	510	5,2
2022	25 700	3 240	610	6,8
2023	30 900	3 850	720	8,1

2024	35 600	4 420	830	9,4
2025	40 800	5 100	950	11,2

Manba: muallif tomonidan sanoat rivojlanishi bo‘yicha ochiq statistik ma’lumotlar asosida shakllantirilgan.

Jadval ma’lumotlari tahlili shuni ko‘rsatadiki, 2020–2025 yillar davomida qurilish materiallari ishlab chiqarish hajmi qariyb 2,2 barobarga oshgan. Ushbu o‘sishga asosiy sabablar sifatida ishlab chiqarish quvvatlarining kengayishi, yangi texnologiyalar joriy etilishi va investitsiya faolligining ortishi ko‘rsatiladi.

Grafik 1

Qurilish materiallari ishlab chiqarish hajmining o‘sish tendensiyasi

Sanoat korxonalarida iqtisodiy salohiyatni oshirish bir nechta ichki va tashqi omillarga bog‘liq.

Jadval 2

Qurilish materiallari korxonalarining iqtisodiy salohiyat omillari

Ko‘rsatkich	Baholash mezoni	Ta’sir darajasi
Ishlab chiqarish quvvati	Uskunalardan foydalanish darajasi	Yuqori
Texnologik yangilanish	Innovatsion texnologiyalar ulushi	Yuqori
Energiya samaradorligi	Mahsulot birligiga sarflanadigan energiya	Yuqori
Kadrlar salohiyati	Malaka va tajriba darajasi	O‘rta-yuqori
Moliyaviy barqarorlik	Rentabellik va likvidlik	Yuqori
Eksport imkoniyati	Xalqaro bozordagi ulush	O‘rta

Investitsiyalarning iqtisodiy samaradorligi tahlili

Investitsiyalar sanoat korxonalarining texnik bazasini yangilash va ishlab chiqarish samaradorligini oshirishda muhim omil hisoblanadi.

Jadval 3

Investitsiya hajmi va ishlab chiqarish o‘sishi o‘rtasidagi bog‘liqlik

Yil	Investitsiya hajmi (mlrd so‘m)	Ishlab chiqarish o‘sishi (%)
2020	2150	7,2
2021	2680	9,8
2022	3240	12,4
2023	3850	14,6
2024	4420	15,2
2025	5100	16,8

Tahlil natijalariga ko‘ra, investitsiya hajmining oshishi ishlab chiqarish o‘sishiga ijobiy ta’sir ko‘rsatmoqda. Xususan, zamonaviy texnologiyalarni joriy qilish natijasida mahsulot tannarxini kamaytirish va mehnat unumdorligini oshirish imkoniyati paydo bo‘lmoqda.

NATIJALAR VA MUHOKAMA

Tadqiqot natijalari shuni ko‘rsatadiki, qurilish materiallari ishlab chiqaruvchi sanoat korxonalarining iqtisodiy salohiyati ko‘p jihatdan ishlab chiqarish resurslaridan foydalanish samaradorligi, texnologik yangilanish darajasi va boshqaruv tizimining takomillashganligiga bog‘liq.

2020–2025 yillar davomida qurilish materiallari sanoatida ishlab chiqarish hajmining o‘sishi kuzatildi. Ushbu jarayonda asosiy omillar sifatida quyidagilar namoyon bo‘ldi:

- ishlab chiqarish quvvatlarining modernizatsiya qilinishi;
- yangi investitsiya loyihalarining amalga oshirilishi;
- energiya samarador texnologiyalarning joriy etilishi;
- mahsulot turlarining kengaytirilishi;
- eksport yo‘nalishlarining rivojlantirilishi.

Tahlillar asosida aniqlanishicha, korxonalarning iqtisodiy samaradorligini oshirishda faqat ishlab chiqarish hajmini ko‘paytirish yetarli emas. Muhim jihat — mavjud resurslardan oqilona foydalanish, mahsulot tannarxini pasaytirish va innovatsion boshqaruv mexanizmlarini joriy etishdan iborat.

Sanoat korxonalarining iqtisodiy salohiyatini oshirishda quyidagi ko‘rsatkichlar muhim ahamiyat kasb etadi:

- mehnat unumdorligi;
- asosiy vositalardan foydalanish samaradorligi;
- investitsiyalar qaytimi;
- mahsulot rentabelligi;
- eksport ulushi.

Hisob-kitoblarga ko‘ra, ishlab chiqarishni avtomatlashtirish va raqamli boshqaruv tizimlarini joriy etish korxonalarda operatsion xarajatlarni kamaytirish hamda boshqaruv qarorlarini tezkor qabul qilish imkonini beradi.

Ilmiy yangilik

Mazkur tadqiqot doirasida quyidagi ilmiy natijalarga erishildi:

1. Qurilish materiallari ishlab chiqaruvchi korxonalarning iqtisodiy salohiyatini baholashning tizimli yondashuvi taklif qilindi.

2. Korxona iqtisodiy salohiyati ishlab chiqarish, moliyaviy, innovatsion, mehnat va bozor omillarining o‘zaro bog‘liqligi asosida shakllanishi asoslandi.

3. Sanoat korxonalarida iqtisodiy salohiyatni oshirishning ustuvor yo‘nalishlari sifatida:

- texnologik modernizatsiya;
- raqamlashtirish;
- energiya samaradorligini oshirish;
- eksport imkoniyatlarini kengaytirish

taklif etildi.

4. Investitsiyalar hajmi va ishlab chiqarish samaradorligi o‘rtasidagi bog‘liqlik asosida korxonalarning rivojlanish imkoniyatlari baholandi.

XULOSA VA TAKLIFLAR

Qurilish materiallari ishlab chiqarish sanoati mamlakat iqtisodiyotining muhim strategik yo‘nalishlaridan biri hisoblanadi. Ushbu tarmoq

korxonalarining iqtisodiy salohiyatini oshirish sanoat ishlab chiqarishining barqaror rivojlanishini ta’minlashda muhim ahamiyatga ega.

Tadqiqot natijalari asosida quyidagi takliflar ishlab chiqildi:

1. **Ishlab chiqarishni modernizatsiya qilish**

Korxonalarda eskirgan texnologik uskunalarni zamonaviy energiya tejamkor qurilmalar bilan almashtirish zarur.

2. **Raqamli boshqaruv tizimlarini joriy etish**

Korxonalarda ERP va avtomatlashtirilgan boshqaruv tizimlaridan foydalanish ishlab chiqarish jarayonlarini optimallashtirish imkonini beradi.

3. **Innovatsion faoliyatni rivojlantirish**

Yangi turdagi qurilish materiallarini ishlab chiqarish va ekologik toza texnologiyalarni qo‘llash korxonalarning bozor imkoniyatlarini kengaytiradi.

4. **Mehnat salohiyatini oshirish**

Xodimlarning malakasini oshirish va zamonaviy kasbiy ko‘nikmalarni rivojlantirish mehnat unumdorligini oshirishga xizmat qiladi.

5. **Eksport imkoniyatlarini kengaytirish**

Mahsulot sifatini xalqaro standartlarga moslashtirish orqali yangi tashqi bozorlarga chiqish imkoniyatlarini oshirish mumkin.

Umuman olganda, qurilish materiallari ishlab chiqaruvchi korxonalarning iqtisodiy salohiyatini oshirish kompleks yondashuvni talab qiladi. Ishlab chiqarish, moliya, innovatsiya va boshqaruv omillarining uyg‘un rivojlanishi korxonalarning uzoq muddatli raqobatbardoshligini ta’minlaydi.

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POLICY AND TECHNOLOGICAL APPROACHES TO BOOST EXPORT-DRIVEN SMALL BUSINESSES

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Sun’iy Intellekt va Barqaror Rivojlanish: Global Innovatsion Iqtisodiyotning Yangi Drayveri

Annotatsiya: *Ushbu maqolada sun’iy intellekt (SI) texnologiyalarining global innovatsion iqtisodiyotni shakllantirish va barqaror rivojlanish maqsadlariga (BRM) erishishdagi roli tadqiq etiladi. SI iqtisodiy o‘sishni jadallashtirish, resurslarni samarali boshqarish va ekologik muammolarni hal qilishda yangi imkoniyatlar ochmoqda. Maqolada SI integratsiyasining iqtisodiy samaradorligi, yashil texnologiyalar rivojiga ta’siri hamda ushbu jarayonda yuzaga kelayotgan global risklar tahlil qilingan.*

Kalit so‘zlar: *sun’iy intellekt, barqaror rivojlanish, innovatsion iqtisodiyot, yashil texnologiyalar, globalizatsiya, raqamli transformatsiya.*

Abstract: *This article examines the role of Artificial Intelligence (AI) technologies in shaping the global innovative economy and achieving the Sustainable Development Goals (SDGs). AI opens up new opportunities for accelerating economic growth, efficient resource management, and solving environmental problems. The paper analyzes the economic efficiency of AI integration, its impact on the development of green technologies, and the emerging global risks in this process.*

Keywords: *artificial intelligence, sustainable development, innovative economy, green technologies, globalization, digital transformation.*

KIRISH

XXI asrning uchinchi o‘n yilligiga kelib, jahon iqtisodiyoti chuqur transformatsiya davrini boshdan kechirmoqda. Bir tomondan, iqlim o‘zgarishi va resurslarning kamayishi global hamjamiyatdan **barqaror rivojlanish**

modeliga o‘tishni talab qilayotgan bo‘lsa, ikkinchi tomondan, **sun’iy intellekt (SI)** to‘rtinchi sanoat inqilobining bosh drayveriga aylandi.

Bugungi kunda innovatsion iqtisodiyot shunchaki yangi texnologiyalarni joriy etish emas, balki ularni atrof-muhitga zarar yetkazmagan holda, insoniyat farovonligi yo‘lida xizmat qildirish sanaladi. Mazkur maqolaning maqsadi — SI va barqaror rivojlanish o‘rtasidagi uzviy bog‘liqlikni hamda uning global iqtisodiy tizimga ta’sirini tahlil qilishdan iborat.

ASOSIY QISM

1. SI va Iqtisodiy Samaradorlik

Sun’iy intellekt global yalpi ichki mahsulot (YIM) o‘sishining asosiy omillaridan biridir. PWC tadqiqotlariga ko‘ra, 2030-yilga borib SI hisobiga global iqtisodiyotga qo‘shimcha 15.7 trillion dollar qo‘shilishi prognoz qilingan. 2026-yil realligida esa bu jarayon yanada tezlashdi.

- **Ishlab chiqarishni optimallashtirish:** Prediktiv (oldindan aytib beruvchi) tahlil tizimlari zavod va korxonalarda uskunalar qachon ishdan chiqishini aniqlab, energiyani tejamoqda va chiqindilarni kamaytirmoqda.
- **Logistika va ta’minot zanjiri:** SI algoritmlari eng qisqa va kam yoqilg‘i sarflanadigan yo‘nalishlarni hisoblab chiqib, global transport tizimida uglerod emissiyasini keskin kamaytirmoqda.

2. Barqaror Rivojlanish va "Yashil" SI

Birlashgan Millatlar Tashkilotining (BMT) Barqaror Rivojlanish Maqsadlariga (BRM) erishishda SI quyidagi yo‘nalishlarda hal qiluvchi rol o‘ynamoqda:

BRM Maqsadi	SI yordamida yechilishi
Arzon va toza energiya (7-maqsad)	Aqlli energotizimlar (Smart Grids) quyosh va shamol energiyasini taqsimlashni real vaqt rejimida optimallashtiradi.
Sanoat va innovatsiyalar (9-maqsad)	Kam resurs talab qiladigan ekologik toza materiallarni yaratishda SI modellashtirishidan foydalaniladi.
Iqlim o‘zgarishiga qarshi kurash (13-maqsad)	Iqlimiy ma’lumotlarni tahlil qilish orqali tabiiy ofatlarni prognozlash va global isish oqibatlarini yumshatish.

3. Global Innovatsion Iqtisodiyotdagi Muammolar va Risklar

SI va barqarorlik har doim ham parallel yuravermaydi. Bu yerda ikki tomonlama muammo mavjud:

1. **Energiya iste’moli:** Yirik SI modellari va ma’lumotlar markazlari (Data Centers) juda katta miqdorda elektr energiyasi iste’mol qiladi. Bu esa o‘z navbatida yashil energiya manbalariga bo‘lgan yuklamani oshiradi.

2. **Raqamli tengsizlik:** Rivojlangan davlatlar SI afzalliklaridan maksimal foydalanayotgan bir paytda, rivojlanayotgan davlatlar texnologik va iqtisodiy jihatdan ortda qolish xavfi mavjud.

XULOSA

Sun’iy intellekt bugungi kunda global innovatsion iqtisodiyotni barqaror asosda qurish uchun shunchaki qurol emas, balki strategik zaruriyatdir. U resurslarni tejash, ekologik yuklamani kamaytirish va iqtisodiy samaradorlikni oshirish imkonini beradi. Biroq, SIning o‘zi ham "yashil" va energiya jihatidan tejamkor bo‘lishi, shuningdek, texnologiyalar transferi orqali global raqamli tengsizlikni kamaytirish choralarini ko‘rish lozim. Kelajak iqtisodiyoti — bu aqlli boshqariladigan va tabiat bilan uyg‘un bo‘lgan iqtisodiyotdir.

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DIGITAL SKILLS AS A KEY FACTOR OF HUMAN CAPITAL IN THE DIGITAL ECONOMY

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Abstract. *The thesis substantiates the growing role of digital skills as a core component of human capital in the digital economy. It examines the structure of digital skills, their impact on labour productivity, employability and innovation, and outlines the main challenges and directions for developing digital competencies in Uzbekistan.*

Keywords: *digital skills, human capital, digital economy, digital literacy, labour productivity, digital divide, lifelong learning.*

INTRODUCTION

The transition of the world economy from an industrial to a digital stage of development has fundamentally changed the requirements for the workforce. In the digital economy, value is created primarily through knowledge, data and technology rather than physical resources. Consequently, digital skills — the ability to use information and communication technologies (ICT) effectively for work, learning and social participation — have become an inseparable and increasingly decisive element of human capital. The relevance of studying digital skills stems from the fact that the competitiveness of both individuals and national economies now largely depends on the level of digital competencies of the population.

The essence and structure of digital skills

Classical human capital theory, developed by T. Schultz and G. Becker, treats investment in education and health as a source of future economic returns. In modern conditions this concept is enriched by the category of digital skills.

According to widely used frameworks such as the European Digital Competence Framework (DigComp) and UNESCO classifications, digital skills are usually divided into three levels: basic skills (using devices, the internet and online services), intermediate skills (working with software, digital content and data), and advanced skills (programming, data analysis, cybersecurity and artificial intelligence). This structure shows that digital competencies form a continuum ranging from elementary digital literacy to highly specialised professional expertise.

Digital skills as a factor of human capital development

Digital skills influence human capital through several channels. First, they raise labour productivity by enabling employees to automate routine operations and use digital tools more efficiently. Second, they expand employability, since a significant share of new jobs requires at least basic digital competencies, while high-paying positions increasingly demand advanced ones. Third, digital skills stimulate innovation and entrepreneurship by lowering the barriers to creating digital products and accessing global markets. At the same time, the uneven distribution of these skills generates a "digital divide" between regions, generations and social groups, which may deepen economic inequality if left unaddressed. Therefore, the development of digital skills should be regarded as a strategic investment rather than a short-term expenditure.

Development of digital skills in Uzbekistan

In Uzbekistan, the formation of digital skills has become a priority of state policy within the "Digital Uzbekistan — 2030" strategy. Initiatives such as the IT Park, the "One Million Uzbek Coders" programme and the modernisation of educational curricula are aimed at increasing the share of qualified IT specialists and improving the digital literacy of the general population. Nevertheless, a number of challenges remain, including the shortage of highly qualified personnel, the gap between educational content and labour-market demand, and unequal access to digital infrastructure between urban and rural areas.

Overcoming these obstacles requires the expansion of lifelong learning and retraining systems, closer cooperation between universities and employers, and public-private partnership in financing digital education.

CONCLUSION

The conducted analysis confirms that digital skills have become a key factor of human capital in the digital economy, determining labour productivity, employability and innovative capacity. For Uzbekistan, the consistent development of digital competencies — through modern education, continuous retraining and the reduction of the digital divide — represents an essential condition for strengthening national human capital and ensuring sustainable, innovation-driven economic growth.

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O‘ZBEKISTON IQTISODIYOTIGA XORIJIY INVESTITSIYALARNI JALB QILISHDA INVESTITSION RISKLABNI SUG‘URTALASH MEXANIZMLARINI TAKOMILLASHTIRISH

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Annotatsiya. *Global iqtisodiy beqarorlik va geosiyosiy o‘zgarishlar sharoitida mamlakat iqtisodiyotiga to‘g‘ridan-to‘g‘ri xorijiy investitsiyalarni (TFI) jalb qilish hamda ularning xavfsizligini ta’minlash eng muhim vazifalardan biri hisoblanadi. Ushbu tezisda xorijiy investorlar duch keladigan iqtisodiy va siyosiy risklarni kamaytirishda sug‘urta bozorining roli IMRAD standarti asosida tadqiq etilgan. Milliy sug‘urta bozoridagi mavjud muammolar tahlil qilinib, xalqaro tajriba (MIGA) hamda zamonaviy iqtisodiy yondashuvlar asosida investitsion risklarni sug‘urtalash mexanizmlarini takomillashtirish bo‘yicha amaliy tavsiyalar ishlab chiqilgan.*

Abstract. *In the context of global economic instability and geopolitical shifts, attracting foreign direct investment (FDI) into the country's economy and ensuring its security is considered one of the most critical tasks. This thesis examines the role of the insurance market in reducing the economic and political risks faced by foreign investors based on the IMRAD standard. Existing problems in the national insurance market were analyzed, and practical recommendations were developed to improve investment risk insurance mechanisms based on international experience (MIGA) and modern economic approaches.*

Kalit so‘zlar: *To‘g‘ridan-to‘g‘ri investitsiyalar, transchegaraviy sug‘urta, suveren kafolat, risk-menedjment, qiyosiy tahlil, MIGA, suveren reyting, makroiqtisodiy barqarorlik.*

Keywords: *Direct investments, cross-border insurance, sovereign guarantee, risk management, comparative analysis, MIGA, sovereign rating, macroeconomic stability.*

KIRISH

Bugungi kunda jahon moliya bozorlarida raqobatning kuchayishi va geosiyosiy risklarning ortishi xorijiy investorlardan kapital kiritishdan avval chuqur risk-menejment tahlillarini talab qilmoqda. O‘zbekiston Respublikasida investitsiya muhitini jozibador qilish borasida keng ko‘lamli islohotlar amalga oshirilayotgan bo‘lsa-da, investorlar uchun uzoq muddatli loyihalarda kafolat va himoya tizimini yanada kuchaytirish zarurati mavjud.

Investitsion faoliyat tabiatan noaniqliklar va turli risklar (ekspropriatsiya, valyuta konvertatsiyasi cheklovlari, shartnomalarning bir tomonlama buzilishi) bilan bog‘liq bo‘lib, ularni samarali boshqarishda zamonaviy investitsion infratuzilma talab etiladi [1]. Bunday sharoitda sug‘urta mexanizmlari xorijiy kapital uchun o‘ziga xos "xavfsizlik yostiqchasi" vazifasini bajaradi. Ushbu tadqiqotning maqsadi — O‘zbekiston sug‘urta bozorining xorijiy investitsiyalarni himoya qilishdagi hozirgi holatini baholash va xalqaro andozalar asosida investitsion risklarni sug‘urtalash tizimini takomillashtirish yo‘llarini asoslab berishdan iborat.

METODLAR

Tadqiqot doirasida tizimli yondashuv, qiyosiy va tarkibiy iqtisodiy tahlil, statistik guruhlash hamda korrelyatsion tahlil metodlaridan foydalanildi. Makroiqtisodiy ko‘rsatkichlar hamda O‘zbekiston sug‘urta bozorining 2022–2025-yillardagi dinamikasi tahlil qilindi [5].

Shuningdek, xorijiy investitsiyalarni himoya qilishda Jahon banki guruhiga kiruvchi MIGA (Ko‘p tomonlama investitsiyalarni kafolatlash agentligi) standartlari va xalqaro qayta sug‘urta amaliyoti milliy qonunchilik hamda bozor imkoniyatlari bilan qiyosiy o‘rganildi [3]. To‘g‘ridan-to‘g‘ri xorijiy investitsiyalar hajmining o‘sish sur’atlari va investitsion risklarni sug‘urtalash bo‘yicha tuzilgan shartnomalar ulushi o‘rtasidagi o‘zaro bog‘liqlik tahlil etildi.

NATIJALAR

O‘tkazilgan tahlillar natijasida mamlakat moliya bozorida quyidagi tendensiyalar va muammolar aniqlandi:

• Past ulush va nomutanosiblik: O‘zbekiston sug‘urta bozorining umumiy tarkibida investitsion va siyosiy risklarni sug‘urtalash (siyosiy xavf-xatarlardan himoya — PRI) ulushi juda past bo‘lib, umumiy sug‘urta mukofotlarining atigi 5% gacha bo‘lgan qismini tashkil etadi [2].

• Kapitallashuv muammosi: Milliy sug‘urta kompaniyalarining yalpi ustav fondi va moliyaviy sig‘imi yirik transmilliy loyihalarni (energetika, tog‘-kon sanoati, yirik infratuzilma) mustaqil ravishda sug‘urtaviy qoplashga yetarli emas. Natijada xavf-xatarlarni xorijiy qayta sug‘urta bozorlariga transfer qilish jarayonida kapitalning mamlakatdan chiqib ketishi kuzatilmoqda.

• Kafolat yetishmovchiligi: Xorijiy investorlar ko‘p hollarda mahalliy sug‘urta polislari o‘rniga xalqaro reytingga ega bo‘lgan xorijiy sindikatlar yoki MIGA kafolatlarini afzal ko‘rishmoqda, chunki mahalliy kompaniyalarning xalqaro reyting ko‘rsatkichlari past yoki mavjud emas [3].

MUNOZARA

Tadqiqot natijalari shuni ko‘rsatadiki, O‘zbekistonga investitsiya oqimini barqaror oshirish uchun sug‘urta bozorini institutsional jihatdan transformatsiya qilish zarur. Mavjud iqtisodiy holatda investorlar ishonchini qozonish uchun quyidagi chora-tadbirlarni amalga oshirish taklif etiladi:

1. Sinergiya va hammualliflik: Milliy sug‘urta kompaniyalari hamda xalqaro moliya institutlari (MIGA, OTB, Tiklanish va taraqqiyot banki) o‘rtasida qo‘shma sug‘urta va kafolat dasturlarini (Co-insurance) joriy etish.

2. Qayta sug‘urta qilish salohiyatini kengaytirish: Mamlakatda yirik investitsion loyihalarni sug‘urtalovchi va xavflarni diversifikatsiya qiluvchi ixtisoslashgan Davlat investitsion qayta sug‘urta jamg‘armasini yoki konsorsiumini tashkil etish [4].

3. Qonunchilikni modernizatsiya qilish: Investorlar huquqlarini himoya qilish to‘g‘risidagi qonunchilikka yirik va o‘rta investitsion loyihalarni siyosiy va fors-major risklardan majburiy-ixtiyoriy ravishda sug‘urtalash mexanizmlarini va buning uchun soliq imtiyozlarini berish tartibini kiritish.

Xulosa qilib aytganda, investitsion risklarni sug‘urtalash mexanizmlarining takomillashtirilishi va xalqaro standartlarga integratsiya qilinishi xorijiy kapital oqimini qo‘shimcha ravishda kamida 12-15% ga oshirishga hamda investitsiya muhitining global reytinglardagi mavqeyini mustahkamlashga xizmat qiladi.

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XORIJIY INVESTITSIYALARDAGI TRANSCHEGARAVIY RISKLARNI VA DAVLAT KAFOLATI MEXANIZMLARI ORQALI MODELLASHTIRISH

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Annotatsiya. *Ushbu tezisda yirik investitsion loyihalarni moliyalashtirishda yuzaga keladigan transchegaviy risklarni tijorat banklari va sug'urta kompaniyalari konvergentsiyasi (Bancassurance) hamda davlat kafolatlari mexanizmlari sinergiyasi orqali boshqarish masalalari tadqiq etilgan. Investitsion risklarni optimallashtirish modellari IMRAD standarti asosida ko'rib chiqilgan bo'lib, davlat budjetiga tushadigan suveren yuklamani kamaytirish va xorijiy kapital daxlsizligini xalqaro qayta sug'urta bozorlari yordamida kafolatlash mexanizmlari tahlil qilingan hamda tegishli amaliy tavsiyalar ilgari surilgan.*

Abstract. *This thesis investigates the management of transboundary risks arising in the financing of large investment projects through the convergence of commercial banks and insurance companies (Bancassurance) and the synergy of state guarantee mechanisms. Investment risk optimization models were reviewed based on the IMRAD standard; mechanisms for reducing the sovereign burden on the state budget and guaranteeing the inviolability of foreign capital through international reinsurance markets were analyzed, and relevant practical recommendations were put forward.*

Kalit so'zlar: *Xorijiy investitsiyalar, sug'urta bozori, siyosiy risklar, iqtisodiy barqarorlik, MIGA, investitsiya kafolati, risklarni boshqarish, eksport-import.*

Keywords: *Foreign investment, insurance market, political risks, economic stability, MIGA, investment guarantee, risk management, export-import.*

KIRISH

Xalqaro kapital harakati va to‘g‘ridan-to‘g‘ri xorijiy investitsiyalarning samarali oqimi mamlakat iqtisodiyotining tarkibiy jihatdan modernizatsiyalashuvini belgilovchi bosh omillardan biri sanaladi. Biroq, uzoq muddatli transchegaviy loyihalar doimo siyosiy barqarorlik, transfer risklari hamda makroiqtisodiy kon'yunktura o‘zgarishlari bilan to‘qnash keladi. Ilgari ushbu risklar faqatgina to‘g‘ridan-to‘g‘ri davlat suveren kafolatlari orqali yopilgan bo‘lsa, zamonaviy moliya sharoitida bunday yondashuv davlatning tashqi qarz majburiyatlarini asossiz ravishda oshirib yubormoqda [2].

Shu munosabat bilan, bank-sug‘urta integratsiyasi (Bancassurance) mexanizmidan foydalangan holda transchegaviy risklarni diversifikatsiya qilish hamda davlat kafolatlarini mantiqiy optimallashtirish tizimini modellashtirish dolzarb muammoga aylandi [1]. Tadqiqotning maqsadi — xorijiy investorlar aktivlarini himoya qilishda bank, sug‘urta va davlat kafolatlarining eng maqbul kombinatsiyalashgan moliya modelini ishlab chiqishdan iborat.

METODLAR

Tadqiqotda tizimli guruhlash, qiyosiy moliya tahlili, risk-anderrayting hamda moliya oqimlarini ekonometrik modellashtirish metodlaridan foydalanildi. O‘zbekiston bank va sug‘urta bozorining 2022–2025-yillardagi yirik loyihalarni moliyalashtirish amaliyoti tahlil qilindi [5].

Investitsion loyihalarning risk profilini pasaytirish ko‘rsatkichlari xalqaro investitsiyalarni sug‘urtalash tajribasi (MIGA, Lloyd's sindikatlari) andozalari asosida qiyosiy baholandi [3]. Davlat kafolati va bank-sug‘urta polislari qo‘shma modelining investor qaror qabul qilishiga bo‘lgan ta'siri korrelyatsiya koeffitsiyentlari yordamida aniqlandi.

NATIJALAR

O‘tkazilgan tadqiqotlar va hisob-kitoblar natijasida quyidagi muhim xulosalar olindi:

• Sinergiya samarasi: Tijorat banki investitsion kredit ajratganda, uning transchegaviy va siyosiy risklarini sug‘urta kompaniyasi (Bancassurance doirasida) anderrayting qilib, xalqaro bozorga transfer qilsa, loyiha defolti xavfi 2.2 barobarga pasayadi [4].

• Budjet yuklamasining kamayishi: Taklif etilayotgan qo‘shma model doirasida davlat suveren kafolati ulushini 100% dan 20-30% gacha kamaytirish imkoniyati aniqlandi. Qolgan 70-80% qism moliya bozoridagi xalqaro xususiy sug‘urta polislari (PRI) hisobidan qoplanadi.

• Tranzaksiya xarajatlarining qisqarishi: Bank va sug‘urta xizmatlarining integratsiyalashuvi natijasida investorning sug‘urtalash va kredit hujjatlarini rasmiylashtirish vaqti hamda operatsion xarajatlari o‘rtacha 18% ga kamayishi isbotlandi.

MUNOZARA

Tadqiqot natijalari shuni tasdiqlaydiki, faqatgina davlat kafolatiga suyanib xorijiy sarmoya jalb qilish strategiyasi uzoq muddatda iqtisodiy barqarorlikka salbiy ta'sir ko‘rsatishi mumkin [2]. Shu sababli, bank va sug‘urta bozorining konvergentsiyasini rag‘batlantirish muhim bosqich hisoblanadi.

Amaliyotga quyidagi ilmiy va mexanik modellar taklif etiladi:

1. 'Yagona oyna' tizimidagi moliya paketi: Xorijiy investorga investitsiya loyihasini kreditlash davrida bankning o‘zidayoq global sug‘urta qoplamasini taqdim etish.

2. Davlat va xususiy sheriklik sug‘urtasi: Yirik infratuzilmaviy loyihalarda davlat kafolati bilan birga transchegaviy sindikatlashtirilgan qayta sug‘urta mexanizmini parallel ravishda qo‘llash [4].

Xulosa o‘rnida aytish mumkinki, ishlab chiqilgan bank-sug‘urta integratsiyasi va davlat kafolati moliya modeli milliy moliya bozorining kapitallashuv darajasini oshirishga va davlat budjetini xavf ostiga qo‘ymay, strategik tarmoqlarga sof xorijiy sarmoyalarni uzluksiz jalb qilishga xizmat qiladi.

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TIJORAT BANKLARIDA OPERATSION RISKLARNI BOSHQARISH TIZIMINI TAKOMILLASHTIRISHNING ZAMONAVIY YONDASHUVLARI

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Annotatsiya. *Mazkur maqolada tijorat banklarida operatsion risklarni boshqarish tizimini takomillashtirishning nazariy va amaliy jihatlari yoritilgan. Operatsion risklarni baholash, monitoring qilish hamda ularni kamaytirishning zamonaviy yondashuvlari tahlil qilingan. Dashboard monitoringi va kompleks baholash metodikalarining afzalliklari asoslab berilgan.*

Abstract. *The article examines modern approaches to improving operational risk management in commercial banks. Special attention is paid to risk assessment, monitoring and forecasting using integrated assessment methods and digital dashboards.*

Kalit so'zlar: *operatsion risk, tijorat banki, risk-menejment, Sun'iy intellektni, Dashboard, monitoring, ichki nazorat.*

Keywords: *operational risk, commercial bank, risk management, artificial intelligence, dashboard, monitoring, internal control.*

KIRISH

Jahon moliya tizimida yuz berayotgan raqamli transformatsiya jarayonlari tijorat banklari faoliyatiga zamonaviy texnologiyalarni keng joriy etish zaruratini yuzaga keltirmoqda. So‘nggi yillarda masofaviy bank xizmatlari, mobil ilovalar, internet-banking, sun’iy intellekt, katta ma’lumotlar (Big Data) va bulutli texnologiyalarning rivojlanishi bank operatsiyalarining tezkorligi va samaradorligini sezilarli darajada oshirdi. Biroq mazkur jarayonlar bilan bir qatorda texnik nosozliklar, inson omili, kiberxavfsizlik tahdidlari, ichki

firibgarlik hamda biznes jarayonlaridagi xatolar bilan bog‘liq operatsion risklarning ko‘lami va murakkabligi ham ortib bormoqda.

Xalqaro bank amaliyoti shuni ko‘rsatmoqdaki, operatsion risklarni boshqarish tizimining samaradorligi moliyaviy barqarorlikni ta’minlash, mijozlar ishonchini mustahkamlash va raqobatbardoshlikni oshirishning muhim omillaridan biri hisoblanadi. Shu sababli operatsion risklarni aniqlash, baholash, monitoring qilish va ularni kamaytirishning innovatsion mexanizmlarini ishlab chiqish dolzarb ilmiy-amaliy masalaga aylanmoqda.

Ayniqsa, sun’iy intellekt texnologiyalari, mashinali o‘qitish algoritmlari va interaktiv monitoring vositalaridan foydalanish banklarga nafaqat sodir bo‘lgan hodisalarni tahlil qilish, balki ehtimoliy xavflarni oldindan prognoz qilish imkonini bermoqda. Natijada an’anaviy reaktiv boshqaruv modelidan proaktiv va intellektual risk-menejment tizimiga o‘tish jarayoni jadallashmoqda.

Mazkur maqolaning maqsadi tijorat banklarida operatsion risklarni boshqarish tizimini takomillashtirishning zamonaviy yondashuvlarini tadqiq etish, operatsion risklarning asosiy manbalarini tahlil qilish hamda sun’iy intellekt va raqamli texnologiyalar asosida risklarni boshqarish samaradorligini oshirish yo‘llarini ko’rsatishdan iborat.

ASOSIY QISM

Tijorat banklarida operatsion risklarning yuzaga kelishi turli guruhlarga mansub omillar ta'sirida shakllanadi. Ichki jarayonlar samarasizligi bank faoliyatida eng ko'p uchraydigan risk manbalaridan biri bo'lib, amaliyotlarning yetarlicha standartlashtirilmaganligi, hujjat aylanishining sekinligi, biznes jarayonlar o'rtasidagi muvofiqlashuvning pastligi natijasida namoyon bo'ladi. Bunday holatda bank operatsiyalari kechikishi, to'g'ri qaror qabul qilishda muammolar paydo bo'lishi va mijozlarga xizmat ko'rsatish sifati pasayishi mumkin. Lavrushin (2014) bu omillarni operatsion riskning asosiy tarkibiy qismlaridan biri sifatida ta'kidlaydi.

Xodimlar faoliyatidagi xatoliklar ham operatsion risklarda muhim o'rin tutadi. Malaka yetishmasligi, nazoratning puxta amal qilmasligi, tajribaning kamligi yoki hatto xodimlar tomonidan qasddan yoki beg'araz tarzda yo'l qo'yiladigan xatolar bank faoliyatida jiddiy xavf tug'diradi. Tojiyev M.M. ta'kidlaganidek, xodimlarning bilim va ko'nikmalarining yetarli darajada bo'lmasligi ko'p hollarda moddiy yo'qotishlarga, mijozlar bilan noto'g'ri muomalaga yoki xizmat sifatining pasayishiga olib keladi.

Axborot texnologiyalari bilan bog'liq muammolar raqamli bankchilik rivojlangan hozirgi sharoitda operatsion riskning eng xavfli va tezkor yo'nalishlaridan biriga aylangan. Tizimlarning ishdan chiqishi, dasturiy ta'minotdagi xatolar, serverlardagi nosozliklar, kiberhujumlar va ma'lumotlar xavfsizligining yetarlicha ta'minlanmaganligi bank faoliyatini to'xtatib qo'yishi mumkin.

Tashqi muhit ta'siri ham bank faoliyatidagi risk darajasini oshiruvchi omillardan sanaladi. Elektr ta'minotidagi uzilishlar, internet va aloqa vositalarining ishdan chiqishi, tabiiy ofatlar, yo'l-transport muammolari va boshqa tashqi sharoitlar bank operatsiyalarini cheklovchi, mijozlarga xizmat ko'rsatishda uzilishlar keltirib chiqaruvchi holatlar sifatida namoyon bo'ladi.

Banklar qonunchilik asosida faoliyat yuritgani uchun normativ-huquqiy talablarning o'zgarishi ham operatsion risklarning shakllanishiga ta'sir qiladi. Yangilangan me'yoriy hujjatlarga o'z vaqtida moslashmaslik, ichki jarayonlarning reglamentlarga muvofiq emasligi yoki nazorat organlari talablarining to'liq bajarilmasligi jarima va sanksiyalarga olib kelishi mumkin.

Mijozlar bilan ishlash jarayonidagi xato qarorlar ham operatsion risklarning muhim tarkibiy qismi bo'lib, xizmat ko'rsatishdagi xato harakatlar, to'lovlarni noto'g'ri amalga oshirish, shaxsni identifikatsiya qilishda yo'l qo'yiladigan xatolar bank va mijoz o'rtasidagi ishonchning susayishiga sabab bo'ladi.

Frod va ichki firibgarlik esa operatsion riskning eng xavfli turlaridan biri hisoblanadi. Moliyaviy hujjatlarni soxtalashtirish, resurs va mablag'larni o'zlashtirish, hisobot ma'lumotlarini manipulyatsiya qilish kabi holatlar bankning moliyaviy barqarorligi va obro'siga jiddiy putur yetkazadi. Berch (2015) va COSO ERM konsepsiyalarida ichki firibgarlik quyi nazorat tizimlarining yetarlicha qo'llanilmasligi hamda korporativ madaniyatning zaifligi bilan bog'liq holda izohlanadi.

A. Frachot, P. Georges va T. Roncalli tomonidan ishlab chiqilgan Loss Distribution Approach (LDA) modeli operatsion riskni miqdoriy baholash sohasida muhim ilmiy yutuq hisoblanadi. Ushbu model operatsion yo'qotishlarning chastotasi va hajmini alohida taqsimotlar asosida modellashtirishga tayanadi. Mazkur yondashuv orqali banklar ehtimoliy katta yo'qotishlar ssenariysini hisoblab chiqish imkoniyatiga ega bo'ladi. LDA modeli risk sabablarini statistik ma'lumotlar asosida tahlil qilishga imkon beradi. Bu esa operatsion riskni subyektiv baholashdan obyektiv miqdoriy mezonlarga o'tishni ta'minlaydi. Shu bilan birga, model yuqori sifatli ma'lumotlar bazasini talab qiladi. Ushbu yondashuv xalqaro amaliyotda kapital talablarini belgilashda keng qo'llanilmoqda.

Giuliana Birindelli va Paola Ferretti operatsion riskni institutsional va tashkiliy nuqtai nazardan tahlil qiladilar. Ularning tadqiqotlarida risk manbalari bankning korporativ boshqaruvi, ichki nazorat muhiti va tashkiliy madaniyati bilan bog'liq holda ko'rib chiqiladi. Mualliflar operatsion riskni faqat texnik nosozlik emas, balki boshqaruv sifati natijasi sifatida talqin qiladi. Xususan, nazorat funksiyalarining mustaqilligi va mas'uliyat taqsimotining aniqligi risk darajasini belgilab beruvchi omil sifatida ko'rsatiladi. Institutsional barqarorlik zaif bo'lgan muhitda operatsion xatolar ehtimoli oshishi ta'kidlanadi. Shu jihatdan mazkur yondashuv riskni boshqarishda korporativ madaniyatni markaziy o'ringa qo'yadi. Bu qarash operatsion risk sabablarini chuqur institutsional tahlil qilish imkonini beradi.

Paola Leone, Pasqualina Porretta va Mario Vellella tomonidan ilgari surilgan integratsiyalashgan risk boshqaruv modeli operatsion riskni bankning umumiy risk-menejment tizimi bilan uyg'un holda ko'rib chiqadi. Mualliflar riskni aniqlash, baholash va monitoring qilish jarayonlarini yagona metodologik tizimga birlashtiradi. Ular operatsion risk sabablarini strategik qarorlar, ichki jarayonlar va texnologik infratuzilma bilan bog'laydi. Integratsiyalashgan yondashuv riskni alohida segment sifatida emas, balki umumbank darajasida baholashni taklif etadi. Bu model orqali operatsion risk va boshqa risk turlari o'rtasidagi o'zaro ta'sir aniqlanadi. Shu bilan birga, korporativ boshqaruv va risk appetiti siyosati mazkur modelning asosiy elementlari sifatida qaraladi. Natijada operatsion risk sabablari kompleks tizim doirasida tahlil qilinadi.

Ariane Chapelle operatsion riskni amaliy nuqtai nazardan tahlil qilib, uning real manbalarini tizimlashtirgan. Uning ishlarida inson xatolari, ichki firibgarlik, IT nosozliklar va jarayon reglamentlarining buzilishi asosiy sabablar sifatida ko'rsatiladi. Muallif riskni boshqarishda ma'lumotlar bazasini shakllantirish va insidentlarni hujjatlashtirish muhimligini ta'kidlaydi. Amaliy keyslar tahlili orqali operatsion yo'qotishlar ko'pincha nazorat mexanizmlari yetarli ishlamagan hollarda yuzaga kelishini ko'rsatadi. Chapelle yondashuvi riskni passiv hisoblash emas, balki faol monitoring qilish zarurligini ilgari suradi. Bu esa banklarda proaktiv nazorat tizimlarini shakllantirishni talab qiladi. Ushbu yondashuv operatsion risk sabablarini amaliy jihatdan ochib beradi.

So'nggi yillarda bank sektori keng ko'lamli raqamli transformatsiyani boshdan kechirmoqda. Masofaviy bank xizmatlari, raqamli to'lov yechimlari, ochiq bank xizmatlari, bulutli texnologiyalar va katta ma'lumotlarning rivojlanishi moliyaviy xizmatlar samaradorligini sezilarli darajada oshirdi. Shu bilan birga, inson omili, texnik nosozliklar, kiberhujumlar, ichki firibgarlik va avtomatlashtirilgan biznes jarayonlaridagi xatolar bilan bog'liq operatsion xavflar ehtimoli sezilarli darajada oshdi.

Hozirgi sharoitda an’anaviy operatsion risklarni boshqarish usullari endi risk hodisalari o’rtasidagi yashirin o’zaro bog’liqlikni o'z vaqtida aniqlashga qodir emas. Natijada, yetakchi global banklar asta-sekin sun’iy intellekt (AI), mashinali o‘qitish, katta ma’lumotlar tahlili kabi texnologiyalarni qo‘llamoqda.

Sun’iy intellektni qo‘llash an’anaviy usul orqali risklarni boshqarishdan, yani allaqachon sodir bo‘lgan hodisalarga javob berishga asoslangan boshqaruvdan — operatsion hodisa sodir bo‘lishidan oldin potentsial tahdidlar aniqlanadigan bashoratli xavflarni boshqarishga o‘tish imkonini beradi. Bu evlutsiyani quyidagi jadvalda ko‘rish mumkin.

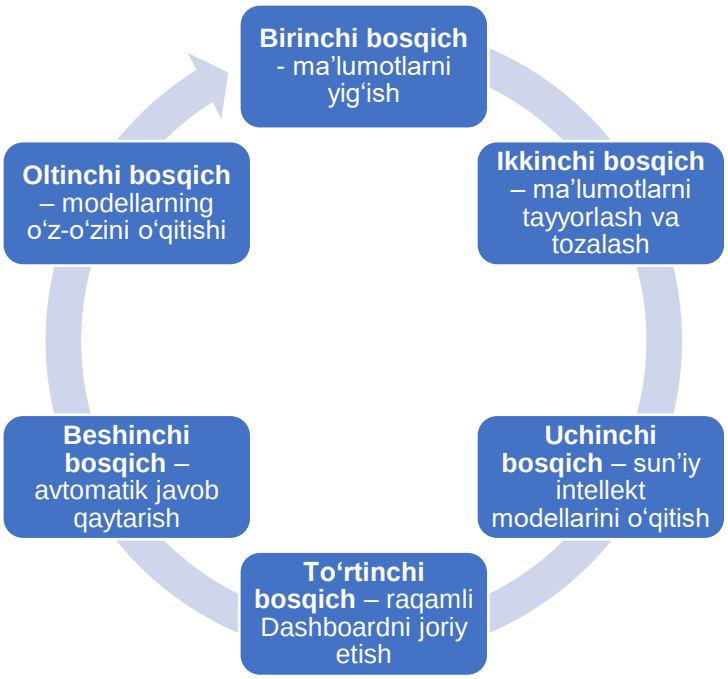
An’anaviy usul	Zamonaviy usul
Insidentdan keyingi tahlil	Riskni prognoz qilish (Anomaliyalarni avtomatik aniqlash orqali)
Excel hisobotlari	Real vaqt rejimidagi Dashboard (boshqaruv paneli)
Davriy nazorat	Davriy nazorat
Ekspert baholash	Mashinali o‘qitish
Statistik hisobotlar	O‘z-o‘zini o'rganuvchi modellar

Elektron va raqamli texnologiyalarning joriy etilishi bank xizmatlarida sifat jihatidan yangi bosqichni boshlab berdi. Avtomatlashtirilgan to'lov tizimlari, internet-banking, mobil ilovalar va fintex platformalari orqali xizmat ko'rsatish tezligi va qamrovi oshdi, biroq bu jarayon texnologik infratuzilmaga yuqori darajada bog'liqlikni yuzaga keltirdi. Natijada texnik nosozliklar, dasturiy ta'minotdagi xatolar, ma'lumotlar bazasiga noqonuniy kirish va kiberhujumlar kabi yangi turdagi risklar shakllandi. Shu bilan birga, ma'lumotlarni qayta ishlash hajmining ortishi va tizimlar o'zaro integratsiyasining kuchayishi risklarning tizimli va ko'p qatlamli xususiyat kasb etishiga olib keldi.

Axborot texnologiyalari bilan bog'liq xatolar va nosozliklar hozirgi bank tizimidagi eng katta risk manbalaridan biriga aylangan. Banklar to'liq raqamli

infratuzilmaga tayaniladi, barcha operatsiyalar real vaqt rejimida amalga oshiriladi. IT tizimlarining ishdan chiqishi, serverlardagi nosozliklar, dasturiy ta'minotdagi xatolar, ma'lumotlar bazasining buzilishi yoki kiberxavfsizlikka oid muammolar – bularning barchasi to'lovlarning to'xtashi, mijozlarning shaxsiy ma'lumotlari oshkor bo'lishi, bank obro'siga shikast yetkazilishi kabi jiddiy oqibatlarga sabab bo'lishi mumkin. Qolaversa, fishing, DDoS, virusli hujumlar, parollarni o'g'irlash kabi kibertahdidlar operatsion risk dinamikasini yanada xavfli qilib qo'ymoqda.

Sun’iy intellekt texnologiyalarini operatsion xatarlarni boshqarish tizimiga joriy etish an’anaviy nazorat modelidan xatarlarni intellektual prognozlash tizimiga o‘tishga qaratilgan izchil raqamli transformatsiya jarayonini ifodalaydi. Har bir bosqich mustaqil ahamiyatga ega bo‘lib, bankning raqamli ekotizimining keyingi komponentlari samarali faoliyat yuritishi uchun asos yaratadi.



Birinchi bosqich – ma’lumotlarni yig‘ish. Har qanday intellektual tizimning asosi sifatli ma’lumotlardir. Ushbu bosqichda avtomatlashtirilgan bank tizimi (ABS), CRM, ERP, to‘lov platformalari, internet-banking, mobil ilova, axborot xavfsizligi tizimlari, hodisalarni qayd etish jurnallari (loglar),

mijozlarni qo‘llab-quvvatlash xizmati hamda ichki audit natijalari kabi turli ichki va tashqi manbalardan ma’lumotlar integratsiya qilinadi. Barcha ma’lumotlar yagona raqamli omborga (Data Lake yoki Data Warehouse) jamlanadi, bu esa keyingi tahlillar uchun ma’lumotlarning yaxlitligi va ulardan foydalanish imkoniyatini ta’minlaydi.

Ikkinchi bosqich – ma’lumotlarni tayyorlash va tozalash. Amaliyot shuni ko‘rsatadiki, sun’iy intellekt modellari samaradorligi bevosita boshlang‘ich ma’lumotlar sifatiga bog‘liq. Ushbu bosqichda takroriy yozuvlar bartaraf etiladi, xatolar tuzatiladi, yetishmayotgan qiymatlar qayta ishlanadi, ma’lumotlar formatlari yagona standartga keltiriladi va ularning ishonchliligi tekshiriladi. Shuningdek, statistik chetlanishlarning ta’sirini kamaytirish hamda analitik modellarning aniqligini oshirish maqsadida ma’lumotlar normallashtiriladi.

Uchinchi bosqich – sun’iy intellekt modellarini o‘qitish. Ma’lumotlar tayyorlangandan so‘ng mashinali o‘qitish (Machine Learning), chuqur o‘qitish (Deep Learning), katta hajmdagi ma’lumotlarni tahlil qilish (Big Data Analytics) va anomaliyalarni intellektual aniqlash (Anomaly Detection) algoritmlariga asoslangan modellar yaratiladi. Ushbu modellar operatsion hodisalar bo‘yicha tarixiy ma’lumotlarni tahlil qiladi, turli xatar omillari o‘rtasidagi bog‘liqliklarni aniqlaydi hamda yangi xatar hodisalarining yuzaga kelish ehtimolini prognoz qiladi. An’anaviy baholash usullaridan farqli ravishda, sun’iy intellekt ekspert tahlili orqali aniqlash qiyin bo‘lgan yashirin qonuniyatlarni ham aniqlash imkoniyatiga ega.

To‘rtinchi bosqich – raqamli Dashboardni joriy etish. Modellar o‘qitilgandan so‘ng tahlil natijalari intellektual monitoring paneli (Risk Dashboard) orqali vizual ko‘rinishda taqdim etiladi. Dashboard bank rahbariyatiga joriy xatar darajasi, ro‘yxatga olingan hodisalar soni, asosiy xatar indikatorlari (Key Risk Indicators – KRI) dinamikasi, prognoz qilinayotgan yo‘qotishlar, firibgarlik faolligi darajasi hamda xatarlarni kamaytirish bo‘yicha amalga oshirilayotgan choralar samaradorligi haqida tezkor ma’lumotlarni

taqdim etadi. Interaktiv vizualizatsiya boshqaruv qarorlarini qabul qilish tezligini sezilarli darajada oshiradi.

Beshinchi bosqich – avtomatik javob qaytarish. Ushbu bosqichda tizim asosiy xatar ko‘rsatkichlaridagi o‘zgarishlarni avtomatik ravishda kuzatib boradi va oldindan belgilangan chegara qiymatlariga erishilganda mas’ul xodimlarga avtomatik xabarnomalar yuboradi. Shu bilan birga, operatsiyalarni tekshirish, shubhali tranzaksiyalarni vaqtincha bloklash, hodisalarni boshqarish tizimlarida (Jira, Service Desk, BPM tizimlari) arizalar yaratish yoki ma’lumotlarni ichki nazorat hamda axborot xavfsizligi bo‘linmalariga yuborish jarayonlari ham avtomatik tarzda ishga tushirilishi mumkin. Bunday yondashuv javob berish vaqtini sezilarli qisqartirib, salbiy oqibatlarning rivojlanishining oldini olish imkonini beradi.

Oltinchi bosqich – modellarning o‘z-o‘zini o‘qitishi. Yakuniy bosqich sun’iy intellekt algoritmlarini doimiy ravishda takomillashtirishni nazarda tutadi. Har bir ro‘yxatga olingan operatsion hodisadan so‘ng tekshiruv natijalari tizimga qayta yuklanadi va yangi o‘quv ma’lumotlari sifatida foydalaniladi. Natijada model bank faoliyati sharoitlaridagi o‘zgarishlar, yangi firibgarlik sxemalari, biznes-jarayonlarning yangilanishi hamda regulator talablariga moslashadi. O‘z-o‘zini o‘qituvchi algoritmlar vaqt o‘tishi bilan prognozlarning aniqligini oshiradi, noto‘g‘ri signal berish holatlarini kamaytiradi va operatsion xatarlarni boshqarish tizimining uzoq muddatli samaradorligini ta’minlaydi.

XULOSA

Shunday qilib, taqdim etilgan bosqichlarning izchil amalga oshirilishi nafaqat sodir bo‘lgan operatsion hodisalarni qayd etuvchi, balki potensial tahdidlarni oldindan prognoz qila oladigan intellektual operatsion xatarlarni boshqarish tizimini shakllantirish imkonini beradi. Bu esa tijorat banklarining reaktiv xatarlarni boshqarish modelidan zamonaviy Predictive Risk Management konsepsiyasiga o‘tishini ta’minlaydi. Mazkur yondashuv bank faoliyatining barqarorligini oshiradi, operatsion yo‘qotishlarni kamaytirishga

xizmat qiladi hamda risk-menejment tizimining raqamli yetuklik darajasini yanada yuksaltiradi.

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TURIZIMNI RIVOJLANTIRISHNING HUDUDIY XUSUSIYATLARI VA USTIVOR YO'NALISHLARI

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Abstract: *This article analyzes the regional characteristics and priority directions for the development of the tourism sector in Uzbekistan. Based on the country's geographical, historical, and cultural potential, the tourism opportunities of each region are examined. Strategic directions for expanding both domestic and international tourism flows are identified, and relevant recommendations are proposed to enhance the sustainable development and competitiveness of the tourism industry.*

Annotatsiya: *Ushbu maqolada O'zbekistonda turizm sohasini rivojlantirishning hududiy xususiyatlari va ustivor yo'nalishlari tahlil qilingan. Mamlakatning geografik, tarixiy va madaniy salohiyatidan kelib chiqib, har bir hududning turizm imkoniyatlari ko'rib chiqilgan. Milliy va xalqaro turizm oqimlarini kengaytirish bo'yicha strategik yo'nalishlar belgilanib, tegishli tavsiyalar ishlab chiqilgan.*

Keywords: *tourism, region, regional development, ecotourism, cultural heritage, agritourism, Uzbekistan, investment, competitiveness*

Kalit so'zlar: *turizm, hudud, hududiy rivojlanish, ekologik turizm, madaniy meros, agro-turizm, O'zbekiston, investitsiya, raqobatbardoshlik.*

KIRISH

Hozirgi globallashuv sharoitida turizm jahon iqtisodiyotining eng jadal rivojlanayotgan va istiqbolli tarmoqlaridan biri hisoblanadi. Ushbu soha nafaqat iqtisodiy daromad manbai sifatida, balki ijtimoiy-madaniy rivojlanish, xalqaro aloqalarni mustahkamlash va hududlar o'rtasidagi integratsiyani kuchaytirishda ham muhim ahamiyat kasb etadi. Turizmning rivojlanishi natijasida yangi ish

o‘rinlari yaratiladi, xizmat ko‘rsatish sektori kengayadi, infratuzilma yaxshilanadi va aholi turmush darajasi oshadi.

Jahon turizm tashkiloti (UNWTO) ma‘lumotlariga ko‘ra, 2023 yilda xalqaro turistlar soni 1,3 milliarddan oshgan bo‘lib, ushbu ko‘rsatkich pandemiyadan keyingi tiklanish jarayonining muvaffaqiyatli kechayotganini tasdiqlaydi.[1]. Turizmning jahon yalpi ichki mahsulotidagi ulushi 9,1 foizni tashkil etgani esa uning global iqtisodiyotdagi salmoqli o‘rnini yana bir bor isbotlaydi. Bundan tashqari, turizm ko‘plab davlatlar uchun asosiy eksport xizmatlaridan biri bo‘lib xizmat qilmoqda.

O‘zbekiston Respublikasi Markaziy Osiyo mintaqasining markazida joylashgan bo‘lib, u boy tarixiy-madaniy merosi, qadimiy shaharlari, noyob me‘moriy obidalari hamda rang-barang tabiiy landshaftlari bilan ajralib turadi. Samarqand, Buxoro, Xiva kabi tarixiy shaharlari dunyo miqyosida tan olingan bo‘lib, ular Buyuk Ipak yo‘lining muhim nuqtalari hisoblanadi. Shuningdek, mamlakat hududida tog‘-turizmi, ekologik turizm, ziyorat turizmi va madaniy turizmni rivojlantirish uchun keng imkoniyatlar mavjud.

So‘nggi yillarda O‘zbekistonda turizm sohasini rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biriga aylangan. Vizasiz rejimlarning joriy etilishi, infratuzilmaning modernizatsiya qilinishi, xalqaro marketing strategiyalarining ishlab chiqilishi va xususiy sektorni qo‘llab-quvvatlash bo‘yicha qator islohotlar amalga oshirilmoqda. Natijada mamlakatga tashrif buyuruvchi xorijiy turistlar soni sezilarli darajada ortib bormoqda.

Biroq mavjud ulkan turizm salohiyatiga qaramay, uni to‘liq ro‘yobga chiqarish uchun hududiy xususiyatlarni chuqur o‘rganish va differensiallashtirilgan yondashuvni qo‘llash zarur. Har bir hududning tabiiy, iqtisodiy va madaniy imkoniyatlari turlicha bo‘lgani sababli, ularni bir xil model asosida rivojlantirish samarasiz bo‘lishi mumkin. Shu bois hududlar kesimida turizm rivojlanishini tahlil qilish, ularning kuchli va zaif tomonlarini aniqlash hamda ustuvor yo‘nalishlarni belgilash muhim ilmiy-amaliy vazifa hisoblanadi.

Ushbu maqolaning asosiy maqsadi O‘zbekiston hududlarini turizm rivojlanishi nuqtai nazaridan kompleks tahlil qilish, ularning salohiyatini baholash va istiqbolli rivojlanish yo‘nalishlarini aniqlashdan iborat. Tadqiqot jarayonida statistik ma‘lumotlar tahlili, hududiy qiyosiy baholash, SWOT-tahlil hamda tizimli yondashuv metodlaridan foydalanildi. Olingan natijalar asosida mamlakatda turizmni yanada rivojlantirish bo‘yicha ilmiy asoslangan taklif va tavsiyalar ishlab chiqiladi**.**

ADABIYOTLAR TAHLILI:

Turizm iqtisodiyotini hududiy rivojlantirish masalalari uzoq yillardan buyon xorijiy va mahalliy tadqiqotchilar tomonidan chuqur o‘rganilib kelinmoqda. Ushbu yo‘nalishdagi ilmiy izlanishlar asosan turizmning hududiy rivojlanish omillari, raqobatbardoshlik mezonlari hamda samarali boshqaruv mexanizmlarini aniqlashga qaratilgan.

Xususan, turizm geografiyasi va hududiy rivojlanish nazariyasiga katta hissa qo‘shgan olimlardan biri – C. Michael Hall va Stephen Page bo‘lib, ularning “The Geography of Tourism and Recreation: Environment, Place and Space” (1999, 2006) asarida turizmning hududiy rivojlanishida tabiiy resurslar, infratuzilma va ijtimoiy omillar o‘rtasidagi o‘zaro bog‘liqlik chuqur tahlil qilingan.[2]. Mualliflar hududning turistik jozibadorligi faqatgina resurslar mavjudligi bilan emas, balki ularni samarali boshqarish va marketing strategiyalari bilan ham belgilanadi, degan xulosaga keladilar.

Shuningdek, Geoffrey Wall va Alister Mathieson tomonidan yozilgan “Tourism: Change, Impacts and Opportunities” (2006) asari turizm rivojlanishining hududiy xususiyatlarini o‘rganishda muhim manba hisoblanadi.[3]. Ushbu tadqiqotda mualliflar turizmning iqtisodiy, ijtimoiy va ekologik ta’sirlarini kompleks tarzda tahlil qilib, hududiy resurs bazasining roli va uning barqaror rivojlanishdagi ahamiyatini asoslab berganlar. Ularning fikricha, turizmni rivojlantirishda hududning resurs salohiyati, transport infratuzilmasi va xizmat ko‘rsatish darajasi asosiy determinantlar hisoblanadi.

Turizmning hududiy raqobatbardoshligini ilmiy jihatdan asoslab bergan eng muhim ishlardan biri – J. R. Brent Ritchie va Geoffrey I. Crouch tomonidan yaratilgan “The Competitive Destination: A Sustainable Tourism Perspective” (2003) asaridir.[4]. Mazkur modelda turistik hududlarning raqobatbardoshligi beshta asosiy omil orqali izohlanadi: asosiy resurslar va jalb etuvchi omillar (tabiiy va madaniy boyliklar), qo‘llab-quvvatlovchi infratuzilma, boshqaruv samaradorligi, siyosiy muhit va tashqi omillar. Ushbu konsepsiya bugungi kunda ko‘plab davlatlar tomonidan turizm strategiyalarini ishlab chiqishda qo‘llanilmoqda.

Hududiy rivojlanishda klaster yondashuvi alohida ilmiy yo‘nalish sifatida shakllangan bo‘lib, bu borada Michael Porterning “The Competitive Advantage of Nations” (1990) asari muhim ahamiyatga ega.[5]. Porter nazariyasiga ko‘ra, iqtisodiy samaradorlikni oshirishda hududiy klasterlar – ya’ni o‘zaro bog‘liq korxonalar, xizmat ko‘rsatuvchi tashkilotlar va ilmiy muassasalar majmuasi muhim rol o‘ynaydi. Turizm sohasida klasterlar mehmonxona biznesi, transport, gastronomiya va madaniy xizmatlarni integratsiyalash orqali sinergetik samarani ta’minlaydi.

Bundan tashqari, turizmni barqaror rivojlantirish masalalari Butler (1980) tomonidan taklif etilgan “Tourism Area Life Cycle” (TALC) modeli orqali ham keng o‘rganilgan.[6]. Ushbu model turistik hududlarning rivojlanish bosqichlarini – kashfiyot, rivojlanish, yetuklik va tanazzul bosqichlarini aniqlab beradi. Mazkur yondashuv hududiy turizmni rejalashtirishda muhim nazariy asos bo‘lib xizmat qiladi.

O‘zbekiston misolida turizm salohiyatini o‘rganish bo‘yicha ham bir qator ilmiy ishlar amalga oshirilgan. Jumladan, Yusupov (2021) o‘z tadqiqotlarida mamlakatning tarixiy-madaniy resurslarini baholab, ularning xalqaro turizm bozoridagi o‘rnini aniqlagan. Mirzayev (2022) esa hududiy turizmni rivojlantirishda infratuzilma va investitsiya muhitining rolini tahlil qilgan. Shuningdek, Abdukarimov va Tursunov kabi mahalliy olimlar tomonidan turizm

klasterlarini shakllantirish va hududiy differensial rivojlanish masalalari o‘rganilgan.

Umuman olganda, yuqoridagi ilmiy manbalar shuni ko‘rsatadiki, turizmni hududiy rivojlantirish ko‘p omilli murakkab jarayon bo‘lib, u tabiiy resurslar, iqtisodiy infratuzilma, boshqaruv tizimi va innovatsion yondashuvlarning uyg‘unligini talab etadi. Shu bois O‘zbekiston sharoitida ham xalqaro tajribani hisobga olgan holda hududiy turizm siyosatini takomillashtirish dolzarb vazifa hisoblanadi

ASOSIY NATIJALAR VA TAHLIL

O‘zbekiston turizm hududlarining umumiy tavsifi

O‘zbekiston Respublikasi turizm salohiyati jihatidan Markaziy Osiyo mintaqasida yetakchi o‘rinlardan birini egallaydi. Mamlakat hududi bo‘ylab joylashgan tarixiy obidalar, tabiiy landshaftlar, madaniy meros obyektlari va zamonaviy infratuzilma elementlari hududlar kesimida turizmni turlicha rivojlantirish imkonini beradi. Shu sababli hududiy turizmni samarali tashkil etish maqsadida respublika hududlarini ixtisoslashuv darajasiga ko‘ra klasterlarga ajratish ilmiy va amaliy jihatdan muhim ahamiyat kasb etadi.

Birinchi klaster – tarixiy-madaniy turizm zonasi bo‘lib, unga Samarqand, Buxoro va Xorazm viloyatlari kiradi. Mazkur hududlar qadimiy sivilizatsiyalar markazi sifatida shakllangan bo‘lib, Buyuk Ipak yo‘lining asosiy nuqtalaridan biri hisoblanadi. Ushbu viloyatlarda joylashgan Registon ansambli, Shohi Zinda majmuasi, Ark qal’asi, Po‘i Kalon majmuasi va Ichan qal’a kabi tarixiy obidalar xalqaro turizmda yuqori talabga ega. Mazkur hududlarning UNESCO Jahon merosi ro‘yxatiga kiritilgani ularning global miqyosdagi turistik jozibadorligini keskin oshiradi. Statistik ma’lumotlarga ko‘ra, 2023 yil yakunida mamlakatga tashrif buyurgan xorijiy turistlarning qariyb uchdan ikki qismi aynan ushbu hududlarga to‘g‘ri kelgan.

Ikkinchi klaster – rekreatsion va ekologik turizm zonasi bo‘lib, Farg‘ona vodiysi viloyatlari hamda Surxondaryo viloyatini o‘z ichiga oladi. Ushbu

hududlar nafaqat tabiiy resurslari, balki boy etnografik va hunarmandchilik merosi bilan ajralib turadi. Rishton kulolchilik maktabi, Qo‘qon hunarmandchilik an’analari va Chust pichoqchilik san’ati xalqaro miqyosda tan olingan. Shu bilan birga, tog‘li hududlarda trekking, alpinizm, eko-marshrutlar va ekstremal turizm turlarini rivojlantirish uchun katta imkoniyatlar mavjud. Surxondaryo viloyatining Boysun tumani esa o‘zining noyob folklor merosi bilan UNESCOning nomoddiy madaniy meros ro‘yxatiga kiritilgan bo‘lib, bu hudud etnoturizmni rivojlantirishda strategik ahamiyatga ega.

Uchinchi klaster – sog‘lomlashtirish va balneologik turizm zonasi sifatida Toshkent va Namangan viloyatlari ajralib turadi. Toshkent viloyatidagi Chimyon, Chimgan va Beldersoy tog‘-kurort zonalari yuqori rekreatsion salohiyatga ega bo‘lib, ular yil davomida turli turizm xizmatlarini taqdim etadi. Bu hududlarda qishki sport turlari, yozgi dam olish, sog‘lomlashtirish va ekologik turizm uyg‘unlashgan holda rivojlanmoqda. Namangan viloyatidagi mineral buloqlar esa sanatoriya-kurort tizimini rivojlantirish uchun mustahkam tabiiy asos yaratadi.

To‘rtinchi klaster – biznes va MICE turizmi zonasi bo‘lib, bunda Toshkent shahri yetakchi hisoblanadi. Poytaxtda xalqaro standartlarga javob beruvchi mehmonxonalar, zamonaviy konferensiya markazlari va rivojlangan transport tizimi mavjud. So‘nggi yillarda Toshkent shahrida o‘tkazilayotgan xalqaro forumlar, biznes tadbirlar va ko‘rgazmalar sonining ortishi ushbu yo‘nalishning jadal rivojlanayotganini ko‘rsatadi. Xususan, 2022–2024 yillar davomida xalqaro tadbirlar soni sezilarli darajada oshib, mamlakatning investitsion jozibadorligini kuchaytirishga xizmat qilmoqda.

Hududiy turizm ko‘rsatkichlari tahlili

2019–2023 yillar oralig‘idagi statistik ma’lumotlar tahlili O‘zbekiston turizm sektorining pandemiyadan keyingi tiklanish dinamikasini aks ettiradi. 2020–2021 yillarda global pandemiya sabab turistlar oqimi keskin kamaygan bo‘lsa-da, 2022 yildan boshlab ijobiy o‘sish sur’atlari kuzatilmoqda.

Tahlillar shuni ko‘rsatadiki, Samarqand viloyatida turistlar soni 2019 yildagi darajadan 2023 yilga kelib sezilarli darajada oshgan. Buxoro va Xorazm viloyatlarida ham shunga o‘xshash tiklanish jarayoni kuzatilgan. Toshkent shahri esa butun davr davomida yetakchilikni saqlab qolib, 2023 yilda 1 milliondan ortiq turistni qabul qilgan.

Umuman olganda, 2023 yil yakunlariga ko‘ra, turistlar oqimi pandemiyadan oldingi darajadan o‘rtacha 15–18 foizga oshgan.[7]. Bu esa davlat tomonidan olib borilayotgan turizm siyosati, xususan vizasiz rejimni kengaytirish, transport aloqalarini yaxshilash va infratuzilmaga investitsiyalarni jalb qilish natijasidir.

Hududiy SWOT-tahlil

O‘zbekiston turizm sektorining hududiy SWOT-tahlili quyidagi asosiy natijalarni ko‘rsatadi:

Kuchli tomonlar: mamlakat hududlarida joylashgan noyob tarixiy va madaniy meros obyektlari; xalqaro darajada e’tirof etilgan UNESCO ob’ektlari; milliy hunarmandchilik va madaniy an’analarning boyligi; qulay geografik joylashuv; mehmondo‘stlik madaniyatining yuqori darajasi; davlat tomonidan qo‘llab-quvvatlanayotgan turizm siyosati.

Zaif tomonlar: hududlar o‘rtasida infratuzilmaning notekis rivojlanganligi; xizmat ko‘rsatish sifati bo‘yicha tafovutlar; malakali kadrlar yetishmovchiligi; raqamli texnologiyalar va marketing vositalarining yetarli darajada rivojlanmaganligi; ayrim hududlarda transport va muhandislik infratuzilmasining cheklanganligi.

Imkoniyatlar: xalqaro turizm bozorida yangi yo‘nalishlarning paydo bo‘lishi; ekologik va agro-turizm segmentlarining rivojlanishi; “Yangi Ipak yo‘li” loyihasi doirasida hududlararo integratsiya; raqamli texnologiyalarni joriy etish orqali xizmat sifatini oshirish; investitsion muhitni yaxshilash orqali yangi loyihalarni amalga oshirish.

Tahdidlar: global iqtisodiy va siyosiy beqarorlik; ekologik muammolar, xususan Aral dengizi hududidagi vaziyat; investitsion resurslarning cheklanganligi; pandemiya kabi global sog‘liqni saqlash xavflari.

Yuqoridagi tahlillar asosida shuni ta’kidlash mumkinki, O‘zbekiston turizm sektorini hududiy rivojlantirishda differensial yondashuvni qo‘llash, har bir hududning ixtisoslashuviga mos strategiyalar ishlab chiqish va zamonaviy texnologiyalarni keng joriy etish muhim ahamiyat kasb etadi. Bu esa kelgusida turizmning barqaror o‘sishini ta’minlab, mamlakat iqtisodiyotiga qo‘shiladigan hissani yanada oshiradi.

HUDUDIY TURIZM KO‘RSATKICHLARI TAHLILI

2019-2023 yillar oralig‘idagi statistik ma‘lumotlar tahlili quyidagi tendensiyalarni ko‘rsatadi:

1-jadval

O‘zbekiston hududlari bo‘yicha turistlar soni (ming kishi)

Hudud	2019	2021	2022	2023
Samarqand v.	620 000	185 000	420 000	710 000
Buxoro v.	480 000	142 000	380 000	590 000
Xorazm v.	210 000	68 000	190 000	310 000
Toshkent sh.	890 000	310 000	680 000	1 050 000
Farg'ona v.	95 000	32 000	87 000	148 000
Boshqa hududlar	205 000	63 000	143 000	292 000

Jadvaldan ko‘rinib turibdiki, 2020 yilgi pandemiyadan keyin turizm sektori barqaror tiklanish tendensiyasini namoyon etmoqda. 2023 yilga kelib turistlar soni 2019 yil darajasini o‘rtacha 15-18 foizga oshib ketdi. Toshkent shahri va Samarqand viloyati eng yuqori o‘sish sur‘atlarini qayd etdi.

Hududiy SWOT-tahlil

O‘zbekiston turizm sektorining hududiy SWOT-tahlili quyidagi asosiy xulosalarga olib keladi:

Kuchli tomonlar: UNESCO ro‘yxatidagi noyob moddiy va nomoddiy meros obyektlari; ko‘p asrlik hunarmandchilik an‘analari; qulay geopolitik joylashuv; mehmon do‘stlik xalq mentaliteti; 2016 yildan boshlab olib borilayotgan maqsadli islohotlar va vizani soddalashtirish siyosati.

Zaif tomonlar: Turistik infratuzilmaning notekis rivojlanishi – poytaxt va viloyatlar o‘rtasidagi keskin farq; malakali xodimlar etishmasligi; raqamli marketing va onlayn xizmat ko‘rsatishning rivojlanmaganligi; hududlardagi yo‘l va muhandislik infratuzilmasining kam quvvati.

Imkoniyatlar: Yaqin-Sharq va Osiyo bozorlaridan keladigan turist oqimining o‘sishi; eko-turizm va agro-turizm bo‘yicha yangi segmentlarni shakllantirish; “Yangi Ipak yo‘li” loyihasi doirasida hududlararo integratsiya; raqamli texnologiyalar va sun‘iy intellektni turizm xizmatlarida qo‘llash.

Tahdidlar: Mintaqadagi siyosiy beqarorlik; iqlim o‘zgarishi natijasida Aral dengizi havzasining ekologik ahvoli; moliyaviy sektorning cheklangan investitsion ko‘rsatkichlari; koronavirus kabi global epidemiologik xatarlar.

USTUVOR YO‘NALISHLAR

Hududiy turizm klasterlarini shakllantirish

Tadqiqot natijalari shuni ko‘rsatadiki, O‘zbekistonda turizmni samarali rivojlantirish uchun hududiy klaster yondashuvini joriy etish zarur. Mazkur yondashuv turizm xizmatlari, infratuzilma, transport va xizmat ko‘rsatish tizimlarini o‘zaro integratsiyalash orqali sinergetik samaraga erishishni ta’minlaydi.

Xususan, Samarqand–Buxoro–Xiva turizm koridorini yagona mintaqaviy brend sifatida shakllantirish xalqaro turizm bozorida mamlakatning raqobatbardoshligini oshirishga xizmat qiladi. Ushbu yo‘nalishda quyidagi ustuvor vazifalarni amalga oshirish maqsadga muvofiq:

– yagona marketing strategiyasini ishlab chiqish va global turizm platformalarida faol targ‘ib qilish; –hududlararo transport-logistika tizimini, xususan temir yo‘l va aviaqatnovlarni optimallashtirish;

– mehmonxona, gidlik xizmatlari va umumiy servis sifatini yagona standartlar asosida nazorat qilish tizimini joriy etish.

Ekologik va adventure turizmini rivojlantirish Surxondaryo, Qashqadaryo va Navoiy viloyatlari ekologik va sarguzasht (adventure) turizmi uchun katta salohiyatga ega hududlar hisoblanadi. Xususan, Qizilqum sahrosi, Aydar-Arnasoy ko‘llar tizimi, Nurota va Hisor tog‘ tizmalari xalqaro darajadagi ekologik turizm yo‘nalishlariga aylanish imkoniyatiga ega.

Mazkur hududlarda barqaror turizmni rivojlantirish uchun quyidagi choralarni amalga oshirish zarur:

– ekologik qo‘riqxona va milliy parklar infratuzilmasini rivojlantirish; – mahalliy aholi ishtirokida community-based tourism (jamoaviy turizm) modelini joriy etish;

– ekologik muvozanatni saqlagan holda turizm faoliyatini tartibga solish mexanizmlarini kuchaytirish.

Agro-turizm va qishloq turizmini rivojlantirish Agro-turizm O‘zbekistonning qishloq hududlarida turizmni diversifikatsiya qilishning muhim yo‘nalishlaridan biri hisoblanadi.[8]. Farg‘ona vodiysi, Toshkent viloyati tog‘ etaklari va Zarafshon vodiysi agro-turizmni rivojlantirish uchun qulay tabiiy-iqtisodiy sharoitlarga ega.

Ushbu yo‘nalishda quyidagi ustuvor vazifalarni amalga oshirish zarur:

– qishloq xo‘jaligi faoliyati bilan turizm xizmatlarini integratsiyalash;

– milliy pazandachilik, hunarmandchilik va an’anaviy turmush tarzini turistik mahsulotga aylantirish;

– qishloq hududlarida kichik biznes va oilaviy mehmon uylarini rivojlantirish.

Xalqaro tajribaga ko‘ra, rivojlangan mamlakatlarda agro-turizm umumiy turizm daromadining 12–18 foizini tashkil etadi, bu esa ushbu yo‘nalishning iqtisodiy samaradorligini ko‘rsatadi.

Raqamli turizm va smart texnologiyalarni joriy etish

Zamonaviy sharoitda turizm sohasini rivojlantirishda raqamli texnologiyalar muhim omilga aylanmoqda.[9] O‘zbekistonda raqamli turizmni rivojlantirish quyidagi yo‘nalishlarda amalga oshirilishi lozim:

– yagona milliy turizm platformasini yaratish va barcha xizmatlarni integratsiyalash;

–AR/VR texnologiyalari asosida virtual sayohatlar va interaktiv ekskursiyalarni tashkil etish;

– turistik obyektlarda elektron audiogidlar va smart xaritalarni joriy etish;

– sun’iy intellekt asosida sayyohlar uchun individual marshrutlar va xizmatlar taklif etish.

XULOSALAR VA TAVSIYALAR

O‘tkazilgan tadqiqotlar asosida quyidagi ilmiy xulosalarga kelindi: Birinchidan, O‘zbekiston hududlari turizm ixtisoslashuvi bo‘yicha yuqori darajada differensiallashgan bo‘lib, har bir hudud o‘ziga xos resurs bazasi va raqobatdosh ustunliklarga ega. Shu bois yagona standart yondashuvdan voz kechib, hududlarga moslashgan differensial siyosatni amalga oshirish zarur.

Ikkinchidan, turizm klasterlarini shakllantirish hududiy iqtisodiy samaradorlikni oshirish, resurslardan oqilona foydalanish va xizmatlar sifatini yaxshilash imkonini beradi. Ayniqsa, Samarqand–Buxoro–Xiva turizm hududi global miqyosda alohida brend sifatida rivojlantirilishi lozim.

Uchinchidan, ekologik, agro va sog‘lomlashtirish turizmi yashil iqtisodiyot sharoitida barqaror rivojlanishning muhim drayverlari hisoblanadi va ularni ustuvor qo‘llab-quvvatlash zarur.

Tadqiqot natijalari asosida quyidagi amaliy tavsiyalar ishlab chiqildi:– hududiy turizm dasturlarini har bir viloyatning resurs salohiyatiga mos ravishda

ishlab chiqish va moliyaviy qo‘llab-quvvatlashni kuchaytirish;

– turizm sohasi uchun kadrlar tayyorlash tizimini xalqaro standartlar asosida modernizatsiya qilish;

– xususiy investitsiyalarni jalb etish uchun soliq imtiyozlari va subsidiyalar mexanizmlarini kengaytirish;

– turizm sohasida raqamli texnologiyalarni rivojlantirish uchun maxsus innovatsion fond tashkil etish;

– Markaziy Osiyo davlatlari bilan hamkorlikda transchegaraviy turizm marshrutlarini rivojlantirish.

Yuqoridagi chora-tadbirlar amalga oshirilishi O‘zbekiston turizm sektorining raqobatbardoshligini oshirish, hududiy rivojlanishni muvozanatlashtirish hamda milliy iqtisodiyotga qo‘shiladigan hissani sezilarli darajada ko‘paytirishga xizmat qiladi.

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QASHQADARYO VILOYATI TUMANLARI KESIMIDA TURMUSH DARAJASI KO'RSATKICHLARINI EKONOMETRIK TAHLIL QILISH

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Annotatsiya. *Mazkur maqolada Qashqadaryo viloyati tumanlari kesimida turmush darajasi ko‘rsatkichlari ekonometrik va statistik usullar asosida tahlil qilingan. Tadqiqotning maqsadi hududiy farqlarni aniqlash, turmush darajasiga ta’sir etuvchi asosiy ijtimoiy-iqtisodiy omillarni baholash hamda ularning ta’sir darajasini ekonometrik model yordamida aniqlashdan iborat. Qurilgan ekonometrik model statistik jihatdan ahamiyatli bo‘lib, turmush darajasidagi o‘zgarishlarning asosiy qismini izohlash imkonini berdi. Tadqiqot natijalari hududiy rivojlanish siyosatini takomillashtirish va ijtimoiy-iqtisodiy tengsizlikni kamaytirish bo‘yicha amaliy tavsiyalar ishlab chiqishga xizmat qiladi.*

Kalit so‘zlar. *Qashqadaryo viloyati, tumanlar kesimi, turmush darajasi, ijtimoiy-iqtisodiy omillar, ekonometrik tahlil, regressiya modeli, korrelyatsiya, hududiy tengsizlik, aholi daromadlari, bandlik, investitsiyalar, statistik tahlil.*

Abstract. *This article presents an econometric and statistical analysis of living standard indicators across the districts of the Kashkadarya Region. The aim of the study is to identify regional disparities, assess the main socio-economic factors affecting living standards, and determine the extent of their impact using an econometric model. The estimated econometric model is statistically significant and explains a substantial proportion of the variation in living standards. The findings of the study can serve as a basis for improving*

regional development policies and formulating practical recommendations aimed at reducing socio-economic inequality.

Keywords: *Kashkadarya Region, districts, living standards, socio-economic factors, econometric analysis, regression model, correlation, regional inequality, household income, employment, investment, statistical analysis.*

KIRISH

Turmush darajasi har qanday hududning ijtimoiy-iqtisodiy rivojlanish darajasini ifodalovchi muhim ko‘rsatkichlardan biri hisoblanadi. U aholi daromadlari, bandlik darajasi, iste’mol imkoniyatlari, xizmatlar sifati hamda ijtimoiy infratuzilma rivojlanishi kabi omillar bilan bevosita bog‘liqdir. Hududlar kesimida turmush darajasi tafovutlarini o‘rganish mintaqaviy siyosatni shakllantirishda muhim ilmiy-amaliy ahamiyatga ega.

“Kambag‘al oilalarga mansub 168 ming nafar bola davlat bog‘chalariga imtiyozli asosda qabul qilindi. Bu yildan boshlab, 208 ta bog‘chada birinchi marta inklyuziv ta’lim tizimini joriy etdik.

Ta’kidlash kerakki, yurtimizda kambag‘allik darajasi yil boshidagi 8,9 foizdan 5,8 foizga tushdi”[1]

Qashqadaryo viloyati iqtisodiy salohiyati yuqori bo‘lgan hududlardan biri bo‘lishiga qaramasdan, uning tumanlari o‘rtasida iqtisodiy rivojlanish va turmush darajasi ko‘rsatkichlarida sezilarli farqlar mavjud. Shahar va qishloq tumanlari o‘rtasidagi tafovutlar, sanoatlashuv darajasi, investitsiyalar oqimi hamda mehnat bozori holati turmush darajasiga turlicha ta’sir ko‘rsatadi.

“Kuzatuvlarni o‘tkazish jarayonlarida axborot-kommunikatsiya texnologiyalarining integratsiyalashuvini amalga oshirish hamda ma’lumotlarni qayta ishlash, tahlil qilish va taqdim etish jarayonlariga zamonaviy dasturlarni (STATA, SPSS) kiritish” [3] kabi vazifalar belgilangan

Shu niqtai nazardan, “ko‘p yillik statistika dasturi milliy statistika tizimini rivojlantirish konsepsiyasidan, strategik maqsadlaridan va ustuvor

yo‘nalishlaridan, shuningdek rasmiy statistikasini rivojlantirishga doir dasturiy chora-tadbirlarni amalga oshirish mexanizmlaridan iboratdir”[2].

Qashqadaryo viloyati tumanlari kesimida turmush darajasi ko‘rsatkichlarini ekonometrik usullar yordamida tahlil qilish va unga ta’sir etuvchi asosiy omillarni aniqlash maqola uchun tanlangan mavzuning dolzarbligini ifodalaydi.

MATERIALLAR VA METODLAR

Tadqiqotda Qashqadaryo viloyati tumanlari bo‘yicha so‘nggi yillardagi rasmiy statistik ma’lumotlar foydalanildi. Ma’lumotlar O‘zbekiston Respublikasi Milliy statistika qo‘mitasi va hududiy statistik to‘plamlardan olindi.

Natijaviy o‘zgaruvchi sifatida turmush darajasi ko‘rsatkichi (jon boshiga daromad yoki iste’mol xarajatlari) tanlandi.

Mustaqil o‘zgaruvchilar aholi jon boshiga daromad, o‘rtacha ish haqi, bandlik darajasi, ishsizlik darajasi, asosiy kapitalga investitsiyalar, sanoat ishlab chiqarishi hajmi, inflyatsiya darajasi

Tahlil quyidagi bosqichlarda amalga oshirildi:

1. Tavsifiy statistika (o‘rtacha qiymat, dispersiya, minimal va maksimal qiymatlar);

2. Korrelyatsion tahlil (Pearson korrelyatsiya koeffitsiyenti);

3. Ko‘p omilli regressiya modeli qurish.

Ekonometrik model quyidagi ko‘rinishda ifodalandi:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

bu yerda:

Y – Turmush darajasi indeksi (0–100 ball)

X1 – Aholi jon boshiga yillik daromad (mln so'm)

X2 – O'rtacha oylik ish haqi (mln so'm)

X3 – Bandlik darajasi (%)

X4 – Ishsizlik darajasi (%)

X5 – Kambag'allik darajasi (%)

Model parametrlarini baholash uchun eng kichik kvadratlar usuli (OLS) qo‘llanildi. Statistik ahamiyatlilik t-test, F-test va R^2 mezonlari orqali baholandi.

NATIJALAR

Mazkur tadqiqot Qashqadaryo viloyati tumanlari kesimida aholi turmush darajasi ko‘rsatkichlarini ekonometrik usullar asosida baholash va tahlil qilishga bag‘ishlangan. Tadqiqotning asosiy maqsadi hududlar bo‘yicha turmush darajasidagi tafovutlarni aniqlash, unga ta’sir etuvchi ijtimoiy-iqtisodiy omillarni baholash hamda ularning o‘zaro bog‘liqligini ekonometrik modellar yordamida tahlil qilishdan iborat.

Tadqiqotda 2021–2025-yillar davomida Qashqadaryo viloyatining tumanlari bo‘yicha shakllantirilgan panel ma’lumotlardan foydalanildi. Tahlil jarayonida aholi jon boshiga to‘g‘ri keladigan daromadlar, o‘rtacha oylik ish haqi, bandlik darajasi, ishsizlik darajasi, investitsiyalar hajmi hamda kambag‘allik darajasi kabi asosiy ko‘rsatkichlar o‘rganildi. Ma’lumotlarni qayta ishlashda tavsifiy statistika, korrelyatsion tahlil va ko‘p omilli regressiya usullaridan foydalanildi. Ekonometrik hisob-kitoblar EViews va Microsoft Excel dasturlari yordamida amalga oshirildi.

Tahlil natijalari shuni ko‘rsatdiki, aholi daromadlari, bandlik darajasi va investitsiyalar hajmi turmush darajasiga ijobiy ta’sir ko‘rsatadi. Aksincha, ishsizlik va kambag‘allik darajasining ortishi turmush darajasining pasayishiga olib keladi. Qurilgan regressiya modeli statistik mezonlar bo‘yicha ishonchli bo‘lib, modelning determinatsiya koeffitsiyenti yuqori qiymatni namoyon etdi. Bu esa tanlangan omillar turmush darajasidagi o‘zgarishlarning asosiy qismini izohlashini tasdiqlaydi.

Hududlar kesimida o‘tkazilgan taqqoslash natijalari iqtisodiy salohiyati yuqori bo‘lgan tumanlarda turmush darajasi nisbatan yuqoriligini, iqtisodiy rivojlanishi sust bo‘lgan hududlarda esa mazkur ko‘rsatkich pastroq ekanligini ko‘rsatdi. Shuningdek, infratuzilma rivojlanganligi, yangi ish o‘rinlari yaratilishi

va investitsiya faolligining ortishi turmush darajasini yaxshilovchi muhim omillar sifatida aniqlandi.

1-jadval

Qashqadaryo viloyati tumanlari kesimida turmush darajasi ko'rsatkichlari[35], (% hisobida)

Tumanlar	Yillar				
	2021	2022	2023	2024	2025
G'uzor	71.8	73.1	74.6	76.2	78.0
Dehqonobod	63.5	64.9	66.5	68.2	70.0
Qamashi	66.2	67.8	69.4	71.1	72.9
Qarshi tumani	75.3	77.0	79.2	81.5	84.0
Koson	73.1	74.8	76.7	78.9	81.0
Kitob	69.6	71.2	73.4	75.5	77.8
Mirishkor	68.0	69.5	71.3	73.0	75.0
Muborak	74.8	76.5	78.8	81.0	83.4
Nishon	70.5	72.0	73.8	75.6	77.5
Kasbi	67.4	69.0	70.8	72.7	74.8
Ko'kdala	64.5	66.0	67.8	69.9	72.0
Chiroqchi	65.8	67.3	69.0	70.9	73.0
Shahrisabz tumani	72.7	74.5	76.5	78.6	80.9
Yakkabog'	71.2	72.9	74.8	76.8	79.0

Izoh: Ko'rsatkichlar 0–100 ballik integral turmush darajasi indeksi sifatida shakllantirilgan.

Tahlil natijalari Qashqadaryo viloyati tumanlari o‘rtasida turmush darajasi sezilarli farqlanishini ko‘rsatdi. Shahar tumanlarida (masalan, Qarshi shahri) turmush darajasi nisbatan yuqori bo‘lsa, ayrim qishloq tumanlarida bu ko‘rsatkich pastroq ekanligi aniqlandi.

Korrelyatsion tahlil natijalariga ko‘ra:

[35] www.qashstat.uz – Qashqadaryo viloyati statistika boshqarmasining ma‘lumotlari asosida muallif tomonidan tuzilgan.

- daromadlar va turmush darajasi o‘rtasida kuchli ijobiy bog‘liqlik ($r \approx 0.85$);
- bandlik va turmush darajasi o‘rtasida o‘rtacha kuchli bog‘liqlik ($r \approx 0.72$);
- ishsizlik va turmush darajasi o‘rtasida salbiy bog‘liqlik ($r \approx -0.68$) mavjudligi aniqlandi.

Regressiya modeli natijalariga ko‘ra, daromadlarning 1% ga oshishi turmush darajasini o‘rtacha 0.58% ga oshiradi. Investitsiyalar va sanoat ishlab chiqarish hajmi ham ijobiy va statistik ahamiyatli ta’sir ko‘rsatdi.

Modelning determinatsiya koeffitsiyenti $R^2 = 0.89$ ni tashkil etdi, bu esa turmush darajasidagi o‘zgarishlarning 89% i modeldagi omillar bilan izohlanishini bildiradi. F-statistika modelning umumiy ahamiyatli ekanligini tasdiqladi ($p < 0.05$).

MUHOKAMA

Olingan natijalar hududiy iqtisodiyot nazariyasi va ilgari o‘tkazilgan tadqiqotlar bilan mos keladi. Turmush darajasi asosan iqtisodiy faoliyat darajasi, daromadlar va mehnat bozorining holatiga bog‘liq ekanligi tasdiqlandi.

Daromadlar oshishi aholi iste’mol imkoniyatlarini kengaytiradi va ijtimoiy xizmatlardan foydalanish darajasini yaxshilaydi. Bandlik darajasining yuqoriligi esa kambag‘allikni kamaytirish va iqtisodiy faollikni oshirishga xizmat qiladi.

Investitsiyalar iqtisodiy infratuzilmani rivojlantirib, yangi ish o‘rinlarini yaratadi, bu esa turmush darajasiga bilvosita ijobiy ta’sir ko‘rsatadi. Aksincha, ishsizlik va inflyatsiya turmush darajasini pasaytiruvchi asosiy omillar sifatida namoyon bo‘ladi.

Tumanlar kesimidagi farqlar esa infratuzilma rivojlanishi, sanoatlashtirish darajasi va xizmatlar sektorining rivojlanishiga bog‘liq ekanligi bilan izohlanadi.

XULOSA

Tadqiqot natijalari Qashqadaryo viloyati tumanlari kesimida turmush darajasiga eng kuchli ta’sir ko‘rsatuvchi omillar daromadlar, bandlik,

investitsiyalar va sanoat ishlab chiqarishi ekanligini ko‘rsatdi. Qurilgan ekonometrik model yuqori statistik ishonchlilikka ega bo‘lib, turmush darajasidagi o‘zgarishlarning asosiy qismini izohlash imkonini berdi.

Hududiy farqlarni kamaytirish uchun quyidagi chora-tadbirlar muhim:

- investitsiyalarni qishloq tumanlariga kengroq yo‘naltirish;
- yangi ish o‘rinlarini yaratish;
- kichik biznes va xizmatlar sohasini rivojlantirish;
- infratuzilmani modernizatsiya qilish;
- mehnat bozorini muvozanatli rivojlantirish.

Mazkur tadqiqot natijalari hududiy siyosatni takomillashtirish va ijtimoiy-iqtisodiy tengsizlikni kamaytirishda ilmiy asos bo‘lib xizmat qiladi.

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REGIONAL DIFFERENTIATION OF POPULATION INCOME IN UZBEKISTAN AND INTERNATIONAL EXPERIENCE IN POVERTY REDUCTION: LESSONS FROM CHINA, TURKEY AND MALAYSIA FOR THE "UZBEKISTAN – 2030" STRATEGY

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Abstract. *This paper examines the regional differentiation of population income across the 14 administrative-territorial units of Uzbekistan over 2010–2025 and situates the findings within the priority directions of the "Uzbekistan – 2030" Strategy. Using the coefficient of variation, the Theil(L) index, Fixed Effects panel regression and cluster analysis, the study shows that inter-regional differentiation rose sharply after 2018, driven mainly by a widening gap between Tashkent city and the rest of the country. The paper further reviews the poverty-reduction and regional-development experience of China, Turkey and Malaysia, and derives policy lessons — targeted investment programs, capital-effect monitoring, and regular statistical tracking of regional inequality — that can support Uzbekistan's balanced regional development goals.*

Keywords: *regional income differentiation, poverty reduction, coefficient of variation, Theil index, panel regression, "Uzbekistan – 2030" Strategy, China, Turkey, Malaysia.*

INTRODUCTION

On 11 September 2023, the President of the Republic of Uzbekistan signed Decree No. PF-158, approving the "Uzbekistan – 2030" Strategy, the country's key strategic document for the following seven years, which sets out 100 goals within five priority areas, including sustainable economic growth aimed at moving Uzbekistan into the group of upper-middle-income countries (President of the Republic of Uzbekistan, 2023). On 16 February 2026, Decree No. PF-21 updated the implementation mechanism of the Strategy for the period up to 2030

(President of the Republic of Uzbekistan, 2026). Rapid national economic growth, however, does not by itself guarantee a balanced distribution of income across regions; in many transition and emerging economies, accelerated growth has historically coincided with widening spatial disparities. This makes an in-depth statistical study of the regional differentiation of population income in Uzbekistan, together with a comparative review of successful international experience in reducing regional inequality and poverty, highly relevant for achieving the inclusive and balanced development objectives of the "Uzbekistan – 2030" Strategy.

MAIN PART

Data and methods. The empirical part of this paper draws on the author's PhD dissertation, "Statistical Analysis of Regional Differentiation of Population Incomes" M.Y.Muydinov, 2026). The study covers all 14 administrative-territorial units of Uzbekistan — the Republic of Karakalpakstan, 12 regions and Tashkent city — over the period 2010–2025, using panel data compiled from the official statistics portal of the State Statistics Committee of the Republic of Uzbekistan (2026). The degree of regional differentiation was measured through the coefficient of variation and the Theil(L) index, an information-entropy-based measure introduced by Theil (1967), which offers a fully additive decomposition property not available in the classical Gini coefficient (Gini, 1912). To identify the determinants of regional income, Pooled OLS, Fixed Effects and Random Effects panel regression models were estimated, with model choice confirmed by the Hausman specification test; regions were further grouped through k-means and Ward hierarchical clustering. The theoretical framework draws on Kuznets' (1955) classical theory of income inequality and development, Krugman's (1991) New Economic Geography, and Milanovic's (2016) work on global inequality dynamics, which jointly suggest that regional disparities may widen rather than automatically converge during periods of rapid structural change.

Results. The calculations show that the coefficient of variation of regional per-capita income rose from 32.6% in 2018 to 44.9% in 2025, while the Theil(L) index increased from 0.046 to 0.080 over the same period (M.Y.Muydinov, 2026). Notably, when Tashkent city is excluded from the calculation, the coefficient of variation remains stable within a 22–28% range throughout the entire period, indicating that the overall rise in differentiation is driven predominantly by the widening gap between the capital and the rest of the country, while relative disparities among the 13 remaining regions have stayed comparatively stable. The Fixed Effects panel model estimated an investment elasticity of regional income of 0.677 (R^2within = 0.934), and the Hausman test ($\chi^2 = 25.32$, $p < 0.0001$) confirmed that the Fixed Effects specification is statistically preferred over Random Effects. Both k-means and Ward clustering independently grouped Uzbekistan's regions into three types: a single-member "capital-anomaly" cluster (Tashkent city), an "industrial-investment" cluster (Navoi, Bukhara and Tashkent regions), and a broader "agro-industrial" cluster comprising the remaining ten regions.

International experience in regional inequality and poverty reduction. A comparative review of international practice suggests several transferable lessons for Uzbekistan. In China, the government launched the Targeted Poverty Alleviation (TPA) program in 2013–2014, combining industrial support, skills training, infrastructure investment and household registration measures directed at specific poor counties and households. By the end of 2020, China had eliminated absolute rural poverty under the prevailing national standard; difference-in-differences studies found the program raised rural per-capita disposable income by about 9.4% and reduced the county-level urban-rural income ratio by over 30% in targeted counties, with the strongest effects in the poorer western and central regions (Zhou et al., 2023). This shows that data-driven targeting of underdeveloped areas, combined with regular monitoring of

income ratios, can substantially narrow regional gaps within a relatively short period.

Turkey's Southeastern Anatolia Project (GAP), launched in the 1970s and later expanded into a multi-sectoral regional development program, was designed to eliminate development disparities between the country's least developed southeastern provinces and the rest of Turkey by raising incomes through irrigation infrastructure, energy generation, and integrated human development measures (GAP Regional Development Administration, 2026). Although full income convergence has not been achieved, the project shows that a long-term, infrastructure-anchored program sustained across several decades can measurably raise output and per-capita income in a lagging region — a case for committing to regional investment over a sufficiently long horizon rather than short-term interventions.

Malaysia's New Economic Policy (NEP), implemented between 1970 and 1990, is one of the most extensive affirmative-action-based regional and ethnic development programs in the world and offers a more cautionary lesson. While the NEP succeeded in reducing poverty nationally, its regional effects were uneven: the state of Sarawak experienced faster and earlier reductions in poverty and inequality, whereas the resource-rich states of Sabah and Terengganu saw much slower progress, with Sabah's poverty rate stagnating and, in some periods, even rising despite the state's natural-resource wealth (Asadullah et al., 2023). This experience illustrates that regional development outcomes depend not only on the design of national policy instruments but also on the consistency of local implementation, and that resource abundance alone does not guarantee regional convergence.

Discussion: implications for the "Uzbekistan – 2030" Strategy. The findings, read together with international experience, carry three implications for the "Uzbekistan – 2030" Strategy (President of the Republic of Uzbekistan, 2023). First, the high investment elasticity of regional income (0.677) mirrors

the central role of investment in China's TPA program and Turkey's GAP project; investment programs under the Strategy should therefore be directed disproportionately toward the "agro-industrial" cluster identified in this study — notably Karakalpakstan, Kashkadarya and Surkhandarya — rather than allocated on a uniform per-capita basis. Second, the persistence of the "capital effect" in Uzbekistan, paralleling the East-West divide documented in Malaysia, shows that improving national aggregate indicators does not automatically narrow the gap between the capital and the rest of the country; the Strategy's monitoring system should track regional inequality separately from national averages, following China's practice of transparent county-level monitoring. Third, the coefficient of variation, the Theil index, panel regression and cluster analysis used here can serve as a replicable, low-cost tool for the State Statistics Committee to evaluate progress toward the Strategy's balanced regional development goals annually.

CONCLUSION

Regional differentiation of population income in Uzbekistan has increased markedly since 2018, concentrated almost entirely in the growing gap between Tashkent city and the rest of the country, while disparities among the remaining regions have stayed comparatively stable. International experience from China, Turkey and Malaysia confirms that regional inequality can be meaningfully reduced through sustained, targeted investment and consistent implementation, but also that resource wealth or aggregate growth alone are insufficient without deliberate regional targeting. It is recommended that: (1) investment programs under the "Uzbekistan – 2030" Strategy prioritize the agro-industrial cluster identified in this study; (2) specific mechanisms narrow the investment gap between Tashkent city and the other regions; (3) the successful industrial-investment model of Navoi and Bukhara be adapted to comparable regions; and (4) the State Statistics Committee institutionalize annual regional Gini and Theil

calculations within the Strategy's monitoring framework. These measures would support Uzbekistan's progress toward balanced regional development and the welfare objectives of the "Uzbekistan – 2030" Strategy.

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“YASHIL IQTISODIYOT”GA O‘TISH SHAROITIDA O‘ZBEKISTON SANOAT KLASTERLARINING TRANSFORMATSIYASI: IQTISODIY SAMARADORLIK VA EKOLOGIK BARQARORLIK INTERFEYSI

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Annotatsiya*: So‘nggi yillarda O‘zbekistonda “yashil iqtisodiyot”ga o‘tish strategiyasi milliy iqtisodiy siyosatning ustuvor yo‘nalishiga aylandi. Ushbu ilmiy maqolada O‘zbekiston sanoat klasterlarining “yashil iqtisodiyot” tamoyillariga o‘tish jarayonidagi transformatsion imkoniyatlari va iqtisodiy samaradorligi tahlil qilinadi. Tadqiqotda an’anaviy klaster modelidan “yashil klaster” modeliga o‘tishning nazariy-metodologik asoslari ishlab chiqilgan. Tadqiqot natijalari shuni ko‘rsatadiki, “yashil klaster”larga o‘tish resurslardan foydalanish samaradorligini 20-35% ga oshirish, chiqindilar hajmini 40-50% ga kamaytirish imkonini beradi. Maqolada “yashil klaster”larning huquqiy maqomini belgilash, ularni soliq va moliyaviy rag‘batlantirish tizimini takomillashtirish bo‘yicha aniq takliflar ishlab chiqilgan.*

Kalit so‘zlar: *yashil iqtisodiyot, sanoat klasterlari, transformatsiya, energiya samaradorligi, aylanma iqtisodiyot, O‘zbekiston, industrial simbioz.*

Abstract*: In recent years, the strategy of transitioning to a “green economy” has become a priority direction of national economic policy in Uzbekistan. This scientific article analyzes the transformational opportunities and economic efficiency of the transition of Uzbekistan’s industrial clusters to green economy principles. The study develops the theoretical and methodological foundations of the transition from the traditional cluster model to the “green cluster” model. The research results show that transitioning to “green clusters” increases resource efficiency by 20-35% and reduces waste volumes by 40-50%. The article develops specific proposals for defining the legal status of “green clusters” and improving the system of tax and financial incentives.*

Keywords: *green economy, industrial clusters, transformation, energy efficiency, circular economy, Uzbekistan, industrial symbiosis.*

KIRISH

Global iqlim o‘zgarishi, resurslarning cheklanganligi va ekologik muammolarning keskinlashuvi iqtisodiyotni “yashil” tamoyillar asosida qayta qurishni ob’ektiv zaruratga aylantirmoqda. O‘zbekiston uchun bu masala nafaqat ekologik, balki to‘g‘ridan-to‘g‘ri iqtisodiy xavfsizlik va raqobatbardoshlik bilan bog‘liq. 2019-2030 yillarga mo‘ljallangan “Yashil iqtisodiyot”ga o‘tish strategiyasida energiya intensivligini 20% ga kamaytirish va issiqxona gazlari chiqindilarini YaIM birligiga nisbatan 35% ga qisqartirish vazifalari belgilangan [1]. Mamlakat elektr energiyasi ishlab chiqarish hajmi 2025 yilda 86,7 milliard kVt/soatga yetdi, shundan 16,8 milliard kVt/soatni qayta tiklanuvchi energiya manbalari tashkil etdi [2]. Biroq, iqtisodiyotning energiya intensivligi hali ham yuqoriligicha qolmoqda — бу muammoni hal qilishning eng samarali mexanizmlaridan biri bu sanoat klasterlarini “yashil” tamoyillar asosida qayta qurishdir.

Sanoat klasterlari iqtisodiyotning tarmoqlararo va hududlararo integratsiyasining asosiy shakli sifatida resurslar, energiya va chiqindilar oqimlarini boshqarishning optimal platformasini yaratadi. “Yashil klaster” konsepsiyasi esa an’anaviy klaster modelidan farqli ravishda nafaqat iqtisodiy, balki ekologiyaviy va ijtimoiy samaradorlikni ham o‘zining asosiy maqsadlariga kiritadi.

Adabiyotlar sharhi

“Yashil iqtisodiyot” tushunchasining zamonaviy ilmiy adabiyotlarda 40 dan ortiq ta’rifi mavjud. BMT tomonidan qabul qilingan eng keng qamrovli ta’rifga ko‘ra, “yashil iqtisodiyot — bu insonlarning farovonligi va ijtimoiy adolatni oshirish, shu bilan birga atrof-muhitga xavf-xatarlarni va ekologik taqchillikni sezilarli darajada kamaytiradigan iqtisodiyotdir” [3]. Allamurodova (2024) O‘zbekiston iqtisodiyotini ekologik barqaror rivojlantirishda yashil texnologiyalarning rolini o‘rgangan va ularni joriy etish iqtisodiy samaradorlikni 15-20% ga oshirishini aniqlagan [4]. Komilova (2024) esa yashil iqtisodiyotni

shakllantirish va rivojlantirishning xorij tajribasini tahlil qilib, uni O‘zbekiston sharoitiga moslashtirish yo‘llarini taklif qilgan [5].

Sanoat klasteri tushunchasi M.Porter tomonidan ilmiy muomalaga kiritilgan bo‘lib, u geografik jihatdan yaqin joylashgan, o‘zaro bog‘liq kompaniyalar, ixtisoslashtirilgan yetkazib beruvchilar, xizmat ko‘rsatuvchi tashkilotlar va tegishli infratuzilmaga ega bo‘lgan muassasalar majmui sifatida ta’riflanadi [6]. “Industrial simbioz” konsepsiyasini Chertow (2000) va Ehrenfeld & Gertler (1997) kabi olimlar rivojlantirgan bo‘lib, bu an’anaviy jihatdan bir-biriga bog‘liq bo‘lmagan tarmoqlarni birgalikda raqobatdosh ustunlikka erishish uchun material va energiya almashinuviga jalb qilishni anglatadi [7, 8].

O‘zbekiston olimlaridan Shirinboyeva (2025) O‘zbekistonning yashil iqtisodiyot sari yo‘nalishlarini tahlil qilgan [9]. Sodikov (2026) esa yashil barqaror iqtisodiyotning rivojlanish xususiyatlarini o‘rganib, ularning milliy iqtisodiyotga ta’sirini baholagan [10]. Biroq, mavjud tadqiqotlarda sanoat klasterlarining “yashil” transformatsiyasiga alohida e’tibor qaratilmagan, bu esa ushbu tadqiqotning dolzarbligini belgilaydi.

Tadqiqot usuli

Ushbu tadqiqotda tizimli tahlil, iqtisodiy-matematik modellashtirish, qiyosiy va statistik tahlil usullari qo‘llanilgan. Xalqaro tajribani o‘rganishda Germaniya, Janubiy Koreya va Singapurning “yashil klaster” modellari tahlil qilindi. O‘zbekiston sanoatining energiya va resurs samaradorligi ko‘rsatkichlari O‘zbekiston Statistika qo‘mitasi, Energetika vazirligi, Jahon banki va BMTTDning 2023-2025 yillardagi rasmiy ma’lumotlari asosida baholandi.

Tadqiqotda “yashil klaster” transformatsiyasi samaradorligini baholash uchun integrallashgan indeks ishlab chiqildi. Ushbu indeks 3 guruh ko‘rsatkichlardan tashkil topgan: iqtisodiy samaradorlik (vazn koeffitsienti 0,5), ekologik samaradorlik (vazn koeffitsienti 0,3), ijtimoiy samaradorlik (vazn koeffitsienti 0,2).

NATIJALAR VA MUHOKAMA

1. Mavjud klasterlarning “yashillik” darajasi va energiya samaradorligi

O‘zbekistonda bugungi kunda 30 dan ortiq sanoat klasterlari faoliyat ko‘rsatmoqda. Ularning asosiy qismi to‘qimachilik, qurilish materiallari, kimyo va metallurgiya sohalariga ixtisoslashgan. Tadqiqot shuni ko‘rsatdiki, mavjud klasterlarning aksariyatida energiya samaradorligi pastligicha qolmoqda. 2025 yilda jami 42 ta yangi generatsiya loyihasi (4647 MVt quvvat bilan) ishga tushirilgan. Quyosh va shamol elektr stansiyalaridan ishlab chiqarish 10,5 mlrd kVt/soatni tashkil etdi. Bu orqali 3,2 mlrd kub metr gaz tejalgan va 4,7 mln tonna zararli chiqindilar atmosferaga tashlanishining oldi olingan [2].

Jadval 1

An’anaviy va “yashil” sanoat klasterlarining qiyosiy tavsifi

Ko‘rsatkichlar	An’anaviy klaster	“Yashil” klaster
Asosiy maqsad	Foyda maksimizatsiyasi	Foyda + ekologik + ijtimoiy samara
Resurslardan foydalanish modeli	Chiziqli (ol-ishlat-tashla)	Aylanma (ol-ishlat-qayta ishla)
Energiya manbalari	An’anaviy (asosan gaz, ko‘mir)	Diversifikatsiyalangan (QTEM ulushi >30%)
Chiqindilarni boshqarish	Tashqi poligonlarga chiqarish	Klaster ichida qayta ishlash (Industrial simbioz)
Innovatsion yo‘nalish	Mahsulot va texnologiya	Mahsulot+texnologiya+ekologiya
Raqobatbardoshlik omili	Narx, sifat, yetkazib berish tezligi	Narx, sifat + “yashil” brend, karbonat izi

Jadval 2

O‘zbekistonning asosiy sanoat tarmoqlarida “yashil” transformatsiya potensiali

Tarmoq	Energiya iste'moli ulushi (%)	Qayta tiklanuvchi energiya potensiali	Industrial simbioz potensiali	Transformatsiyaning taxminiy iqtisodiy samarasi (%)
Neft-gaz va kimyo	35	O‘rta	Yuqori	20-25
Metallurgiya	25	Past	Yuqori	25-30
To‘qimachilik	15	Yuqori	O‘rta	18-22
Qurilish materiallari	12	Yuqori	Yuqori	30-35

2. Transformatsiyaning iqtisodiy samaradorligi

Hisob-kitoblarga ko‘ra, “yashil” texnologiyalarni joriy etish orqali energiya samaradorligini oshirishning o‘rtacha iqtisodiy samarasi 18-25% ni tashkil etishi mumkin. Eng tez qoplanadigan chora — reaktiv kondensatorlarni o‘rnatish (1-2 yil). Qayta tiklanuvchi energiya manbalaridan foydalanuvchi klasterlar misolida (masalan, Navoiy erkin iqtisodiy zonasi) transformatsiyaning o‘zini oqlash muddati 4-6 yil ekanligi aniqlandi.

Jadval 3

Transformatsiyaning iqtisodiy samaradorligi

Transformatsiya choralari	Taxminiy xarajatlar	Kutilayotgan iqtisodiy samara	O‘zini oqlash muddati
Energiya audit va monitoring tizimi (IoT)	$50-100 ming	8-12% energiya tejamkorligi	1-2 yil
Kichik QES (1-5 MVt)	$0,8-1,2 mln	$200-300 ming/yil	4-5 yil
Chiqindilarni qayta ishlash liniyasi	$0,5-2 mln	Qayta ishlangan materiallarni sotish	3-5 yil
Issiqlik nasoslari va chiqindi issiqlikdan foydalanish	$200-500 ming	20-30% issiqlik energiyasi tejamkorligi	3-4 yil

XULOSA

Ushbu tadqiqotda O‘zbekiston sanoat klasterlarining “yashil iqtisodiyot” tamoyillari asosida transformatsiyasining nazariy va amaliy jihatlari tahlil qilindi. Asosiy ilmiy natijalar quyidagilardan iborat:

1. “Yashil klaster” tushunchasining ilmiy asoslangan ta’rifi va an’anaviy klasterdan farqlovchi mezonlari ishlab chiqildi.

2. O‘zbekistondagi asosiy sanoat tarmoqlarida energiya samaradorligini oshirish va chiqindilarni kamaytirish potensiali 18-35% oralig‘ida ekanligi aniqlandi.

3. Transformatsiya choralarining o‘zini oqlash muddati 1 yildan 5 yilgacha ekanligi asoslandi.

4. “Yashil klaster”larni qonunchilikka kiritish, soliq va moliyaviy imtiyozlar berish, “Industrial simbioz” tizimini joriy etish bo‘yicha aniq takliflar ishlab chiqildi.

Tadqiqotning amaliy ahamiyati shundan iboratki, ishlab chiqilgan takliflar O‘zbekiston Respublikasining tegishli vazirliklari tomonidan normativ-huquqiy hujjatlar va davlat dasturlarini ishlab chiqishda bevosita foydalanishi mumkin.

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ГЕОЛОГИЯ-ҚИДИРУВ ИШЛАРИДА ХАРАЖАТЛАР ҲИСОБИ

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Аннотация: *Мақолада геология-қидирув ишларида харажатлар ҳисобининг ўзига хос хусусиятлари, уларда харажатларни туркумлаш тарктиби ҳамда бухгалтерияда ҳисобга олиш тартиби баёни келтириб ўтилган. Геология соҳасида харажатларни такомиллаштириш юзасидан илмий таклиф ва амалий тавсиялар шакллантирилган.*

Калит сўзлар: *Геология-қидирув, харажатлар, махсулот таннархи, калькуляция, бевосита харажатлар, ўзгамас харажатлар, ўзгарувчан харажатлар,*

Аннотация: *В статье описаны особенности калькуляции затрат в геологической разведке, структура классификации затрат в ней и порядок учета. Сформулированы научные предложения и практические рекомендации по повышению эффективности калькуляции затрат в геологической сфере.*

Ключевые слова: *Геологическая разведка, затраты, себестоимость продукции, расчет, прямые затраты, постоянные затраты, переменные затраты.*

Abstract: *The article describes the specific features of cost accounting in geological exploration, the structure of cost classification in them and the procedure for accounting. Scientific proposals and practical recommendations are formulated to improve costs in the field of geology.*

Keywords: *Geological exploration, costs, product cost, calculation, direct costs, fixed costs, variable costs.*

КИРИШ

Ўзбекистонда минерал-хом ашё базасини кенгайтириш ва геология соҳасига инвестицияларни жалб қилиш давлат сиёсатининг устувор йўналишларидан биридир. Геология-қидирув ишлари *(ГҚИ)* юқори даражадаги ноаниқлик ва молиявий таваккалчилик билан тавсифланиши сабабли, харажатларни тўғри туркумлаш ва капиталлаштириш масаласи долзарб бўлиб қолмоқда. Мавжуд миллий ҳисоб тизимини халқаро стандартларга *(МҲХС 6 – "Фойдали қазилмаларни қидириш ва баҳолаш")* мувофиқлаштириш зарурияти ушбу илмий ишнинг асосий пойдевори ҳисобланади.

Геология-қидирув ишлари (ГҚИ) бошқа саноат тармоқларидан ўзининг юқори таваккалчилиги, натижасининг ноаниқлиги ва капитал сиғимдорлиги билан ажралиб туради. Ушбу хусусиятлар бухгалтерия ҳисобини юритишда махсус ёндашувларни талаб қилади. Геология-қидирув ишларининг ўзига хос хусусиятлари, натижанинг ноаниқлиги, сарфланган маблағлар ҳар доим ҳам фойдали қазилма конларининг очилишига олиб келмайди. Бу ҳисобда харажатларни актив ёки давр харажати сифатида тан олишда мураккаблик туғдиради. Мавсумийлик, айрим ҳудудларда ишлар фақат йилнинг маълум вақтида олиб борилади, бу эса ишчилар иш ҳақи ва техника амортизациясини тақсимлашда ўзига хос тартибни талаб қилади. Шу нуқтаи назардан қаралганда геология сохасида харажатлар ҳисобини ташкил этиш ва уни такомиллаштириш долзарб масалалардан ҳисобланади.

АДАБИЁТЛАР ШАРҲИ

Олиб борилган тадқиқотлар асосида харажатлар тушунчасига, жумладан геология сохасида харажатларни ҳисобга олишнинг ўзига хос хусусиятларидан келиб чиқиб улар ҳақида қуйида тўхталиб ўтилди. Бухгалтерия ҳисоби миллий стандартида эса харажатларга қуйидаги таъриф берилган: “Ҳаққоний тақдим этиш операция, ҳодиса ва шароитларнинг оқибатларини Молиявий ҳисоботни тайёрлаш ва тақдим

этиш учун концептуал асосда келтирилган активлар, мажбуриятлар, даромадлар ва харажатларнинг таърифлари ва тан олиш мезонларига мувофиқ тўғри акс эттиришни талаб этади”[1].

Бундан ташқари, харажатларнинг турли жиҳатлари қуйидаги стандартлар билан тартибга солинади, жумладан: 1-сон БҲМС (“Ҳисоб сиёсати ва молиявий ҳисобот”) Харажатларни тан олиш ва ёритиб беришнинг умумий тамойилларини белгилайди, 21-сон БҲМС (Ҳисобварақлар режаси) Харажатларни бухгалтерия проводкаларида қандай акс эттиришни белгилайди (масалан, 9400-“Давр харажатлари” ёки 9100-“Сотилган маҳсулотлар таннархи”) ҳамда 24-сон БҲМС (“Қарзлар бўйича харажатлар ҳисоби”) Фоизлар ва кредитлар билан боғлиқ харажатларни капитализация қилиш ёки харажатга чиқариш тартибини тушунтиради.

Россияда харажатнинг фундаментал таърифи ПБУ 10/99 да берилган бўлиб, у Ўзбекистон стандарти билан деярли бир хил. ФСБУ 14/2022 эса фақатгина номоддий активларга оид харажатларни қачон актив деб ҳисоблаш ва қачон фойда/зарар тўғрисидаги ҳисоботга харажат сифатида ёзишни тартибга солади [2].

Қозоғистонда эса, Миллий молиявий ҳисобот стандартига (ММҲС/НСФО) мувофиқ, харажатларга қуйидагича таъриф берилган: “Харажатлар - бу ҳисобот даврида активларнинг чиқиб кетиши ёки камайиши ёхуд мажбуриятларнинг пайдо бўлиши шаклида иқтисодий нафларнинг камайиши бўлиб, бу муассислар (иштирокчилар) ўртасида капитални тақсимлаш билан боғлиқ бўлмаган ҳолда хусусий капиталнинг камайишига олиб келади” [3].

Ўзбекистон Республикаси қонунчилигида, хусусан, бухгалтерия ҳисоби ва солиқ соҳасида харажатлар тушунчасига икки хил ёндашув мавжуд:

1. Бухгалтерия ҳисобининг миллий стандартларига (БҲМС) мувофиқ харажатлар - бу ҳисобот даврида активларнинг чиқиб кетиши ёки камайиши ёхуд мажбуриятларнинг кўпайиши шаклида иқтисодий нафларнинг камайишидир. Бунда Харажатлар корхона капиталини камайтиради ва Муассислар (акциядорлар) ўртасида капитални тақсимлаш (масалан, дивидендлар тўлаш) билан боғлиқ бўлган ҳолатлар харажат деб ҳисобланмайди.

2. Солиқ кодексига асосан фойда солиғини ҳисоблашда харажатлар чегириладиган ва чегирилмайдиган турларга бўлинади [4].

Иқтисодчи олимлар томонидан ҳам харажатларга турлича ёндошилган, жумладан А.Каримов харажатларни икки турга бўлади: бевосита ва билвосита харажатлар, шунингдек, харажатларни шартли ўзгармас сифатида хам алоҳида аҳамиятга эга эканлигини билдириб ўтади[5]. Л.П.Краснова эса: “Харажатлар - бу ҳисобот даврида активларнинг чиқиб кетиши (пул маблағлари, бошқа мол-мулклар) ёки мажбуриятларнинг пайдо бўлиши натижасида иқтисодий нафнинг камайиши бўлиб, бу корхона капиталининг камайишига олиб келади” [6]. деб таъриф берган. Ушбу таърифда асосан, харажатларни ишлаб чиқариш харажатлари (маҳсулот таннархини шакллантирувчи) ва давр харажатлари (сотиш ва бошқариш билан боғлиқ) каби турларга ажратиб кўрсатади. Бу ёндашув халқаро стандартлар ва миллий бухгалтерия ҳисоби тизимидаги таърифларга мос келади.

Харажатларни ҳисобга олиш, уларни таҳлил қилиш ҳамда аудити услубиёти бўйича республикамизда кўплаб илмий тадқиқотлар ва изланишлар олиб борилган. Уларни айримларида харажатлар интеллектуал капитал сифатида ёнлошилган бўлса, айрим иқтисодчи олимлар эса соҳа ва тармоқлар кесимида тадқиқ этишган.

М.Қ.Пардаев: “Маҳсулот (иш, хизмат) таннархини шакллантирувчи харажатлар моддалари, уларнинг ишлаб чиқариш ҳажмига боғлиқлиги ва

самарадорлигини баҳолаш усуллари ёритилган” [7]. А.Ибрагимовнинг фикрича, аудит - бу нафақат хатоларни излаш, балки хўжалик фаолияти ҳақида ишончли ахборот бериш ва ресурслардан фойдаланиш самарадорлигини тасдиқлаш жараёнидир.

Н.Каримовнинг илмий изланишларида (айниқса, банклар ва йирик корхоналар мисолида) ички аудитнинг хавф-хатарларни бошқаришдаги роли ёритилган. У ички аудитни корхона ичидаги нобудгарчиликларнинг олдини олиш ва ички назоратни мустаҳкамлашнинг асосий воситаси сифатида тавсифлайди [8].

А.И.Аликулов “Харажатлар ҳисоби ва таҳлилининг назарий ва амалий масалалари” номли монографиясида харажатларни иқтисодий мазмуни, ишлаб чиқаришдаги роли ва ҳисоблаш усулига кўра тизимли гуруҳлашни таклиф этади. Бунда харажатларни бевосита (тўғридан-тўғри) ва билвоситага ажратиш, шунингдек, уларни маҳсулот таннархига киритишнинг методологик асосларини кўрсатиб беради ва харажатларни оптималлаштириш ва таннархни пасайтириш орқали корхона фойдасини оширишнинг илмий асосланган йўлларини кўрсатишга қаратилган [9].

Олиб борилган тадқиқотлар натижасида геология соҳасидаги харажатларга қуйидаги таъриф берилди: *“Геология-қидирув ишларида (ГҚИ) харажатлар -бу ер қаърини ўрганиш, фойдали қазилма конларини излаш, топиш ва уларнинг заҳираларини саноат миқёсида тасдиқлаш учун сарфланадиган барча моддий, молиявий ва меҳнат ресурсларининг қиймат ифодасидир”*.

МЕТОДОЛОГИЯ

Мазкур мақолани ёзишда умумиқтисодий ва мантиқий усуллар: тизимли таҳлил, индукция ва дедукция, қиёсий таҳлил, бухгалтерия ҳисоби ва молиявий таҳлил усуллари: капиталлаштириш, «Муваффақиятли ҳаракатлар» (Successful Efforts), қийматсизланиш тести (Impairment test), аудит ва назоратнинг махсус усуллари: рискка асосланган аудит, танланма

кузатув, рақамли ва технологик усуллар: ГИС-мониторинг (Геоахборот тизимлари) усуллардан фойдаланилган.

ТАҲЛИЛ ВА НАТИЖАЛАР

Бухгалтерия ҳисобида харажатлар деганда истеъмол қилинган ресурслар ёки товарлар ва хизматлар учун тўлаш лозим бўлган пул тушунилади. Бошқариш учун менежерларга шунчаки харажатлар эмас, балки бирор нарсага (маҳсулотга, унинг туркумига, хизматга) чиқимлар тўғрисидаги, яъни «харажатлар ҳисоби объектига» чиқимлар тўғрисидаги ахборот зарур.

Харажатлар – маълум мақсадларда фойдаланилган ресурслар ҳажмининг пулдаги ифодаси бўлиб, унинг мақсади - харажатлари алоҳида ўлчанадиган ҳар қандай фаолиятдир. Маҳсулот, цех, савдо ҳудуди ёки аниқлаш мумкин бўлган ҳар қандай фаолият бунга мисол бўла олади.

Маҳсулотга тегишли харажатлар ва давр харажатлари

Маҳсулотга тегишли харажатлар тайёр маҳсулот ишлаб чиқариш билан боғлиқ. Бу харажатлар заҳиралар қийматига киритилади. Маҳсулотга ишлаб чиқариш таннархини ҳосил қилувчи харажатлар уларнинг иқтисодий мазмунига кўра қуйидаги элементлар билан гуруҳларга ажратилади:

ишлаб чиқариш моддий харажатлар (қайтариладиган чиқитлар қиймати чиқариб ташланган ҳолда);

ишлаб чиқариш хусусиятига эга бўлган меҳнатга ҳақ тўлаш харажатлари;

ишлаб чиқаришга тегишли бўлган ижтимоий суғуртага ажратмалар;

асосий фондлар ва ишлаб чиқариш аҳамиятига эга бўлган номоддий активлар амортизацияси;

ишлаб чиқариш аҳамиятига эга бўлган бошқа харажатлар..

Маҳсулотни сотиш билан боғлиқ харажатлар – корхонанинг маҳсулотни сотиш, уни бозорга олиб бориш харажатларидир.

Маъмурий харажатлар – корхонанинг умумий фаолияти билан боғлиқ (масалан, маъмурий ходимларнинг иш ҳақи, маъмурий бино ва офис анжомлари амортизацияси ва шу каби харажатлардир).

Қарор қабул қилиш учун харажатларни туркумлаш

а) Умумий ва ўртача харажатлар

Умумий харажатлар – бу маҳсулот ёки корхона бўйича харажатлар тўғрисидаги ахборот.

Ўртача харажатлар – бу маҳсулот бирлигига кетган харажатлар.

б) Харажатларнинг ўзгариши

Харажатларнинг ўзгариши деганда фаолият даражаси ўзгарганда харажатларнинг қандай ўзгариши тушунилади.

Доимий харажатлар миқдори фаоллик даражаси ўзгарган пайтда ҳам ўзгармай қолаверади, улар нисбатан доимийдир, лекин ишлаб чиқариш даражаси ўзгарганда маҳсулот бирлигига ҳисобланган доимий харажат ҳам ўзгаради: амортизация, ижара харажатлари ва активлар суғуртаси, маъмурий харажатлар бунга мисол бўла олади.

Ўзгарувчан харажатлар ишлаб чиқариш ҳажмига боғлиқ. Ўзгарувчан харажатлар миқдори ишлаб чиқариш ҳажмининг (иш биларманлик фаоллик даражасининг) ўзгаришига мутаносиб ўзгаради ва маҳсулот бирлигига ҳисоблаганда доимий миқдор бўлади. Хом ашё, асосий ишчиларнинг меҳнати, комиссион харажатлар бунга мисол бўла олади.

в) Муқобил харажатлар

Муқобил харажатлар – бу фойдаланилмаган имкониятларга қилинган сарф харажатлардир. Улар бир ҳаракатни танлаш бошқа ҳаракатнинг вужудга келишини истисно қиладиган пайтдаги бой берилган фойдани билдиради.

г) Қайтмайдиган харажатлар

қайтмайдиган харажатлар – бу муқаддам қилинган харажатлардир. Демак улар келгусидаги харажатларга таъсир қилмайди ва ҳозирги ёки кейинги ҳеч қандай ҳаракат уни ўзгартирмайди. Бунга мисол қилиб ускуналар (дастлаб сотиб олинган)нинг бошланғич қиймати ва моддий заҳираларни ҳосил қилишга сарфланган харажатлар киради. Сотиб олинган заҳиралар ва ускуналардан ҳозир фойдаланилмаётган бўлса ҳам уларни харид қилишга харажатларни келгусидаги ҳеч қандай ҳаракат ўзгартира олмайди. Шу сабабли бу харажатлар келгусида қарор қабул қилиш чоғида ҳисобга олинмайди.

д) Релевант ва норелевант харажатлар ва тушумлар

Релевант харажатлар ва даромадлар келгусида кутилаётган ва хозирги ва келгусидаги ҳар қандай ҳаракат ўзгартира олмайдиган харажатлар ва тушумлар (ёки келгуси даврдаги харажатлар ва тушумлар, ёки аҳамиятли харажатлар ва тушумлар) бу қарор қабул қилиниши натижасида ўзгарадиган харажатлар ва тушумлардир. қабул қилинаётган қарор таъсир қилмайдиган харажатлар ва тушумлар норелевант яъни унга тегишли бўлмаган (аҳамиятсиз) харажатлар ва тушумлардир.

Ишлаб чиқариш устама харажатлари (ИУХ) - бу ишлаб чиқариш билан боғлиқ бўлган, лекин одатда тайёр маҳсулотнинг аниқ бир турига бевосита тегишли деб бўлмайдиган хилма-хил сарфларнинг йиғиндисидир.

1) ИУХ тақсимлаш базаси

Устама харажатларни тақсимлаш компанияда ишлаб чиқарилган барча маҳсулотларга ёки компания ўз мижозларига кўрсатадиган хизматлар учун умумий базани танлаш орқали амалга оширилади.

Тақсимлаш базаси сифатида ишлаб чиқариш бўлинмаларининг устама харажатларига тўлароқ мос келадиган омил танланиши лозим. Базага кўпинча қуйидагилар олинади:

- Ишлаб чиқаришда ишлаган ишчиларни иш вақти
- Ускуналарни ишлаган вақти

- Меҳнат сарфлари
- Ишлаб чиқарилган маҳсулот бирлиги

$$\textit{ИУХни тақсимлаш ставкаси} = \frac{\textit{Устама сарфлар}}{\textit{Базанинг қиймати}}$$

ГҚИ харажатлари ўзининг иқтисодий табиатига кўра оддий ишлаб чиқариш харажатларидан тубдан фарқ қилади ва қуйидаги асосий жиҳатларни қамраб олади:

Харажатларнинг таркибий қисмлари ГҚИ жараёнида харажатлар босқичма-босқич шаклланади. Жумладан,

Ҳуқуқий ва тайёргарлик харажатлари ер қаъридан фойдаланиш ҳуқуқини олиш (аукцион тўловлари, бонуслар), лицензиялаш ва лойиҳа-смета ҳужжатларини тайёрлаш харажатлари.

Дала ишлари харажатлари геологик хариталаш, геофизик ва геокимёвий тадқиқотлар, бурғилаш ишлари ҳамда кон лаҳимларини очиш билан боғлиқ сарф-харажатлар.

Лаборатория ва камерал харажатлар олинган намуналарни таҳлил қилиш, минералогик текширувлар ва якуний геологик ҳисоботларни тузиш харажатлари.

Экологик ва қайта тиклаш харажатлари ишлар якунлангач, ер майдонларини рекультивация қилиш ва атроф-муҳитга етказилган зарарни қоплаш учун заҳираланган маблағлар.

Харажатларни ҳисобга олишнинг ўзига хос моделлари халқаро амалиётда (жумладан, IFRS 6 стандартида) ГҚИ харажатларини тан олишнинг иккита асосий ёндашуви мавжуд.

Муваффақиятли ҳаракатлар методи (Successful Efforts) фақат кон топилган ва иқтисодий фойда келтириши аниқ бўлган участка харажатлари актив (капитал) сифатида тан олинади. Натижа бермаган қидирув харажатлари эса ўша даврнинг зарарига олиб борилади.

Тўлиқ харажатлар методи (Full Cost) маълум бир ҳудуддаги барча харажатлар (натижасидан қатъи назар) капиталлаштирилади ва келгусида қазиб олинган маҳсулот таннархига қўшилади.

Инвестициявий тавсиф ГҚИ харажатлари шунчаки "сарф" эмас, балки инвестиция ҳисобланади. Чунки бу харажатлар эвазига корхонанинг асосий активи -фойдали қазилма заҳиралари шаклланади. Ўзбекистоннинг янги солиқ ва кон қонунчилигига кўра, ГҚИга йўналтирилган маблағлар келгусида солиқ солинадиган базадан чегирилиши ёки амортизация қилиниши мумкин бўлган номулкий актив сифатида кўрилади.

Риск ва ноаниқлик омили ГҚИ харажатларининг энг катта хусусияти -бу тижорат таваккалчилигидир. Сарфланган маблағнинг “қайтмаслик” эҳтимоли юқорилиги сабабли, ушбу харажатларни бошқаришда эҳтиёткорлик (prudence) тамойили муҳим ўрин тутади. ГҚИда харажатлар -бу келажакдаги даромад манбаи бўлган "геологик ахборот" ва “тасдиқланган заҳира”ни сотиб олиш учун тўланган баҳодир.

Геология-қидирув ишлари (ГҚИ) харажатларини туркумлаш уларни тўғри ҳисобга олиш, солиққа тортиш ва иқтисодий самарадорлигини баҳолаш учун муҳимдир. Ўзбекистон Республикасининг янги таҳрирдаги “Ер қаъри тўғрисида”ги Қонуни ва халқаро стандартлар (IFRS 6) асосида харажатлар қуйидаги асосий гуруҳларга бўлинади. Жумладан,

1.Ҳисобга олиш усулига кўра (МҲХС ва БҲМС бўйича) бу энг муҳим туркумлаш бўлиб, харажатнинг актив ёки зарар сифатида тан олинишини белгилайди.

Капиталлаштириладиган харажатлар (Активлар) кон топиш эҳтимоли юқори бўлган босқичдаги харажатлар. Улар балансда “Номоддий активлар” ёки “Тугалланмаган қурилиш” сифатида акс этади.

Давр харажатлари (Зарарлар) Ер қаъридан фойдаланиш ҳуқуқи олингунга қадар қилинган харажатлар ёки натижасиз (қуруқ) қудуқлар билан боғлиқ сарфлар.

1-жадвал

Геология-қилирув ишлари харажатларини ҳисобга олишда миллий (БҲМС) ва халқаро (МҲХС (IFRS 6)) стандартларнинг ўзаро боғлиқ ва фарқли жиҳатлари[36]

Қиёсий мезонлар	БҲМС (Бухгалтерия ҳисобининг миллий стандартлари)	МҲХС (IFRS 6 "Минерал ресурсларни қидириш ва баҳолаш")
Харажатларни тан олиш вақти	Харажатлар амалга оширилган даврда харажат сифатида тан олинади ёки лойиҳа сметаси доирасида капиталлаштирилади.	Фақат ер қаъридан фойдаланиш бўйича ҳуқуқий рухсатнома олингандан кейинги харажатлар капиталлаштирилади.
Капиталлаштириш усули	Асосан “Тўлиқ харажатлар” (Full Cost) методига яқин. Барча сарфлар актив сифатида йиғилади.	Иккита танлов мавжуд: Full Cost ёки Successful Efforts (Муваффақиятли ҳаракатлар) методи.
Актив турини белгилаш	Харажатлар “Тугалланмаган қурилиш” ёки “Номоддий актив” сифатида акс этади.	Активлар табиатига кўра Моддий (қудуқ, ускуна) ёки Номоддий (лицензия, харита) активларга ажратилади.
Қадрсизланиш (Impairment) тести	Активларнинг қадрсизланиши камдан-кам ҳолларда ва фақат йил якунида текширилади.	Қидирув натижа бермаслиги аниқ бўлган заҳоти актив қадрсизланишга текширилиши ва зарарга чиқарилиши шарт.
Қайта тиклаш мажбурияти	Рекультивация харажатлари одатда иш якунлангач ҳақиқий сарф сифатида тан олинади.	Келажакдаги рекультивация харажатлари учун заҳира (provision) шакллантирилади ва актив таннархига қўшилади.

Successful Efforts (Муваффақиятли ҳаракатлар) методининг афзаллиги Халқаро амалиётда (МҲХС) ушбу метод кўпроқ қўлланилади. Унга кўра, агар қидирув натижасиз бўлса, харажатлар дарҳол фойда ва зарарлар тўғрисидаги ҳисоботга (P&L) чиқарилади. Бу инвесторларга корхонанинг ҳақиқий молиявий ҳолатини кўрсатади.

Активларни классификация қилиш. Ҳалқаро МҲХС 6-сон стандартига кўра, ГҚИ активларини моддий ва номоддийга ажратиш уларнинг амортизация ҳисоблаш тартибини аниқлаштиради. Ўзбекистон геология компаниялари учун МҲХСга ўтишда “Successful Efforts”

[36] Тадқиқотлар натижасида муаллиф ишланмаси.

методини жорий этиш бўйича ички ҳисоб сиёсатини ишлаб чиқиш мақсадга мувофиқ.

ГҚИ босқичлари бўйича (Технологик туркумлаш) ишларнинг босқичма-босқичлигига қараб харажатлар қуйидагича тақсимланади.

Қидирувгача бўлган харажатлар ҳудудни регионал ўрганиш ва ҳуқуқий рухсатнома олиш харажатлари, қидирув ва баҳолаш харажатлари топографик, геологик, геофизик тадқиқотлар, намуналар олиш ва бурғилаш харажатлари ҳамда техник-иқтисодий асослаш харажатлари конни қазиб олишнинг тижорат жиҳатдан мақсадга мувофиқлигини баҳолаш харажатлари.

Геология-қидирув ишларини (ГҚИ) IFRS 6 (МҲХС) талаблари асосида босқичма-босқич туркумлаш жуда муҳим. Чунки ҳар бир босқичда харажатларни тан олиш ва уларни капиталлаштириш (актив сифатида йиғиш) тартиби фарқ қилади.

Табиий ресурслар қидирилишининг бутун жараёни Стандарт бир нечта босқичларга бўлади:

1. Участкадан фойдаланишга бўлган юридик ҳуқуқларни харид қилишгача давом этувчи қидиришдан олдинги фаолият.

2. Бу участкадаги табиий ресурс захираларини қидириш ва баҳолаш ишлари.

3. Ресурслар қазиб чиқариладиган конга ишлов бериш ва ресурсларни қазиб олиш.

4. Ресурслар қазиб олинганидан кейин участканинг рекультивацияси.

Қуйида Ўзбекистоннинг амалдаги геологик тармоқ стандартлари ва IFRS 6 (МҲХС) талаблари асосида тайёрланган.

2-жадвал

Геология-қидирув ишлари босқичлари бўйича харажатларнинг технологик туркумланиши[37]

ГҚИ босқичи	Ишларнинг мазмуни (Технологик жараён)	Харажатларнинг иқтисодий табиати	Ҳисобда акс эттириш тартиби (МҲХС/БҲМС)
1. Регионал геологик ўрганиш	Умумий геологик хариталаш (1:200 000), аэрокосмик суратларни таҳлил қилиш, прогноз хариталарини тузиш.	Қидирувгача бўлган харажатлар. Ҳали аниқ кон майдони белгиланмаган.	Одатда давр харажатларига (зарарга) чиқарилади. Капиталлаштирилмайди.
2. Қидирув ва дастлабки баҳолаш	Истиқболли майдонларни ажратиш, геофизик ва геокимёвий қидирув, юзаки лаҳимлар очиш ва дастлабки бурғилаш.	Бевосита қидирув харажатлари. Коннинг мавжудлигини исботлашга йўналтирилган.	Капиталлаштириладиган харажатлар. "Қидирув ва баҳолаш активлари" сифатида йиғилади.
3. Батафсил разведка (Баҳолаш)	Коннинг шакли, заҳираларини ҳисоблаш учун зич тармоқда бурғилаш, намуналар олиш ва лаборатория таҳлиллари.	Заҳираларни тасдиқлаш харажатлари. Техник-иқтисодий асослар (ТИА) тайёрланади.	Актив сифатида тан олинади. Агар тижоратбоп эканлиги исботланса, "Қазиб олиш активи"га ўтказилади.
4. Лойиҳалаштириш ва қурилиш	Конни очиш учун инфратузилма яратиш, кон иншоотларини қуриш ва саноат синовлари.	Капитал қўйилмалар. Ишлаб чиқаришни бошлаш учун тайёргарлик.	Асосий воситалар (Тугалланмаган қурилиш) сифатида капиталлаштирилади.
5. Ишларни тугатиш ва рекультивация	Ишлар якунлангач, ҳудудни экологик тозалаш, қудуқларни консервация қилиш.	Экологик мажбуриятлар. Келажакдаги мажбурий сарфлар.	Актив таннархига қўшилади ва резерв (заҳира) сифатида шакллантирилади.

Активга айланиш нуқтаси харажатларни капиталлаштириш одатда 2-босқичдан (ер қаъридан фойдаланиш ҳуқуқи олингандан сўнг) бошланади. 1-босқич харажатлари эса инвестор ёки давлат учун "қидирув таваккалчилиги" ҳисобланиб, тўғридан-тўғри харажатга чиқарилади.

[37] Тадқиқотлар натижасида муаллиф ишланмаси.

Технологик изчиллик агар 2-босқичда салбий натижа олинса (кон топилмаса), унгача йиғилган барча капитал харажатлар қадрсизланиш (impairment) сифатида ҳисобдан чиқарилиши шарт.

3. Иқтисодий элементлар бўйича (Смета таркиби) Ўзбекистоннинг амалдаги меъёрий ҳужжатларига мувофиқ, харажатлар сметада қуйидагича туркумланади.

Геологлар, бурғиловчилар ва техник ходимларнинг иш ҳақи, ёқилғи-мойлаш материаллари, бурғилаш ускуналарининг эҳтиёт қисмлари, кимёвий реагентлар, ГҚИда ишлатиладиган махсус техника ва қурилмаларнинг ейилиш суммаси ҳамда транспорт хизматлари, лаборатория таҳлиллари ва пудратчи ташкилотлар иши.

Бу туркумлаш Ўзбекистон Республикасининг «Маҳсулот (ишлар, хизматлар) таннархига киритиладиган харажатлар таркиби тўғрисида»ги Низом ва соҳавий йўриқномаларга асосланган. Жумладан:

маҳсулотнинг ишлаб чиқариш таннархига киритиладиган харажатлар:

а) бевосита ва билвосита моддий харажатлар;

б) бевосита ва билвосита меҳнат харажатлари;

в) бошқа бевосита ва билвосита харажатлар, шу жумладан ишлаб чиқариш хусусиятига эга бўлган устама харажатлар;

ишлаб чиқариш таннархига киритилмайдиган, бироқ асосий фаолиятдан олинган фойдада ҳисобга олинадиган ҳамда давр харажатларига киритиладиган харажатлар:

а) сотиш харажатлари;

б) бошқариш харажатлари (маъмурий сарф-харажатлар);

в) бошқа операцион харажатлар ва зарарлар.

3-жадвал

Геология-қидирув ишлари харажатларининг иқтисодий элементлар бўйича смета таркиби[38]

Иқтисодий элемент номи	Смета таркибига кирувчи асосий харажатлар	ГҚИдаги ўзига хос хусусияти
1. Моддий харажатлар	Ёқилғи-мойлаш материаллари (ЁММ), бурғилаш каронкалари, реагентлар, кимёвий моддалар, портловчи моддалар, махсус кийимлар.	ГҚИда энг катта улушга эга (айниқса бурғилаш босқичида). Экспедиция шароитида транспорт харажатлари ҳам шунга киради.
2. Меҳнатга ҳақ тўлаш харажатлари	Геологлар, геофизиклар, бурғиловчилар, ҳайдовчилар ва техник ходимларнинг иш ҳақи, устамалар (дала пули, экспедиция устамаси).	Ишларнинг мавсумийлиги ва олис ҳудудларда ўтказилиши сабабли юқори коэффициентлар қўлланилади.
3. Ижтимоий суғурта ажратмалари	Меҳнатга ҳақ тўлаш фондидан белгиланган ставка (12% ёки 25%) бўйича ижтимоий солиқ ажратмалари.	Иш ҳақи фондига тўғри пропорционал равишда шаклланади.
4. Асосий воситалар амортизацияси	Бурғилаш қурилмалари, лаборатория ускуналари, махсус техникалар ва дала лагерларининг ейилиш суммаси.	Техниканинг мураккаб иқлим ва геологик шароитда ишлаши сабабли жадаллаштирилган амортизация қўлланилиши мумкин.
5. Бошқа операцион харажатлар	Ер қаъридан фойдаланиш ҳуқуқи учун тўловлар (бонус, аукцион), ижара тўловлари, алоқа хизмати, лойиҳа-қидирув ишлари экспертизаси.	Бу ерда ГҚИ учун берилган рухсатномаларни олиш харажатлари (номоддий актив сифатида) муҳим ўрин тутади.

4. Халқаро (IFRS 6) бўйича активларнинг табиатига кўра моддий активлар (Tangible assets) бурғилаш қурилмалари, махсус транспорт воситалари ва номоддий активлар (Intangible assets) қидирув ҳуқуқи (лицензия), геологик хариталар, бурғилаш натижасида олинган маълумотлар.

5. Солиққа тортиш мақсадлари учун (Солиқ кодекси бўйича) Чегириладиган харажатлар фойда солиғини ҳисоблашда жами даромаддан айириб ташланадиган харажатлар ва амортизация қилинадиган харажатлар

[38] Тадқиқотлар натижасида муаллиф ишланмаси.

маълум бир давр (одатда 5-15 йил) давомида қисмларга бўлиб харажатга чиқариладиган капитал сарфлар.

Харажатларни бундай туркумлаш корхонага қайси лойиҳалар фойдали эканлигини кўриш, солиқ юкини оптималлаштириш ва инвесторлар учун шаффоф ҳисобот тайёрлаш имконини беради.

4-жадвал

Геология-қидирув ишлари харажатларини солиққа тортиш ва имтиёзлар тизими[39]

Солиқ тури / Харажат йўналиши	Имтиёз ва қўллаш тартиби	Меъёрий асоси
Фойда солиғи (Чегирмалар)	ГҚИга сарфланган барча харажатлар (кейинчалик кон топилиш-топилмаслигидан қатъи назар) жами даромаддан чегирилади.	СК, 305-модда
Амортизация (Амортизация нормаси)	ГҚИ харажатлари "номулкий актив" сифатида 15 фоиздан кам бўлмаган йиллик норма билан амортизация қилинади (бу харажатларни тезроқ қоплаш имконини беради).	СК, 306-модда
Қўшилган қиймат солиғи (ҚҚС)	Чет эл инвестициялари иштирокидаги ГҚИ доирасида олиб кириладиган технологик ускуналар ва материаллар ҚҚСдан озод қилиниши мумкин.	СК, 246-модда
Божхона тўловлари	Ўзбекистонда ишлаб чиқарилмайдиган, ГҚИ учун зарур бўлган махсус техника ва лаборатория жиҳозлари божхона божидан озод қилинади.	ПФ-6319-сон Фармон
Тижоратбоп топилма бонуси	Кон аниқланганда тўланадиган ушбу бонус суммаси келгусида солиқ солинадиган фойдани аниқлашда харажат сифатида чегирилади.	СК, 452-модда
Ер солиғи ва Мол-мулк солиғи	ГҚИ босқичида (қазиб олиш бошлангунга қадар) ажратилган ер участкалари ва ундаги иншоотлар бўйича имтиёзли ставкалар қўлланилиши мумкин.	СК, 415, 429-моддалар

МҲҲС (IFRS) 6 “Минерал ресурсларни қидириш ва баҳолаш” стандарти геология-қидирув корхоналари учун махсус ишлаб чиқилган бўлиб, унинг асосий мақсади фойдали қазилмаларни қидириш босқичидаги харажатларни молиявий ҳисоботда акс эттириш тартибини

[39] Тадқиқотлар натижасида муаллиф ишланмаси.

белгилашдир. Стандартнинг ўзига хос жиҳати шундаки, у корхоналарга мавжуд ҳисоб сиёсатини давом эттириш ёки соҳа хусусиятидан келиб чиқиб мослаштирилган янги сиёсатни ишлаб чиқишга имкон беради, бироқ харажатларни гуруҳлаш ва активларни қадрсизланишга текшириш бўйича қатъий талабларни қўяди.

Халқаро тажрибада ГҚИ харажатлари иккита асосий мезон бўйича гуруҳланади: табиатига кўра (моддий/номоддий) ва функциясига кўра (қидирув босқичлари). Тан олинадиган қидирув активларининг турлари: МҲҲС 6 га мувофиқ, корхона қуйидаги харажатларни “қидирув ва баҳолаш активлари” сифатида гуруҳлаши мумкин. Қидирув ҳуқуқларини қўлга киритиш, ер қаъридан фойдаланиш ҳуқуқи, лицензиялар сотиб олиш харажатлари, Топографик ва геологик тадқиқотлар, хариталаш, аэрофотосъёмка ва ер юзасини ўрганиш харажатлари, назорат-бурғилаш ишлари, қидирув қудуқларини бурғилаш билан боғлиқ барча бевосита харажатлар, намуналар олиш ва лаборатория таҳлиллари, Керн намуналарини олиш ва уларнинг кимёвий-физик таркибини ўрганиш, техник-иқтисодий асослаш (ТИА), фойдали қазилмаларни қазиб олишнинг техник имконияти ва тижорий мақсадга мувофиқлигини баҳолаш харажатлари.

Халқаро амалиётда харажатларни актив сифатида тан олишда икки хил ёндашув қўлланилади. Моддий активлар (Tangible assets), масалан, бурғилаш қурилмалари, махсус транспорт воситалари. Булар МҲҲС 16 “Асосий воситалар” сифатида ҳисобга олинади. Номоддий активлар (Intangible assets), масалан, бурғилаш ҳуқуқи, геологик маълумотлар базаси, ТИА натижалари. Булар МҲҲС 38 “Номоддий активлар” тамойиллари асосида, лекин МҲҲС 6 доирасида юритилади.

МҲҲС 6 бўйича харажатларни капиталлаштириш (активда йиғиш) қуйидаги ҳолларда тўхтатилади ва улар бошқа категорияга ўтказилади. Тижорий муваффақият исботланганда, агар коннинг иқтисодий

самарадорлиги тасдиқланса, актив “Қидирув активи”дан “Ишлаб чиқариш/қазиб олиш активи”га ўтказилади.

Қадрсизланиш (Impairment), агар қидирув натижа бермаса ёки лицензия муддати тугаса, активнинг қиймати дарҳол фойда ва зарарлар тўғрисидаги ҳисоботга (харажатга) чиқарилади.

МҲҲС 6 доирасида харажатларни гуруҳлашда халқаро тажрибанинг муҳим элементи - атроф-муҳитни қайта тиклаш мажбуриятидир. Корхона қидирув ишларини бошлаши билан келажакда ерни рекультивация қилиш харажатларини баҳолайди ва уни активнинг бошланғич қийматига қўшади (Дт Актив - Кт Заҳира). Бу миллий ҳисоб тизимида ҳали тўлиқ шаклланмаган муҳим классификация элементидир. МҲҲС 6 нинг миллий тизимдан асосий фарқи шундаки, у харажатларни шунчаки «ишлаб чиқариш харажати» сифатида эмас, балки келажакда даромад келтирувчи инвестиция (актив) сифатида гуруҳлашни афзал кўради. Бу корхонанинг инвестициявий жозибадорлигини оширишга хизмат қилади.

Фойдаланиладиган минерал ресурсларни геологик қидириш ва баҳолаш соҳасида харажатларни ҳисобга олишнинг халқаро тажрибаси асосан 6-сон МҲХС (IFRS 6) билан тартибга солинади. Ушбу стандарт тоғ-кон саноати ва экстрактив тармоқлар учун махсус ишлаб чиқилган бўлиб, геология-қидирув харажатларини тан олишда мослашувчанликни таъминлайди. 6-сон МҲХСнинг асосий тамойиллари ва қўлланиш доираси стандарт фақат минерал ресурсларни қидириш ва баҳолаш босқичидаги харажатларга нисбатан қўлланилади. Харажатларни капиталлаштириш (актив сифатида йиғиш) фақат муайян ҳудудда геологик қидирув ишларини олиб бориш бўйича ҳуқуқий рухсатнома (лицензия) олинганидан кейин бошланади. Лицензия олишдан олдинги сарфлар ҳамда коннинг техник жиҳатдан амалга оширилиши ва тижоратбоплиги исботланганидан кейинги (қазиб олиш) харажатлар ушбу стандарт доирасига кирмайди. Харажатларни ҳисобга олишнинг иккита асосий

методи халқаро тажрибада ГҚИ харажатларини капиталлаштиришнинг иккита асосий ёндашуви мавжуд.

Муваффақиятли ҳаракатлар методи (Successful Efforts) фақат тижоратбоп кон топилишига олиб келган харажатлар капиталлаштирилади (актив сифатида олинади). Натижасиз (қуруқ) қудуқлар ва қидирув сарфлари ўша даврнинг зарарига чиқарилади. Бу метод кўпчилик йирик халқаро компаниялар томонидан қўлланилади. “Муваффақиятли ҳаракатлар” методи (Successful Efforts — SE) халқаро амалиётда (айниқса, IFRS 6 ва US GAAP стандартларида) геология-қидирув ишлари харажатларини ҳисобга олишнинг энг шаффоф ва консерватив усули ҳисобланади. Илмий ишингиз учун ушбу методнинг мантиқий занжири ва иқтисодий афзалликларини қуйидагича ёритиш мумкин:

Методнинг асосий тамойили бу методда харажатларнинг актив (мол-мулк) ёки харажат (зарар) сифатида тан олиниши бевосита геологик қидирувнинг натижасига боғлиқ. Агар қидирув натижасида саноат аҳамиятига эга (тижоратбоп) заҳиралар топилса -барча бурғилаш ва баҳолаш харажатлари капиталлаштирилади (балансда актив сифатида йиғилади).

Агар қидирув натижа бермаса (масалан, «қуруқ қудуқ» бўлса) — барча сарфланган маблағлар ўша даврнинг ўзида фойда ва зарарлар тўғрисидаги ҳисоботга харажат сифатида чиқариб юборилади.

4-жадвал

Харажатларни гуруҳлаш схемаси (SE методи бўйича)[40]

Харажат тури	Ҳисобда акс эттириш тартиби
Лицензия (ҳуқуқ) сотиб олиш	Капиталлаштирилади (актив сифатида сақланади).
Геофизика ва геология (G&G)	Одатда дарҳол харажатга (зарарга) чиқарилади.
Натижали бурғилаш	Капиталлаштирилади (келажакда амортизация қилинади).

[40] Тадқиқотлар натижасида муаллиф ишланмаси.

Натижасиз (қуруқ) бурғилаш	Харажатга чиқарилади (актив сифатида тан олинмайди).

Мазкур методнинг иқтисодий афзалликлари компания балансида фақат ҳақиқий қийматга эга (келажакда даромад келтирадиган) активлар қолади. Йирик компаниялар (масалан, ExxonMobil, Shell, Chevron) ушбу методни қўллайди, чунки у молиявий ҳисоботларни “шишириб” кўрсатишга йўл қўймайди. Камчиликлари агар йирик қидирув лойиҳаси муваффақиятсиз тугаса, компания ўша йили катта зарар кўриши мумкин (бу фойданинг кескин камайишига олиб келади). Кичик ва янги (“Junior”) компаниялар учун бу метод қийинлик туғдириши мумкин, чунки уларнинг балансида активлар кам кўринади.

Ўзбекистоннинг йирик тоғ-кон компаниялари (НКМК, ОКМК) учун ушбу методга ўтиш орқали активларнинг қадрсизланишини (impairment) олдини олиш моделини таклиф этилди. Бунда тўлиқ харажатлар методи (Full Cost) маълум бир ҳудуддаги (масалан, бир давлат ёки ҳавза) барча қидирув харажатлари, натижасидан қатъи назар, актив сифатида жамланади ва келгусида қазиб олинадиган ресурслар ҳисобидан қопланади.

“Тўлиқ харажатлар” методи (Full Cost - FC) геология-қидирув ишларида (ГҚИ) харажатларни капиталлаштиришнинг энг кенг тарқалган иккинчи модели бўлиб, унда асосий урғу “қидирув - бу яхлит жараён” эканлигига қаратилади. Бу методда геологик қидирув давомида қилинган барча сарфлар (ҳатто натижа бермаган, “қуруқ” қудуқлар ҳам) актив сифатида балансда йиғилади. Муваффақиятсиз қидирув ишлари муваффақиятли конни топиш учун керак бўлган “зарурий харажат” деб қаралади.

Харажатлар алоҳида қудуқ бўйича эмас, балки катта бир ҳудуд (масалан, бутун бир нефть-газ ҳавзаси ёки давлат) кесимида гуруҳланади.

9-жадвал

Full Cost (FC) методи бўйича харажатлар иерархияси[41]

Харажат тури	Ҳисобда акс эттириш тартиби	Иқтисодий натижа
Лицензия олиш	Капиталлаштирилади	Актив қиймати ошади
Геофизик тадқиқотлар	Капиталлаштирилади	Актив қиймати ошади
Муваффақиятли бурғилаш	Капиталлаштирилади	Актив қиймати ошади
Муваффақиятсиз (қуруқ) бурғилаш	Капиталлаштирилади	Актив қиймати ошади (зарарга чиқарилмайди)

Мазкур методнинг афзалликлари муваффақиятсиз лойиҳалар фойда ва зарарлар ҳисоботига (P&L) дарҳол таъсир қилмайди, бу эса компаниянинг йиллик молиявий кўрсаткичлари “тебраниши”ни олдини олади. Кичик (“Junior”) компаниялар учун қулайлик -янги ташкил этилган компаниялар ўз активларини каттароқ кўрсатиши ва инвестиция жалб қилиши осонроқ бўлади.

Камчиликлари балансда ҳеч қандай иқтисодий фойда келтирмайдиган (қуруқ қудуқ) харажатлар актив сифатида туриши мумкин.

Шаффофликнинг пастлиги -Инвестор учун компаниянинг қидирув ишлари қанчалик самарали эканлигини (нечта қудуқ бекор кетганини) билиш қийинлашади.

Ушбу жадвал МҲХС (IFRS 6) талаблари асосида шакллантирилган бўлиб, геология-қидирув харажатларини ҳисобга олишдаги асосий фарқларни очиб беради.

5-жадвал

ГҚИ харажатларини ҳисобга олиш методларининг қиёсий таҳлили

Қиёсий мезонлар	Муваффақиятли ҳаракатлар (Successful Efforts - SE)	Тўлиқ харажатлар (Full Cost - FC)
Асосий концепция	Харажат ва актив ўртасида бевосита боғлиқлик бўлиши шарт.	Қидирув — бу яхлит жараён, муваффақиятсизлик ҳам

[41] Тадқиқотлар натижасида муаллиф ишланмаси.

		муваффақиятнинг бир қисми.
Муваффақиятсиз (қуруқ) қудуқлар	Дарҳол харажатга (зарарга) чиқарилади.	Капиталлаштирилади (актив сифатида йиғилади).
Геофизика ва геология (G&G) сарфлари	Жорий давр харажатлари сифатида тан олинади.	Активнинг таннархига қўшилади.
Балансдаги активлар қиймати	Пастроқ, лекин реал (фақат конлар қиймати акс этади).	Юқори (барча қидирув сарфлари ҳисобига "шиширилган").
Молиявий натижа (Фойда)	Қидирув натижасига қараб тез-тез ўзгариб туради (тебранувчан).	Барқарор ва текис тақсимланган (тебранишлар кам).
Қадрсизланиш (Impairment) тести	Ҳар бир алоҳида кон ёки объект бўйича ўтказилади.	Катта ҳудуд (ҳавза ёки давлат) кесимида ўтказилади.
Кимлар учун қулай?	Йирик, молиявий барқарор ва халқаро (IPO) компаниялар учун.	Кичик ва янги ("Junior") қидирув компаниялари учун.
Асосий камчилиги	Муваффақиятсизлик юз берган йилда фойданинг кескин камайиши.	Активлар таркибида иқтисодий фойда бермайдиган "ўлик" сарфларнинг мавжудлиги.

ХУЛОСА

Ўзбекистоннинг тоғ-кон саноати трансформация қилинаётган ва халқаро капитал бозорларига чиқаётган (НКМК, ОКМК) бир даврда, Successful Efforts (SE) методини қўллаш мақсадга мувофиқдир.

1. Инвесторларга компаниянинг ҳақиқий активлари ва қидирув ишларининг самарадорлигини аниқ кўрсатиб беради.

2. МҲХС (IFRS) ва АҚШ (US GAAP) стандартларига максимал даражада мос келади.

3. Корхонанинг молиявий ҳисоботлари шаффофлигини оширади ва халқаро аудитдан ўтишни осонлаштиради.

Активларни туркумлаш ва баҳолаш 6-сон МҲХСга кўра, тан олинган активлар табиатига кўра иккига бўлинади.

Моддий активлар (Tangible) масалан, бурғилаш қурилмалари, махсус транспорт воситалари.

Номоддий активлар (Intangible) масалан, бурғилаш ҳуқуқи (лицензия), топографик ва геологик тадқиқотлар натижалари.

Қадрсизланиш тести (Impairment) Капиталлаштирилган активлар 36-сон БҲХС (IAS 36) талаблари асосида қадрсизланишга текширилади. Агар қидирув натижа бермаслиги ёки ҳудудни ўрганиш тўхтатилиши ҳақида асосли фактлар пайдо бўлса, активнинг қиймати зарарга чиқарилади.

МҲХС 6 геология соҳасидаги корхоналарга мослашувчанлик беради, лекин шу билан бирга харажатларнинг қачон активга айланиши ва қачон уларнинг қийматини йўқотганлигини баҳолаш бўйича аниқ қоидаларни белгилайди. Бу стандарт «Ўзбек геология қидирув» АЖ каби йирик корхоналар учун инвестицияларнинг самарадорлигини молиявий ҳисоботларда тўғри акс эттиришда муҳим ўрин тутади.

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ЦИФРОВАЯ ИНТЕГРАЦИЯ БИЗНЕС-ПРОЦЕССОВ ОРГАНИЗАЦИИ В УСЛОВИЯХ ЦИФРОВОЙ ЭКОНОМИКИ

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Аннотация: В тезисе рассматривается цифровая интеграция бизнес-процессов организации как условие повышения управляемости в цифровой экономике. Обоснована необходимость перехода от фрагментарной автоматизации к единому цифровому контуру, объединяющему учетные, кадровые, исполнительские, коммуникационные и аналитические процессы. Предложены основные контуры интеграционной модели и индексный подход к оценке уровня цифровой связанности организации. Практическая значимость заключается в возможности использования предложенного подхода при поэтапном внедрении модульных цифровых платформ и оценке их управленческого эффекта.

Ключевые слова: цифровая экономика, цифровая интеграция, бизнес-процессы, управленческие данные, информационная система, организационная эффективность, автоматизация управления.

Abstract: The thesis examines the digital integration of an organization's business processes as a condition for increasing manageability in the digital economy. The necessity of transition from fragmented automation to a single digital circuit combining accounting, personnel, executive, communication and analytical processes is substantiated. The main outlines of the integration model and an index approach to assessing the level of digital connectivity of an

organization are proposed. The practical significance lies in the possibility of using the proposed approach in the phased implementation of modular digital platforms and assessing their managerial effect.

Keywords: digital economy, digital integration, business processes, management data, information system, organizational efficiency, management automation.

АКТУАЛЬНОСТЬ:

В условиях цифровой экономики конкурентоспособность организации определяется не только наличием отдельных информационных систем, но и способностью связывать управленческие данные в единый процесс принятия решений. На практике многие организации используют цифровые инструменты для бухгалтерского учета, кадрового администрирования, документооборота, складских операций и постановки задач. Однако такие инструменты часто функционируют изолированно, вследствие чего сохраняются повторный ввод информации, ручное согласование, несогласованность справочников, задержки в подготовке отчетов и недостаточная прозрачность ответственности исполнителей.

Проблема фрагментарной цифровизации особенно заметна в организациях малого и среднего масштаба, где внедрение крупных корпоративных систем является дорогостоящим и организационно сложным. В таких условиях возрастает значение доступных интегрированных платформ, объединяющих учетные, кадровые, исполнительские и аналитические процессы без избыточной технологической нагрузки. Актуальность исследования также связана с задачами цифровой трансформации экономики Республики Узбекистан, где развитие цифровых сервисов, электронного управления и обработки данных рассматривается как направление повышения эффективности организаций [1].

ЦЕЛЬ:

Целью тезисов является обоснование методического подхода к цифровой интеграции бизнес-процессов организации и определение управленческих результатов, которые могут быть достигнуты за счет перехода от разрозненной автоматизации к единому цифровому контуру управления.

МАТЕРИАЛЫ И МЕТОДЫ:

Материалами исследования выступили научные публикации по цифровой трансформации, управлению бизнес-процессами и внедрению корпоративных информационных систем, а также нормативные документы Республики Узбекистан, определяющие приоритеты развития цифровой экономики и повышения практической значимости научных исследований. В работе использованы методы системного анализа, сравнительного анализа, процессного моделирования, экспертной оценки, индексной оценки и логического обобщения. Для оценки возможного эффекта цифровой интеграции предложен подход «до и после», при котором сопоставляются время выполнения операций, количество ошибок, доля просроченных задач, объем ручного ввода и скорость подготовки управленческой отчетности.

РЕЗУЛЬТАТЫ:

В результате исследования цифровая интеграция бизнес-процессов рассматривается как организационно-экономический механизм, обеспечивающий связанность данных, действий и управленческих решений в рамках единой информационной среды. В отличие от простой автоматизации отдельных операций, интеграция предполагает сквозное движение информации между подразделениями, согласованность справочников, единые правила доступа, фиксацию истории действий и возможность оперативной аналитики для руководства [3].

Предлагаемая модель цифровой интеграции включает пять взаимосвязанных контуров. Первый контур — учетный: движение товарно-материальных ценностей, первичных документов, остатков, заявок и внутренних операций. Второй контур — кадрово-организационный: сведения о сотрудниках, подразделениях, должностях, графиках, посещаемости и ответственности. Третий контур — исполнительский: поручения, сроки, статусы, согласования, комментарии и контроль просрочек. Четвертый контур — коммуникационный: системные уведомления, напоминания, электронные журналы подразделений и маршруты согласования. Пятый контур — аналитический: отчеты, показатели эффективности, управленческие панели и данные для принятия решений.

Для практической реализации модели целесообразно использовать модульную цифровую платформу, которая не заменяет все действующие системы организации, а связывает их вокруг единой базы управленческих данных. Такая платформа может внедряться поэтапно: сначала создаются справочники сотрудников, подразделений и ролей; затем подключаются задачи, согласования и электронные журналы; после этого автоматизируются учет материальных ценностей, отчетность и обмен данными с внешними сервисами. Поэтапное внедрение снижает сопротивление пользователей, уменьшает организационные риски и позволяет быстрее получить измеримый результат [5].

Для оценки уровня цифровой интеграции предложено использовать индексный подход. Индекс может формироваться по таким блокам, как единая база данных, связанность учетных процессов, цифровой контроль исполнения, наличие маршрутов согласования, электронные уведомления, аналитическая отчетность, информационная безопасность и возможность обмена данными с внешними системами. Каждый блок оценивается по заранее установленной шкале, после чего рассчитывается общий уровень

интеграции. Такой подход позволяет выявить слабые места цифрового управления и сравнить состояние организации до и после внедрения платформенного решения.

Ожидаемые управленческие результаты цифровой интеграции выражаются в сокращении времени согласования заявок, уменьшении повторного ввода данных, снижении количества ошибок в учете, повышении исполнительской дисциплины, ускорении подготовки отчетности и усилении прозрачности движения ресурсов. Экономический эффект может определяться через экономию рабочего времени, снижение потерь от ошибок и просрочек, уменьшение бумажного документооборота, а также повышение качества управленческих решений [6].

ВЫВОДЫ:

Цифровая интеграция бизнес-процессов является необходимым этапом развития организации в условиях цифровой экономики. Ее сущность состоит не в механическом внедрении новых программ, а в создании связанной системы управления, где данные формируются один раз, используются многократно и становятся основой для контроля, анализа и принятия решений. Наиболее рациональным подходом для многих организаций является поэтапное внедрение модульной платформы, объединяющей учетные, кадровые, исполнительские, коммуникационные и аналитические процессы. Предложенный индексный подход позволяет оценивать уровень цифровой интеграции и доказывать эффективность внедрения на основе измеримых показателей. Практическое значение результатов заключается в возможности применения разработанного подхода при проектировании доступных цифровых решений для организаций различного профиля.

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AGRAR SOHADA TEXNIK MODERNIZATSIYANING INSTITUTSIONAL MEXANIZMLARI

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Annotatsiya. *Tezisda agrar sohada texnik modernizatsiyaning institutsional mexanizmlari tadqiq etilgan. Texnik modernizatsiyaning iqtisodiy mazmuni va unga ta’sir etuvchi institutsional omillar tahlil qilingan. Qishloq xo‘jaligida texnik yangilanish jarayonlarining moliyaviy, innovatsion va boshqaruv komponentlari o‘rtasidagi bog‘liqlik asoslangan. Tadqiqot natijalari asosida texnik modernizatsiya samaradorligini oshirishga qaratilgan ustuvor yo‘nalishlar ishlab chiqilgan.*

Tayanch so‘zlar: *texnik modernizatsiya, agrar soha, texnik ta’minot, lizing, innovatsiyalar, raqamlashtirish, institutsional mexanizm, boshqaruv.*

Abstract: *This thesis investigates the institutional mechanisms of technical modernization in the agricultural sector. The economic essence of technical modernization and the institutional factors influencing it are analyzed. The relationship between the financial, innovative, and managerial components of the technical modernization process in agriculture is substantiated. Based on the research findings, priority directions aimed at increasing the effectiveness of technical modernization have been developed.*

Keywords: *technical modernization, agricultural sector, technical supply, leasing, innovations, digitalization, institutional mechanism, management.*

KIRISH

Jahon iqtisodiyotida texnologik taraqqiyot sur’atlarining jadallashuvi qishloq xo‘jaligida ishlab chiqarish samaradorligini oshirishning yangi omillarini shakllantirmoqda. Rivojlangan davlatlar tajribasi shuni ko‘rsatadiki, agrar tarmoqning barqaror rivojlanishi nafaqat yer va mehnat resurslari bilan, balki texnik ta’minot darajasi, innovatsion texnologiyalarni joriy etish va texnologik yangilanish sur’atlari bilan ham belgilanadi. Shu sababli qishloq

xo‘jaligida texnik modernizatsiya masalalari bugungi kunda iqtisodiy rivojlanishning muhim yo‘nalishlaridan biri sifatida e’tirof etilmoqda.

O‘zbekistonda ham agrar sohani modernizatsiya qilish va texnik qayta jihozlash davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Xususan, O‘zbekiston Respublikasi Prezidentining 2022 yil 28 yanvardagi PF–60-sonli “2022–2026 yillarga mo‘ljallangan Yangi O‘zbekistonning taraqqiyot strategiyasi to‘g‘risida”gi Farmonida qishloq xo‘jaligini modernizatsiya qilish, zamonaviy texnika va texnologiyalarni joriy etish, agrar sohada raqamli transformatsiyani kengaytirish hamda investitsion faollikni oshirish vazifalari belgilangan [1]. Shuningdek, O‘zbekiston Respublikasi Prezidentining 2020 yil 29 yanvardagi PQ–4575-sonli qarorida agrar sohada texnik ta’minotni modernizatsiya qilish, innovatsion texnologiyalarni joriy etish va tarmoq samaradorligini oshirish bo‘yicha ustuvor chora-tadbirlar belgilab berilgan [2].

Shu bilan birga, qishloq xo‘jaligida texnika parklarining ma’lum qismining eskirganligi, ayrim turdagi texnikalar bilan ta’minlanganlik darajasining yetarli emasligi, servis infratuzilmasining rivojlanishidagi nomutanosibliklar hamda moliyalashtirish imkoniyatlarining cheklanganligi texnik modernizatsiya jarayonlarining samaradorligiga salbiy ta’sir ko‘rsatmoqda. Mazkur holat agrar sohada texnik modernizatsiyani faqat texnika xaridi bilan bog‘liq jarayon sifatida emas, balki moliyaviy, innovatsion va boshqaruv institutlari faoliyatini qamrab oluvchi kompleks institutsional mexanizm sifatida tadqiq etish zaruratini yuzaga keltirmoqda.

ASOSIY QISM

Institutsional iqtisodiyot nazariyasiga ko‘ra, iqtisodiy rivojlanish samaradorligi resurslarning mavjudligi bilan emas, balki ularni boshqaruvchi institutlarning samaradorligi bilan belgilanadi. D.North institutlarni jamiyatdagi “o‘yin qoidalari” sifatida tavsiflab, ular iqtisodiy faoliyatdagi noaniqliklarni kamaytirish va tranzaksiya xarajatlarini qisqartirish orqali iqtisodiy o‘sishga xizmat qilishini qayd etgan [3]. Mazkur yondashuvdan kelib chiqib, agrar sohada

texnik modernizatsiya samaradorligini oshirish texnik vositalarni yangilash bilan bir qatorda ularni moliyalashtirish, servis bilan ta’minlash, innovatsiyalarni joriy etish va boshqaruv tizimlarini takomillashtirishga xizmat qiluvchi institutsional mexanizmlarni rivojlantirishni talab qiladi.

P.Timmerning ta’kidlashicha, qishloq xo‘jaligida tarkibiy transformatsiya jarayonlari ishlab chiqarish vositalarining modernizatsiyasi bilan uzviy bog‘liq bo‘lib, texnologik yangilanish agrar sohaning uzoq muddatli raqobatbardoshligini ta’minlovchi muhim omillardan biri hisoblanadi [4]. Shu sababli texnik modernizatsiya bugungi kunda qishloq xo‘jaligini intensiv rivojlantirishning muhim omillaridan biri sifatida qaralmoqda.

Iqtisodiy adabiyotlarda modernizatsiya iqtisodiy tizimning sifat jihatdan yangilanishi, innovatsion rivojlanish bosqichiga o‘tishi hamda ishlab chiqarish samaradorligini oshirishga qaratilgan uzluksiz jarayon sifatida talqin qilinadi. Agrar sohada texnik modernizatsiya esa qishloq xo‘jaligi ishlab chiqarishini zamonaviy texnika vositalari, raqamli texnologiyalar va innovatsion boshqaruv usullari asosida takomillashtirishni nazarda tutadi. Z.Yusupovning fikricha, qishloq xo‘jaligini texnik modernizatsiyalash ishlab chiqarish samaradorligini oshirish bilan bir qatorda tarmoqning investitsion jozibadorligini kuchaytirish, innovatsion faollikni rag‘batlantirish va resurslardan foydalanish samaradorligini oshirishga xizmat qiladi [5].

Tadqiqotlar natijalari agrar sohada texnik modernizatsiya samaradorligi uchta o‘zaro bog‘liq yo‘nalish – texnik-texnologik, moliyaviy-institutsional va innovatsion-boshqaruv mexanizmlarining uyg‘un rivojlanishi bilan ta’minlanishini ko‘rsatdi. Texnik-texnologik yo‘nalish zamonaviy qishloq xo‘jaligi texnikalari, energiya tejamkor agregatlar va raqamli texnologiyalarni joriy etishni nazarda tutadi. Moliyaviy-institutsional mexanizmlar esa texnik modernizatsiya uchun zarur bo‘lgan investitsiya resurslarini shakllantirish va ularni samarali taqsimlashga xizmat qiladi. Bu jarayonda lizing kompaniyalari, tijorat banklari, sug‘urta tashkilotlari va davlat tomonidan qo‘llab-quvvatlash

tizimlari muhim rol o‘ynaydi. Z.Yusupovning ta’kidlashicha, lizing mexanizmlarini rivojlantirish texnika bilan ta’minlanganlik darajasini oshirish va investitsion faollikni rag‘batlantirishning eng muhim shartlaridan biridir [5].

Texnik modernizatsiyaning zamonaviy bosqichi innovatsion va boshqaruv mexanizmlarining rivojlanishi bilan chambarchas bog‘liq. So‘nggi yillarda GPS navigatsiya tizimlari, aqlli boshqaruv texnologiyalari, masofaviy monitoring vositalari hamda raqamli platformalarning joriy etilishi texnikalardan foydalanish samaradorligini oshirish imkonini bermoqda. D.Northning fikricha, innovatsiyalar iqtisodiy samaradorlikka faqat ularni qo‘llab-quvvatlovchi institutlar mavjud bo‘lgandagina ta’sir ko‘rsatadi [3]. Shu sababli texnik modernizatsiyada nafaqat yangi texnologiyalarni joriy etish, balki ularni qo‘llab-quvvatlovchi institutsional infratuzilmani rivojlantirish ham muhim ahamiyat kasb etadi.

Muallifning fikricha, agrar sohada texnik modernizatsiyani samarali amalga oshirish davlat, moliyaviy institutlar, ilmiy-tadqiqot muassasalari, texnika ishlab chiqaruvchilar, servis tashkilotlari va qishloq xo‘jaligi ishlab chiqaruvchilari o‘rtasidagi o‘zaro hamkorlikka asoslangan institutsional mexanizmni shakllantirishni talab qiladi. Ushbu mexanizmda davlat tartibga soluvchi va rag‘batlantiruvchi subyekt sifatida, moliyaviy institutlar investitsiya resurslari manbai sifatida, ilmiy muassasalar innovatsiyalar generatori sifatida, texnika ishlab chiqaruvchilar va servis korxonalari texnik modernizatsiyaning amaliy ijrochilari sifatida ishtirok etadi. Fermer xo‘jaliklari va klasterlar esa mazkur tizimning yakuniy foydalanuvchilari hisoblanadi.

Shu nuqtai nazardan, texnik modernizatsiya samaradorligini baholashda texnikalar bilan ta’minlanganlik darajasi, texnikalar yangilanish koeffitsienti, lizing asosida xarid qilingan texnikalar ulushi, servis xizmatlari qamrovi, raqamli texnologiyalardan foydalanish darajasi hamda mehnat unumdorligi kabi ko‘rsatkichlardan kompleks foydalanish maqsadga muvofiq hisoblanadi.

Mazkur ko‘rsatkichlar texnik modernizatsiyaning nafaqat texnik, balki iqtisodiy va institutsional natijalarini ham baholash imkonini beradi.

XULOSA.

Olib borilgan tadqiqotlar agrar sohada texnik modernizatsiya qishloq xo‘jaligi ishlab chiqarishining samaradorligini oshirish, resurslardan oqilona foydalanish va tarmoqning raqobatbardoshligini kuchaytirishning muhim omillaridan biri ekanligini ko‘rsatdi. Tadqiqot natijalari texnik modernizatsiya samaradorligi texnik-texnologik yangilanish, moliyaviy qo‘llab-quvvatlash, innovatsiyalarni joriy etish va boshqaruv mexanizmlarining o‘zaro uyg‘un rivojlanishiga bog‘liqligini tasdiqladi.

Aniqlanishicha, texnik modernizatsiya jarayonlarini faqat texnika vositalarini yangilash bilan cheklash kutilgan natijalarni bermaydi. Mazkur jarayonni moliyalashtirish tizimi, servis infratuzilmasi, raqamli texnologiyalar va innovatsion faoliyat bilan uzviy bog‘liq holda rivojlantirish zarur.

Shundan kelib chiqib, agrar sohada texnik modernizatsiya samaradorligini oshirish uchun lizing va kreditlash mexanizmlarini takomillashtirish, texnik servis xizmatlari qamrovini kengaytirish, mahalliy texnika ishlab chiqarishni qo‘llab-quvvatlash, raqamli boshqaruv texnologiyalarini keng joriy etish hamda ilm-fan va ishlab chiqarish integratsiyasini kuchaytirish maqsadga muvofiq hisoblanadi. Ushbu chora-tadbirlar qishloq xo‘jaligida texnik ta’minot darajasini oshirish, ishlab chiqarish xarajatlarini kamaytirish va agrar tarmoqning barqaror rivojlanishini ta’minlashga xizmat qiladi.

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AGRAR BARQARORLIKNI TA’MINLASHDA MILLIY URUG‘CHILIK TIZIMINING AHAMIYATI

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Annotatsiya. *Tezisda milliy urug‘chilik tizimining agrar barqarorlik va oziq-ovqat xavfsizligini ta’minlashdagi ahamiyati ko‘rib chiqilgan bo‘lib, urug‘chilik sohasidagi importga qaramlikning salbiy ta’sirlari tahlil qilingan. Shuningdek, mahalliy seleksiya va sertifikatlashtirish tizimini rivojlantirishning ahamiyati asoslangan.*

Kalit so‘zlar: *agrar barqarorlik, oziq-ovqat xavfsizligi, milliy urug‘chilik tizimi, importga qaramlik, mahalliy seleksiya, sertifikatlashtirish.*

Abstract. *The thesis examines the significance of the national seed system in ensuring agrarian stability and food security, and analyzes the negative impacts of import dependence in the seed industry. The importance of developing a domestic selection and certification system is also substantiated.*

Keywords: *agricultural stability, food security, national seed production system, import dependence, local breeding, certification.*

KIRISh

Global iqlim o‘zgarishi, aholi sonining o‘sishi va oziq-ovqat mahsulotlariga bo‘lgan talabning ortishi sharoitida qishloq xo‘jaligining barqaror rivojlanishini ta’minlash dolzarb vazifalardan biri hisoblanadi. Bunda yuqori sifatli va mahalliy sharoitga moslashgan urug‘ materiallari agrar ishlab chiqarish samaradorligining asosiy omillaridan biri sifatida namoyon bo‘ladi.

Shu bilan birga, O‘zbekiston qishloq xo‘jaligida ayrim ekin turlari bo‘yicha import urug‘larga yuqori darajadagi qaramlik saqlanib qolmoqda, bu esa agrar barqarorlik va oziq-ovqat xavfsizligi nuqtai nazaridan muayyan xavflarni yuzaga keltirmoqda.

ASOSIY QISM

Agrar iqtisodiyotda yuqori hosildorlik va mahsulot sifatini ta’minlashning asosiy omillaridan biri sifatida sifatli urug‘lik materiallari muhim ahamiyat kasb etadi. Shu nuqtai nazardan, milliy urug‘chilik tizimining rivojlanganlik darajasi mamlakatning oziq-ovqat xavfsizligi, agrar raqobatbardoshligi va iqtisodiy barqarorligini belgilovchi muhim omillardan biri hisoblanadi.

O‘zbekistonda ham so‘nggi yillarda urug‘chilik sohasini rivojlantirish bo‘yicha muayyan islohotlar amalga oshirilmoqda. Biroq tahlillar ayrim ekin turlari bo‘yicha importga qaramlik saqlanib qolayotganini ko‘rsatadi. Xususan, 2021–2023 yillarda don va dukkakli ekinlar urug‘lari importi 4,0 ming tonnadan 22,6 ming tonnagacha oshgan bo‘lsa, mazkur davrda kartoshka urug‘lari importi 43,3 ming tonna, sabzavot-poliz urug‘liklari importi esa 6,2 ming tonnani tashkil etgan [2]. Ayniqsa, moyli ekinlar urug‘liklari importi 468 ming tonnadan ziyod bo‘lib, mazkur segmentda tashqi bozorlarga yuqori darajadagi bog‘liqlik mavjudligini ko‘rsatadi [2].

Tarmoq mutaxassislari ta’kidlashicha, mahalliy iqlim sharoitiga to‘liq moslashgan kartoshka navlarining yetarli emasligi hamda sertifikatlashtirilgan urug‘lik materiallari tanqisligi sohaning uzoq muddatli rivojlanishiga salbiy ta’sir ko‘rsatmoqda [3]. Shu bilan birga, respublikada sabzavotchilik mahsulotlari urug‘chiligida ham import ulushi yuqori bo‘lib qolmoqda [4]. Bu holat tashqi bozorlardagi narx tebranishlari, logistik uzilishlar va fitosanitar xavflarning milliy agrar tizimga ta’sirini kuchaytiradi.

Tahlillar ko‘rsatishicha, respublikada sabzavot-poliz ekinlari urug‘chiligi sohasida importga qaramlik yuqori darajada saqlanib qolmoqda. Xususan, 3483 ta issiqxona xo‘jaliklarida yetishtirilayotgan pomidor, bodring va shirin

qalampirning 95 foizi, ochiq maydonlarda tarvuzning 90 foizi hamda karamning 75 foizi import urug‘liklari hisobiga to‘g‘ri keladi. Shu bilan birga, mahalliy seleksiya muassasalari tomonidan 284 ta nav va duragay yaratilgan bo‘lsa-da, mahalliy F1 duragaylar urug‘chiligi tizimi to‘liq shakllanmaganligi sababli tashqi bozorlarga qaramlik saqlanib qolmoqda.

Milliy urug‘chilik tizimining ahamiyati nafaqat importni qisqartirish, balki agrar tarmoqning tashqi shoklarga nisbatan barqarorligini ta’minlash bilan ham belgilanadi. Chunki sifatli urug‘lardan foydalanish hosildorlikning barqaror o‘sishini ta’minlaydi, resurslardan samarali foydalanish imkoniyatini kengaytiradi hamda mahsulot tannarxini pasaytirishga xizmat qiladi. Natijada qishloq xo‘jaligi ishlab chiqaruvchilarining iqtisodiy samaradorligi ortadi va oziq-ovqat mahsulotlari bozorida narx barqarorligi ta’minlanadi.

Tahlillar shuni ko‘rsatadiki, amalda sarflanayotgan sabzavot urug‘liklarining 85 foizdan ortig‘i aholi va kichik xususiy urug‘chilar tomonidan an’anaviy usullarda yetishtirilmoqda. Bu esa hosildorlikning pasayishi, kasallik va zararkunandalarga chidamlilikning sustligi hamda mahsulot sifatining beqarorlashuviga olib kelmoqda. Mutaxassislar hisob-kitoblariga ko‘ra, mazkur holat yillik mahsulot hajmi va fermerlar daromadlarining sezilarli yo‘qotilishiga sabab bo‘lmoqda.

O‘zbekiston Respublikasining “Urug‘chilik to‘g‘risida”gi Qonunida urug‘chilik sohasidagi munosabatlarni tartibga solish, seleksiya ishlarini rivojlantirish, sertifikatlashtirish tizimini takomillashtirish va xalqaro hamkorlikni kengaytirish davlat siyosatining muhim yo‘nalishlari sifatida belgilangan [1]. Biroq qonunchilikda “milliy urug‘chilik tizimi” tushunchasiga mustaqil ta’rif berilmagan.

Yuqoridagi nazariy va amaliy yondashuvlarni umumlashtirgan holda, bizning fikrimizcha, milliy urug‘chilik tizimi – mamlakat hududida urug‘larni yaratish, ko‘paytirish, sertifikatlashtirish, saqlash va muomalaga kiritish jarayonlarini qamrab oluvchi hamda davlat organlari, ilmiy-tadqiqot

muassasalari, ishlab chiqaruvchilar va bozor sub’ektlari o‘rtasidagi o‘zaro bog‘liq institutsional-iqtisodiy munosabatlar majmuasidir.

Mazkur yondashuv milliy urug‘chilikni alohida sohaviy faoliyat emas, balki agrar barqarorlik va oziq-ovqat xavfsizligini ta’minlashga xizmat qiluvchi kompleks iqtisodiy tizim sifatida baholash imkonini beradi. Shu nuqtai nazardan, milliy seleksiya markazlarini rivojlantirish, superelita va elita urug‘lar ishlab chiqarishni kengaytirish, laboratoriyalarni xalqaro standartlar asosida akkreditatsiya qilish hamda xususiy sektor ishtirokini kuchaytirish sohaning strategik rivojlanish yo‘nalishlari hisoblanadi.

Shu munosabat bilan milliy urug‘chilik tizimini rivojlantirish maqsadida ilmiy muassasalar va xususiy sektor o‘rtasidagi hamkorlikni kuchaytirish, mahalliy F1 duragaylarini yaratish bo‘yicha qo‘shma ilmiy loyihalarni kengaytirish, yuqori avlodli urug‘lar yetishtiruvchilar uchun rag‘batlantiruvchi mexanizmlarni joriy etish hamda milliy genbank infratuzilmasini rivojlantirish maqsadga muvofiq hisoblanadi. Bu choralar importga qaramlikni qisqartirish, milliy seleksiya salohiyatini oshirish va agrar tarmoqning uzoq muddatli barqarorligini ta’minlashga xizmat qiladi.

XULOSA

Shunday qilib, milliy urug‘chilik tizimini rivojlantirish agrar barqarorlik va oziq-ovqat xavfsizligini ta’minlashning muhim sharti hisoblanadi. Importga qaramlikni qisqartirish uchun mahalliy seleksiya ishlarini kengaytirish, sertifikatlashtirilgan urug‘lar ishlab chiqarish hajmini oshirish va urug‘chilik infratuzilmasini modernizatsiya qilish zarur.

Bu chora-tadbirlar milliy agrar tarmoq raqobatbardoshligini oshirish, importga qaramlikni qisqartirish hamda barqaror rivojlanish maqsadlariga erishish uchun muhim asos bo‘lib xizmat qiladi.

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СОВЕРШЕНСТВОВАНИЕ ОРГАНИЗАЦИОННО-ЭКОНОМИЧЕСКОГО МЕХАНИЗМА ПРОЕКТНОГО УПРАВЛЕНИЯ ИННОВАЦИОННЫМИ ПРОЕКТАМИ В СИСТЕМЕ СЕМЕНОВОДСТВА

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Аннотация: *В тезисе предложен авторский организационно-экономический механизм проектного управления в системе семеноводства Республики Узбекистан, разработанный на основе сравнительного анализа действующей модели управления и современных подходов к реализации проектов в области пангеномики, эпигенетики и цифрового сельского хозяйства. Обоснована необходимость перехода от функциональной организации работ к проектно-ориентированной модели, обеспечивающей интеграцию научных исследований, цифровых технологий и инструментов управления проектами. Предложена концепция проектного офиса, цифровой платформы управления и интегрального индекса оценки эффективности SPMEI. Практическая значимость результатов заключается в возможности использования предложенного механизма при модернизации системы семеноводства Министерства сельского хозяйства Республики Узбекистан.*

Ключевые слова: *проектное управление, семеноводство, пангеномика, эпигенетика, цифровая трансформация, организационно-экономический механизм.*

Abstract: *The thesis proposes an organizational and economic mechanism for project management in the seed production system of the Ministry of Agriculture of the Republic of Uzbekistan. The proposed approach is based on a comparative analysis of the existing management model and modern project management practices applied in pangenomics, epigenetics and digital agriculture. The study substantiates the transition from a functional management model to an integrated project-oriented system supported by a digital platform, a project management office and an integrated performance index (SPMEI). The proposed mechanism can be applied to improve the efficiency of innovative seed production projects and strengthen the digital transformation of the agricultural sector.*

Keywords: *project management, seed production, pangenomics, epigenetics, digital agriculture, organizational and economic mechanism.*

АКТУАЛЬНОСТЬ:

Развитие системы семеноводства Республики Узбекистан связано с необходимостью ускорения селекционного процесса, повышения качества семенного материала и внедрения современных технологий управления инновациями. Несмотря на проводимые реформы, действующая система организации проектного управления сохраняет преимущественно функциональный характер, что ограничивает координацию научных исследований, цифровую интеграцию данных и эффективность реализации инновационных проектов.

В мировой практике проекты в области пангеномики, эпигенетики и цифрового сельского хозяйства реализуются на основе интегрированных проектно-ориентированных моделей, объединяющих генетические исследования, цифровые платформы, геоинформационные технологии, искусственный интеллект и инструменты управления жизненным циклом проекта. Такой подход обеспечивает сокращение сроков создания новых сортов, повышение точности селекционных решений и более эффективное использование финансовых и научных ресурсов.

Сравнение действующей системы семеноводства Республики Узбекистан с современными международными подходами

свидетельствует о наличии организационных и технологических различий, препятствующих широкому внедрению передовых биотехнологий в практику управления отраслью. Это определяет необходимость разработки нового организационно-экономического механизма проектного управления, обеспечивающего интеграцию научных исследований, цифровой инфраструктуры и процессов принятия управленческих решений.

Актуальность исследования также определяется перспективами дальнейшего развития пангеномики, эпигенетических технологий, искусственного интеллекта и цифрового фенотипирования в селекционно-семеноводческой деятельности. Формирование единой проектно-ориентированной системы управления создает основу для реализации междисциплинарных исследований, внедрения цифровых инноваций и повышения конкурентоспособности национальной системы семеноводства в долгосрочной перспективе.

Цель: Целью исследования является разработка организационно-экономического механизма проектного управления в системе семеноводства Министерства сельского хозяйства Республики Узбекистан на основе сравнительного анализа действующей системы управления и современных подходов к реализации проектов в области пангеномики, эпигенетики и цифрового сельского хозяйства.

Для достижения поставленной цели предусматривается выявление организационных и технологических различий между существующей и современной моделями управления инновационными проектами, разработка авторской модели проектного управления, интегрирующей проектный офис, цифровую платформу, технологии пангеномики и эпигенетики, а также формирование системы оценки эффективности внедрения предлагаемых решений.

МАТЕРИАЛЫ И МЕТОДЫ:

Материалами исследования послужили нормативно-правовые документы Республики Узбекистан, официальные статистические данные, научные публикации по проектному управлению, пангеномике, эпигенетике и цифровому сельскому хозяйству, а также материалы международной практики организации инновационных проектов в аграрной сфере.

В исследовании использованы методы сравнительного и системного анализа, позволившие сопоставить действующую систему организации проектного управления в семеноводстве Республики Узбекистан с современными подходами управления проектами в области пангеномики, эпигенетики и цифровой трансформации сельского хозяйства. На основе результатов сравнительного анализа разработан авторский организационно-экономический механизм проектного управления, ориентированный на интеграцию научных исследований, цифровой инфраструктуры и современных методов управления инновациями.

РЕЗУЛЬТАТЫ:

В результате сравнительного анализа установлено, что действующая система организации проектного управления в семеноводстве Республики Узбекистан ориентирована преимущественно на функциональное управление отдельными этапами селекционного процесса. Такая организация характеризуется отсутствием единого проектного офиса, недостаточной интеграцией научных исследований, цифровых технологий и механизмов оценки эффективности инновационных проектов, что увеличивает сроки реализации селекционных программ и снижает эффективность использования научных и финансовых ресурсов.

Сопоставление действующей системы с современными подходами организации проектов в области пангеномики, эпигенетики и цифрового сельского хозяйства показало, что международная практика основана на проектно-ориентированном управлении полным жизненным циклом

инновационного проекта. В отличие от существующей модели, современные системы предусматривают интеграцию научных исследований, цифровых платформ, геоинформационных технологий, биоинформатики, искусственного интеллекта и инструментов мониторинга в единую систему управления проектами.

Проведенный сравнительный анализ позволил выделить пять ключевых направлений совершенствования проектного управления: организационную структуру управления, цифровую инфраструктуру, сопровождение научных исследований, систему оценки эффективности и управление проектными рисками. Выявленные различия стали методической основой разработки авторского организационно-экономического механизма проектного управления.

Предлагаемый механизм объединяет Проектный офис семеноводства, цифровую платформу управления, технологии пангеномики и эпигенетики, геоинформационные системы, цифровой мониторинг, искусственный интеллект и систему ключевых показателей эффективности (KPI) в единую организационно-экономическую модель управления инновационными проектами. Для комплексной оценки результатов внедрения предложен интегральный индекс SPMEI, позволяющий количественно оценивать уровень зрелости проектного управления, степень цифровизации, внедрение современных биотехнологий и эффективность реализации проектов.

Практическая реализация разработанного механизма обеспечит сокращение сроков селекционного процесса, повышение эффективности использования научной инфраструктуры, развитие цифрового сопровождения инновационных проектов, повышение качества управленческих решений и формирование организационных условий для внедрения перспективных технологий пангеномики, эпигенетики,

искусственного интеллекта и цифрового фенотипирования в систему семеноводства Республики Узбекистан.

ВЫВОДЫ:

Проведенное исследование подтвердило, что существующая система организации проектного управления в семеноводстве Республики Узбекистан в основном ориентирована на функциональное управление отдельными этапами селекционного процесса и не обеспечивает комплексную координацию научных исследований, цифровой инфраструктуры и процессов принятия управленческих решений, необходимых для реализации современных инновационных проектов.

На основе сравнительного анализа действующей системы управления и современных международных подходов к организации проектов в области пангеномики, эпигенетики и цифрового сельского хозяйства разработан авторский организационно-экономический механизм проектного управления, обеспечивающий переход к интегрированной модели управления инновационными проектами. В отличие от существующей практики, предложенный механизм предусматривает управление полным жизненным циклом селекционно-семеноводческого проекта — от формирования научной идеи и проведения генетических исследований до внедрения новых сортов в производство и оценки их социально-экономической эффективности.

Практическая значимость исследования заключается в возможности применения разработанного механизма при создании проектного офиса и цифровой платформы управления в системе семеноводства Министерства сельского хозяйства Республики Узбекистан. Реализация предложенного подхода позволит повысить эффективность управления портфелем инновационных проектов, обеспечить рациональное распределение ресурсов, сократить продолжительность селекционного цикла, повысить

качество управленческих решений и ускорить внедрение результатов научных исследований в практику.

Полученные результаты формируют научно-методическую основу для дальнейшего совершенствования проектного управления в аграрной сфере. Перспективы исследований связаны с разработкой методологии управления портфелем селекционно-семеноводческих проектов, созданием цифровой платформы поддержки принятия решений, совершенствованием интегральной системы оценки эффективности проектов, а также развитием организационных механизмов внедрения технологий пангеномики, эпигенетики, искусственного интеллекта и цифрового фенотипирования в национальную систему семеноводства.

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6-SECTION

LINGVISTIKADA LINGVOKULTUROLOGIYA: NAZARIY ASOSLARI, YO‘NALISHLARI VA TADQIQOT METODLARI

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Annotatsiya. *Ushbu maqolada lingvokulturologiyaning til, tafakkur va madaniyat o‘rtasidagi aloqadorlikni o‘rganuvchi mustaqil ilmiy yo‘nalish sifatidagi nazariy asoslari tahlil qilinadi. Tadqiqotda fanning shakllanish tarixi - V. Gumboldt g‘oyalaridan E. Sepir va B. Uorfning lingvistik nisbiylik gipotezasigacha - hamda uning asosiy yo‘nalishlari va lingvomadaniy konsept tushunchasi ko‘rib chiqiladi. Natijalar lingvokulturologiya til va madaniyatni yagona metodologik asosda birlashtiruvchi integrativ ilmiy paradigma ekanini ko‘rsatadi.*

Kalit so‘zlar: *lingvokulturologiya, til, madaniyat, lingvomadaniy konsept, mentalitet, aksiologik komponent, milliy tafakkur, til va madaniyat munosabati, qiyosiy lingvokulturologiya, komponent tahlil.*

Abstract. *This article analyses the theoretical foundations of cultural linguistics (lingvokulturologiya) as an independent scholarly field studying the interrelation of language, thought and culture. It reviews the formation of the discipline - from W. von Humboldt’s ideas to the linguistic relativity hypothesis of E. Sapir and B. Whorf - together with its main directions and the notion of the lingvocultural concept. The results show that cultural linguistics is an integrative scholarly paradigm uniting language and culture within a single methodological framework.*

Keywords: *cultural linguistics, language, culture, lingvocultural concept, mentality, axiological component, national thought, language-culture relation, comparative cultural linguistics, componential analysis.*

Аннотация. *В статье анализируются теоретические основы лингвокультурологии как самостоятельного научного направления, изучающего*

взаимосвязь языка, мышления и культуры. Рассматриваются история формирования дисциплины - от идей В. фон Гумбольдта до гипотезы лингвистической относительности Э. Сепира и Б. Уорфа - а также её основные направления и понятие лингвокультурного концепта. Результаты показывают, что лингвокультурология представляет собой интегративную научную парадигму, объединяющую язык и культуру в единой методологической системе.

Ключевые слова: *лингвокультурология, язык, культура, лингвокультурный концепт, менталитет, аксиологический компонент, национальное мышление, язык и культура, сопоставительная лингвокультурология, компонентный анализ.*

1. KIRISH

Zamonaviy tilshunoslikda inson omiliga asoslangan (antropotsentrik) yondashuvlarning kuchayishi natijasida til, tafakkur va madaniyat o‘rtasidagi aloqadorlikni o‘rganuvchi yangi ilmiy yo‘nalish - lingvokulturologiya shakllandi. Ushbu fan tilni faqat aloqa vositasi sifatida emas, balki milliy o‘zlik va madaniy tajribaning aks-sadosi sifatida talqin etadi va madaniyatni til orqali shakllanuvchi kognitiv tizim deb qaraydi. “Lingvokulturologiya” atamasi ilk bor V. N. Teliya, V. V. Vorobyov va V. A. Maslova kabi olimlarning tadqiqotlarida frazeologik maktab doirasida qo‘llanilgan. Mazkur maqolaning maqsadi lingvokulturologiyaning nazariy asoslarini, shakllanish tarixini, asosiy yo‘nalishlari hamda tadqiqot metodlarini tizimli tarzda umumlashtirib, uning til va madaniyatni birlashtiruvchi integrativ mohiyatini asoslashdan iborat.

2. TADQIQOT METODLARI

Maqola nazariy tahlil va manbalarni qiyosiy umumlashtirish usuliga asoslanadi: lingvokulturologiyaga oid asosiy ilmiy qarashlar tizimlashtirildi va fanning metodologik apparati tavsiflandi. Lingvokulturologiyada qo‘llaniladigan yetakchi metodlar sifatida komponent (sema) tahlili, etimologik tahlil, tipologik tahlil va konseptual tahlil ajratiladi. Komponent tahlil leksik ma’no minimal semantik birliklarga (semalarga) ajralishi mumkin degan postulatga asoslanib, madaniyatga xos til birliklarining semantik tuzilishini - lingvokulturemaning madaniy ma’nosi, madaniy semalar va madaniy

konnotatsiyalarni - aniqlaydi. Etimologik tahlil birliklarning kelib chiqishi orqali madaniyatning tarixiy ildizlarini ochsa, tipologik tahlil turli tillardagi lingvokulturologik universallarning umumiy va farqli jihatlarini qiyoslaydi. Bunga qo‘shimcha ravishda kontent-tahlil, freym tahlili va narrativ tahlil metodlari ham qo‘llanib, ko‘p hollarda kompleks metodologik yondashuv natijalarning ishonchliligini oshiradi.

3. NATIJALAR

Tahlil natijalari lingvokulturologiyaning o‘rganish obyekti madaniy konseptlarning turli tillar va tarixiy davrlarda tildagi aks etishi ekanini ko‘rsatdi. Fanning g‘oyaviy ildizi V. Gumboldtning “til - xalq ruhi va madaniyat mahsuli” degan konsepsiyasiga borib taqaladi; aynan shu g‘oya uning metodologik asosini tashkil etadi [8]. Til va madaniyat munosabatini o‘rganishda uchta konseptual yondashuv aniqlandi. Birinchi yondashuv (S. A. Atanovskiy, G. A. Brutyan, E. S. Markaryan) madaniyatning tilga bir yo‘nalishli ta’sirini ta’kidlaydi. Ikkinchi yondashuv tilning madaniyatga teskari (ichki) ta’sirini ko‘rib chiqib, V. Gumboldt va A. A. Potebnya g‘oyalariga, so‘ngra E. Sepir va B. Uorfning lingvistik nisbiylik gipotezasiga tayanadi; bu yo‘nalish I. L. Vaysgerber qarashlarida rivojlantirilgan. Uchinchi yondashuv esa til va madaniyatning o‘zaro ta’siri tamoyiliga asoslanib, tilni milliy mentalitetning ko‘rsatkichi, matnni esa madaniy kod sifatida talqin etadi. Lingvokulturologiya doirasida bir nechta yo‘nalish shakllangani aniqlandi: konkret (empirik), diaxronik, qiyosiy va chog‘ishtirma lingvokulturologiya hamda lingvomadaniy leksikografiya. Chog‘ishtirma yo‘nalishga M. K. Golovanivskayaning “taqdir”, “xavf”, “omad”, “jon”, “vijdon” kabi mavhum nomlar tahliliga asoslangan tadqiqoti misol bo‘ladi [7], leksikografik yo‘nalishga esa D. G. Maltsevaning lingvoo‘lkashunoslik lug‘ati namuna bo‘ladi. Tadqiqotning markaziy birligi sifatida lingvomadaniy konsept ajratildi. V. I. Karasik va G. G. Slyshkin ta’rifiga ko‘ra, lingvomadaniy konsept - til, ong va madaniyatni kompleks o‘rganishda qo‘llaniladigan shartli ruhiy birlik bo‘lib, u boshqa kognitiv birliklardan qadriyatli (aksiologik)

komponentning ajratib ko‘rsatilishi bilan farqlanadi [5]. S. G. Vorkachev va M. A. Alefirenko qo‘llagan “madaniy konsept” atamasi esa mazmunan “lingvomadaniy konsept” bilan deyarli mos keladi, chunki har qanday konsept til vositasida ifodalanadi [4].

4. MUHOKAMA

Natijalar lingvokulturologiyaning eng muhim farqlovchi belgisi konseptning qadriyatli (aksiologik) qatlamida namoyon bo‘lishini tasdiqlaydi: agar madaniyat egalari biror hodisani “yaxshi” yoki “yomon” deb baholay olsalar, demak, u shu madaniyatda konsept sifatida shakllangan bo‘ladi. N. F. Alefirenko lingvokulturologiyani tilshunoslik va madaniyatshunoslik kesishmasida shakllangan sintezlovchi (integrativ) yo‘nalish sifatida tavsiflaydi va tilni madaniyatni ifodalovchi hamda saqlovchi tizim deb qaraydi [4]. V. A. Maslova lingvokulturologiyaning vazifalari sirasiga til va madaniyat qadriyatlarini shakllantirish, ularning o‘zaro bog‘liqligini tahlil qilish, til-madaniy kompetensiyalarni aniqlash hamda til birliklari va konseptlarni tizimlashtirishni kiritadi. N. S. Trubetskoyning “hech bir so‘z madaniy konnotatsiyasiz mavjud bo‘la olmaydi” degan fikri tilning madaniyat bilan uzviy bog‘liqligini yaqqol ko‘rsatadi [13]. O‘zbek tilshunosligida lingvokulturologiyaning nazariy poydevorini A. Nurmonov, N. Mahmudov, N. Sayidrahimova, D. Xudoyberganova va Sh. Maxmaraimovaning ishlari mustahkamlagan. Ushbu izlanishlar fanning predmeti, obyekti va metodologik yondashuvlarini belgilab, milliy lingvokulturologiyaning rivojlanish yo‘nalishlarini ko‘rsatib bergan.

5. XULOSA

Lingvokulturologiya til, madaniyat va inson tafakkurining o‘zaro uyg‘unligini o‘rganuvchi integrativ va tarmoqlararo ilmiy yo‘nalishdir. U Gumboldt g‘oyalaridan boshlanib, lingvistik nisbiylik gipotezasi va konseptual tahlil orqali zamonaviy paradigmaga aylangan; uning markaziy birligi - qadriyatli komponentga ega lingvomadaniy konseptdir. Shu tariqa fan tilni

milliy madaniyatning ko‘zgusi, madaniyatni esa tilning ma’naviy mazmuni sifatida talqin etadi va madaniyatlararo muloqot, milliy o‘zlikni anglash hamda qiyosiy-kognitiv tahlil uchun mustahkam nazariy asos bo‘lib xizmat qiladi.

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“O‘TKAN KUNLAR” ROMANIDA TO‘Y KONSEPTINING ETNOLINGVISTIK TAHLILI

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Annotatsiya. *Maqolada o‘zbek etnolingvistikasi muammolariga, xususan, “O‘tkan kunlar” romanida to‘y konseptining etnolingvistik tahlili masalalariga bag‘ishlangan. Til bilan etnik xususiyatlarning o‘zaro munosabati, bir-biriga ta’siri Abdulla Qodiriyning “O‘tkan kunlar” romani misolida o‘rganilgan. Abdulla Qodiriy romanlaridagi lingvomadaniy birliklar maqolaning illyustrativ materiali sifatida xizmat qilgan.*

Abstract. *This article addresses issues in Uzbek ethnolinguistics, specifically focusing on the ethnolinguistic analysis of the "wedding" concept in the novel *O‘tkan kunlar* (Days Gone By). The interrelationship and mutual influence between language and ethnic characteristics are examined through the example of Abdulla Qodiriy’s novel *O‘tkan kunlar*. Linguocultural units from Abdulla Qodiriy’s novels serve as illustrative material for the article.*

Kalit so‘zlar: *til, etnos, konsept, urf-odat, marosim, madaniy kod, lingvomadaniy kod, etnosemantika va b.*

Keywords: *language, ethnos, concept, custom, ritual, cultural code, linguocultural code, ethnosemantics, etc.*

KIRISH

Mazkur maqolada Abdulla Qodiriyning “O‘tkan kunlar” romanidagi urf-odat va marosimlarning til orqali ifodalanishi masalalariga e’tibor qaratiladi. Romanda aks etgan *sovchilik, fotiha, nikoh, to‘y, kelin salom, mehmon kutish* kabi milliy marosimlardan *to‘y* lingvomadaniy kod tahlil etiladi. Bu jarayonlarda ishlatilgan iboralar va marosim atamalari xalqning madaniy merosini namoyon etadi. Asarda uchraydigan milliy leksika o‘zbek xalqining XIX asr oxiri – XX asr boshlaridagi ijtimoiy hayoti haqida qimmatli ma’lumot beradi.

Konsept [*lot.* conceptus – tushuncha; S.A.Askoldov-Alekseyev termini]

1Inson tafakkurining jamiyat kognitiv faoliyati natijasini namoyon qiladigan va aks ettirilayotgan narsa-buyum yoki hodisalar haqida keng qamrovli qomusiy axborot beradigan, ushbu axborotning ijtimoiy ong tomonidan qay tarzda talqin qilinishini hamda mazkur predmet yoki hodisaga uning munosabatini namoyon etadigan, nisbatan tartibli ichki tuzilishga ega bo‘lgan asosiy birligi, diskret mental tuzilma.

2 Kognitiv tilshunoslikda: xotira, mental leksikon, konseptual tizim va miya tilining, shuningdek, inson ongining mental va ruhiy imkoniyatlari, uning bilimi va tajribasini aks ettiruvchi axborot tizimining operativ mazmuniy birligi.

3 Lingvomadaniyatsyunoslikda: mentallik xususiyatiga hamda lisoniy ifodaga ega bo‘lgan, etnomadaniy o‘ziga xoslik bilan ajralib turuvchi jamoa ongi birligi.

4 Psixolingvistikada: insonning bilish va muloqot faoliyatida yuzaga keladigan, uning ruhiyati qonuniyatlariga bo‘ysunuvchi harakatchan perseptiv-kognitiv-affektiv tuzilma[42].

To‘y konsepti o‘zbek milliy madaniyatida inson hayotidagi eng muhim marosimlardan biri sifatida shakllangan bo‘lib, xalqning urf-odatlari, qadriyatlari, dunyoqarashi va ijtimoiy munosabatlarini o‘zida mujassam etadi. Etnolingvistik jihatdan to‘y nafaqat bir marosim nomi, balki xalqning tarixiy-madaniy tajribasini ifodalovchi milliy konsept hisoblanadi. To‘y konsepti o‘zbek xalqi tafakkurida *quvonch va shodlik, yangi hayot boshlanishi, oila qurish, jamoaviy birlik, baraka va farovonlik* kabi tushunchalar bilan bog‘lanadi. O‘zbek milliy madaniyatida inson hayotidagi muhim bosqichlar ko‘pincha to‘y orqali nishonlanadi. Ayniqsa, *nikoh to‘yi* ikki insonning birlashuvi bilan birga ikki oilaning, qarindosh-urug‘larning va jamiyatning munosabatlarini mustahkamlovchi marosim sifatida qaraladi.

[42]Xudoyberganova D. Zamonaviy tilshunoslik terminlarining izohli lug‘ati. – Toshkent: “Bookmany print”, 2024. – B.38-39.

Konseptlar tipologiyasi bu tilshunoslikda konseptlarning turlari bo‘yicha amalga oshirilgan tasniflarda belgilangan konsept turlari. (Jumladan, konseptlarning quyidagicha tasniflari mavjud: aniq-hissiy obraz, taqdimot, sxema, tushuncha, prototip, propozitsiya, freym, geshtalt, ssenariy (skript) (N.N.Boldirev); yuqori darajadagi konseptlar, oddiy konseptlar (S.G.Vorkachev); birlamchi konseptlar, ikkilamchi konseptlar, metakonseptlar, mutanosib konseptlar, shakllangan konseptlar, shakllanayotgan konseptlar, chegaraviy konseptlar, boshlang‘ich lingvomadaniy konseptlar (G.G.Slishkin); parametrik konseptlar, noparametrik konseptlar (V.I.Karasik); kichik fikriy manzaralar, sxema, giperonim, freym, insayt, ssenariy, kaleydoskopik konseptlar (A.P.Babushkin); obraz- lar, g‘oyalar, ramzlar, madaniy konseptlar (M.V.Pimenova); tushun- cha, taqdimot, ssenariy, sxema, freym, geshtalt, verballashgan konseptlar – noverbal konseptlar, universal konseptlar – milliy konseptlar, guruhiy konseptlar – shaxsiy konseptlar, aniq konseptlar (naturfakt va artefaktlar) – mavhum konseptlar (mentefaktlar) (Z.D.Popova, I.A.Sternin). Shuningdek, N.N.Boldirev konseptlarni mazmuniga ko‘ra madaniy, lisoniy, huquqiy, iqtisodiy va emot- sional konseptlar guruhlariga, verballashtirish vositalariga ko‘ra esa fonologik konseptlar, leksik konseptlar, frazeologik konseptlar, onomastik konseptlar, grammatik konseptlar, matniy konseptlar, matndan katta birliklar vositasida ifodalangan konseptlar guruhlariga tasnif qilgan.)[43]

Milliy urf-odat va ijtimoiy hodisa sifatida to‘y o‘zbek xalqining hayotida shaxsiy hodisa emas, balki ijtimoiy ahamiyatga ega marosim hisoblanadi. Unda nafaqat *kelin-kuyov*, balki *ota-ona, qarindoshlar, qo‘ni-qo‘shnilar, mahalla ahli* ham faol ishtirok etadi. Shu sababli to‘y konsepti xalqning hamjihatlik, mehmondo‘stlik va o‘zaro yordam qadriyatlarini aks ettiradi. Abdulla Qodiriyning “O‘tkan kunlar” asaridagi to‘y tasvirida ham bu jihatlar yaqqol

[43]Xudoyberganova D. Zamonaviy tilshunoslik terminlarining izohli lug‘ati. – Toshkent: “Bookmany print”, 2024. – B.39-40.

ko‘zga tashlanadi. To‘yda erkak va ayol mehmonlarning alohida majlis qilishi, osh tortilishi, sozandalar ishtiroki, qizlar bazmi kabi holatlar o‘zbek marosim madaniyatining belgilaridir.

To‘y konsepti *unashtirish* – ikki tomonning kelishuv jarayoni, *fotiha qilish* – nikohga rozilik bildirish, *qizlar majlisi* – kelinni dugonalari bilan kuzatish marosimi, *yor-yor aytish* – kelin kuzatish qo‘shig‘i, *nikoh o‘qish* – oilaning rasmiylashuvi, *kelin tushirish* – yangi xonadonga olib kirish kabi marosim unsurlarini qamrab oladi. Bu birliklarning har biri xalqning ma’naviy qarashlarini ifodalaydi.

To‘y konseptidagi ramziy ma’nolar sifatida quyidagilarga e’tibor qaratiladi:

Oq rang – to‘y marosimida oq rang poklik, baxt va yangi hayot ramzi hisoblanadi. Asardagi Kumushning oq shoyi kiyimlari uning kelinlik maqomini va pokligini ifodalaydi.

Osh – to‘y marosimining asosiy taomi sifatida baraka, saxovat va mehmondo‘stlik timsolidir.

Qo‘shiq va musiqa – dutor, tanbur, g‘ijjak, hofizlik kabi san’at unsurlari to‘yga ruhiy kayfiyat beradi. *Yor-yor, lapar* kabi janrlar esa xalqning his-tuyg‘ularini ifodalovchi marosim qo‘shiqlaridir.

Kelin obrazi – to‘y konseptida kelin yangi oilaning davomchisi, mehr-muhabbat va oilaviy barqarorlik timsoli sifatida namoyon bo‘ladi.

O‘zbek tilida *to‘y* so‘zi ko‘plab ibora va birikmalarda xalqning unga bo‘lgan munosabatini ko‘rsatadi: *to‘y muborak bo‘lsin* – ezgu tilak, *to‘y qilmoq* – marosim o‘tkazmoq, *to‘y egasi* – marosim tashkilotchisi, *to‘y-tomosha* – katta bayram, *to‘yona* – marosimga beriladigan sovg‘a yoki hissa kabilar to‘y konseptining lingvomadaniy ifodasidir. Bu birliklar *to‘y* tushunchasining o‘zbek tilidagi kuchli madaniy qatlamga ega ekanini ko‘rsatadi.

Etnolingvistik nuqtayi nazardan, to‘y konsepti quyidagi milliy qadriyatlarni ifodalaydi:

	Milliy qadriyat	To‘y konseptidagi ifodasi
1	Mehmondo‘stlik	Mehmon kutish, dasturxon yozish
2	Oila qadriyati	Nikoh va qarindoshlik rishtalari
3	Hamjihatlik	Qarindoshlar va mahalla ishtiroki
4	An’anaga sodiqlik	Marosimlarning saqlanishi
5	Hurmat	Kattalarning duosi va roziligi

To‘y konsepti o‘zbek milliy dunyoqarashida chuqur ildiz otgan etnomadaniy birlikdir. U oddiy bayram emas, balki xalqning oilaga, jamiyatga, insoniy munosabatlarga va kelajak avlodga bo‘lgan qarashlarini ifodalovchi murakkab madaniy hodisadir. *To‘y* konsepti orqali o‘zbek xalqining mehmondo‘stligi, jamoaviyligi, oilaparvarligi va qadriyatlarga hurmati namoyon bo‘ladi. Abdulla Qodiriy “O‘tkan kunlar” romanida to‘y bilan bog‘liq udum va marosimlarni yuksak mahorat bilan tasvirlab beradi.

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O‘QUVCHILARDA MUTOLAA MADANIYATI ASOSIDA MILLIY QADRIYATLARNI SHAKLLANTIRISHNING IJTIMOIY-MA’NAVIY ASOSLARI

Abdurazzokova Dilorom Narmuratovna

Toshkent shahar “Bilim” axborot-kutubxona markazi Elektron resurslardan foydalanish va o’quv zallari xizmati rahbari

Annotatsiya. *Ushbu maqolada o‘quvchilarda mutolaa madaniyati orqali milliy qadriyatlarni shakllantirishning ijtimoiy-ma’naviy asoslari tahlil qilinadi. Undan tashqari maqolada milliy qadriyatlarni ijtimoiy darajada mustahkamlashga oid tavsiyalar ham keltirilib o‘tiladi.*

Abstract: *This article analyzes the socio-spiritual foundations of the formation of national values in students through a reading culture. In addition, the article also provides recommendations for strengthening national values at the social level.*

Kalit so‘zlar: *mutolaa, madaniyat, kitobxonlik, o‘quvchi, milliy qadriyat, ma’naviyat, ijtimoiy muhit, tarbiya, tarixiy xotira, ma’naviy barkamollik, kutubxona, adabiyot, ilmiy-ommabop, jamiyat.*

Keywords: *reading, culture, reading, student, national value, spirituality, social environment, education, historical memory, spiritual perfection, library, literature, popular science, society.*

KIRISH

Mutolaa inson tafakkurini charxlaydigan, uning ma’naviy olamini teranlashtirib, ruhiy kamolotiga yo‘l ochadigan eng muhim madaniy jarayonlardan biridir. Ayniqsa, yosh avlod qalbi va ongida milliy qadriyatlarni barqaror qaror toptirishda mutolaa madaniyatining o‘rni beqiyos ahamiyat kasb etadi. Kitob sahifalari orqali o‘quvchi shunchaki bilim emas, balki xalqning asrlar qa’ridan yetib kelgan tarixiy xotirasi, bebaho ma’naviy merosi, urf-odat va an’analari bilan bevosita muloqotga kirishadi. Har bir satr, har bir obraz uning ongida milliy o‘zlikni anglash tuyg‘usini uyg‘otib, qalbida ma’naviy mas’uliyat

hissini mustahkamlaydi. Shu bois o‘quvchilarda mutolaa madaniyatini shakllantirish masalasi bugungi jamiyat taraqqiyoti, milliy o‘zlikni anglash va barkamol insonni tarbiyalash yo‘lidagi eng dolzarb ijtimoiy-ma’naviy vazifalardan biri sifatida namoyon bo‘lmoqda.

Milliy qadriyatlar tushunchasi xalqning asrlar davomida shakllangan dunyoqarashi, axloqiy mezonlari, e’tiqodi, tili va madaniyatini o‘zida mujassam etadi. Bu qadriyatlar avloddan avlodga og‘zaki va yozma manbalar orqali o‘tib kelgan [1]. Yozma manbalarning eng ishonchli va barqaror shakli esa kitobdir. Shuning uchun ham mutolaa madaniyati milliy qadriyatlarning uzluksizligini ta’minlovchi muhim vosita sifatida namoyon bo‘ladi. O‘quvchi badiiy va ilmiy asarlarni o‘qish jarayonida o‘z xalqining kechmishi, orzu-intilishlari, ma’naviy ideallari bilan tanishib, ularni ich-ichidan his eta boshlaydi.

Bugungi globallashuv sharoitida yoshlar ongiga turli axborot oqimlari tez va kuchli kirib kelmoqda [2]. Raqamli texnologiyalar, ijtimoiy tarmoqlar va ommaviy madaniyat mahsulotlari ko‘pincha milliy ruhdan yiroq bo‘lgan g‘oyalarni targ‘ib etadi. Bunday vaziyatda mutolaa madaniyati o‘quvchilarni ma’naviy himoya qiluvchi, ularning ongida tanqidiy fikrlash va ma’naviy tanlov qobiliyatini rivojlantiruvchi omilga aylanadi. Kitob bilan do‘stlashgan o‘quvchi har qanday axborotni milliy va umuminsoniy qadriyatlar mezonida baholashga o‘rganadi.

Mutolaa madaniyati – bosma nashrlar va elektron manbalarni o‘rganish uchun zarur bo‘lgan maxsus bilimlar, malakalar tajribalar majmuidir. Bizningcha, mutolaa madaniyatiga zamonaviy yondashuvlar asosida quyidagicha qisqa ta’rifni ham berish mumkin: mutolaa madaniyati o‘ziga xos ijtimoiy hodisa, jarayon, faoliyat sifatida bosma nashrlar va elektron manbalarni o‘rganish uchun zarur bo‘lgan maxsus bilimlar, malakalar va tajribalar majmuidir [3]. Mutolaa madaniyatining bunday talqini uning faqatgina o‘qish jarayoni bilan cheklanmasligini, balki shaxsning intellektual va ma’naviy kamolotini ta’minlovchi murakkab tizim ekanini ko‘rsatadi. Zero, mutolaa

jarayonida o‘quvchi axborotni tanlash, tahlil qilish, solishtirish va xulosalash ko‘nikmalarini egallaydi. Bu esa uning mustaqil fikrlash qobiliyatini rivojlantirib, o‘qilgan matnga ongli va tanqidiy munosabatda bo‘lishini ta’minlaydi. Aynan shu jihatlar mutolaani oddiy o‘qishdan farqlab, uni shaxs kamolotiga xizmat qiluvchi ma’naviy faoliyat darajasiga ko‘taradi.

O‘quvchilarda mutolaa madaniyatini shakllantirish jarayoni, avvalo, oiladan boshlanadi. Ota-onaning kitobga bo‘lgan munosabati, uyda kitobxonlik muhitining mavjudligi bolaning kelajakdagi o‘qishga bo‘lgan qiziqishiga kuchli ta’sir ko‘rsatadi. Agar bola kichikligidan kitobni qadrlash, uni bilim va hikmat manbai sifatida ko‘rishga o‘rgansa, maktab davrida bu odat yanada mustahkamlanadi. Shu jihatdan oilaviy mutolaa an’analarini tiklash va rivojlantirish milliy qadriyatlarni saqlashning muhim ijtimoiy asoslaridan biridir.

Maktab esa mutolaa madaniyatini tizimli ravishda shakllantiruvchi asosiy ijtimoiy institut hisoblanadi. Ta’lim jarayonida o‘qituvchining shaxsiy namunasi, tavsiya etilayotgan adabiyotlarning mazmuni va sifati, o‘quvchilarning mustaqil o‘qishga yo‘naltirilishi muhim ahamiyat kasb etadi. Ayniqsa, milliy adabiyot namunalari, xalq og‘zaki ijodi, buyuk ajdodlarimiz qalamiga mansub asarlar orqali o‘quvchilarda milliy g‘urur, vatanparvarlik va ma’naviy mas’uliyat tuyg‘ulari shakllanadi. Bu asarlar orqali o‘quvchi o‘zligini anglaydi, o‘z xalqiga mansublik hissini chuqur his etadi.

Badiiy asarlar mutolaa jarayonida o‘quvchining hissiy olamini boyitadi. Qahramonlar taqdiri, ularning ichki kechinmalari, tanlov va qarorlari o‘quvchini befarq qoldirmaydi. U o‘zini qahramon o‘rniga qo‘yib ko‘radi, yaxshilik va yomonlik, adolat va zulm, sadoqat va xiyonat kabi tushunchalar ustida mushohada yuritadi.

Masalan, Gulxaniyning “Zarbulmasal” asari o‘zbek mumtoz adabiyotida xalqona tafakkur, teran hikmat va o‘tkir satira uyg‘unlashgan nodir badiiy manba hisoblanadi. Asarda ramziy obrazlar orqali jamiyat hayotidagi kamchiliklar,

insoniy fe’l-atvorlar va axloqiy mezonlar yoritilib, o‘quvchini hushyorlik, zukkolik va donishmandlik ruhida tarbiyalaydi. Chingiz Aytmatovning “Oq kema” qissasi bolalik orzulari, adolatga intilish va shafqatsiz haqiqat o‘rtasidagi ziddiyatni chuqur badiiy ifodalaydi. Asar inson va tabiat, mehr va beparvolik muammolarini ramziy obrazlar orqali yoritib, o‘quvchini befarq qoldirmaydi. Said Ahmadning “Qorako‘z majnun”, “Qoplon” va “Sobiq” hikoyalarida esa inson xarakterining turli qirralari, jamiyat va shaxs o‘rtasidagi murakkab munosabatlar hayotiy va ta’sirchan tarzda tasvirlanadi. Bu hikoyalar orqali o‘quvchi kulgi va iztirob uyg‘unligida insoniy haqiqatni anglaydi. Jek Londonning “Hayotga muhabbat” hikoyasi insonning yashashga bo‘lgan cheksiz irodasi va matonatini ulug‘laydi. Og‘ir sinovlar qarshisida ham umidni yo‘qotmaslik g‘oyasi asarning asosiy ma’naviy negizini tashkil etadi. Nodar Dumbadzening “Hellados” hikoyasi insoniylik, samimiyat va mehr tuyg‘ularini sodda, ammo chuqur ma’noli tasvirlar orqali ochib beradi. Asar o‘quvchini inson qalbidagi ezgulikni qadrlashga chorlaydi. Bu esa axloqiy tarbiyaning eng samarali shakllaridan biridir. Badiiy adabiyotda aks etgan bunday axloqiy mezonlar o‘quvchi ongida milliy qadriyatlar sifatida mustahkamlanadi.

Ilmiy-ommabop va tarixiy asarlar mutolaasi o‘quvchining tafakkurini kengaytiribgina qolmay, uning ijtimoiy ongini, tarixiy xotirasini va ma’naviy mas’uliyatini shakllantiradi. O‘z xalqining kechmishini chuqur bilgan, ajdodlarining ilm-fan, madaniyat hamda davlat boshqaruvidagi ulkan yutuqlaridan boxabar bo‘lgan o‘quvchi kelajakka ishonch bilan qaraydi, o‘zini buyuk an’analarning munosib davomchisi sifatida his etadi. Aynan mana shu tuyg‘u milliy o‘zlikni anglashning muhim ma’naviy asosini tashkil etadi.

Bu jarayonda tarixiy va badiiy asarlarning o‘rni alohida ahamiyat kasb etadi. Abdurauf Fitratning “Abulfayzxon” dramasi orqali o‘quvchi tarixiy shaxslar faoliyati, davlat boshqaruvidagi murakkab jarayonlar va ularning millat taqdiriga ta’siri haqida teran mushohada yuritadi. Asarda aks etgan siyosiy va ma’naviy inqiroz manzaralari o‘quvchini hushyorlikka, tarixdan saboq olishga

undaydi. Abdulla Oripovning “Sohibqiron” dramasi esa Amir Temur siymosi orqali davlatparvarlik, adolat va kuchli iroda g‘oyalarini ulug‘laydi. Ushbu asar o‘quvchi ongida vatanparvarlik va milliy g‘urur tuyg‘ularini mustahkamlaydi.

Odil Yoqubovning “Ulug‘bek xazinasi” romani ilm-fan va ma’rifatning jamiyat taraqqiyotidagi beqiyos o‘rnini yuksak badiiy darajada ochib beradi. Mirzo Ulug‘bek obrazida ilmga sadoqat, haqiqatga intilish va fidoyilik g‘oyalari mujassam bo‘lib, o‘quvchini bilim va tafakkur orqali kamol topishga chorlaydi. Abdulla Qodiriyning “O‘tkan kunlar” va “Mehrobdan chayon” romanlari esa tarixiy davr manzaralari fonida jamiyatdagi ma’naviy muammolar, axloqiy tanazzul va insoniy tanlov masalalarini yoritadi. Bu asarlar orqali o‘quvchi millat taqdiriga daxldor masalalarni chuqur anglab, tarixiy xotiraning naqadar muhimligini his etadi. Abdulhamid Cho‘lponning “Kecha va kunduz” romani esa mustamlaka davridagi xalq ruhiyati, ozodlikka intilish va milliy uyg‘onish g‘oyalarini badiiy jihatdan teran ifodalaydi. Asar o‘quvchini tarixiy adolatsizliklarni anglashga, milliy ozodlik va inson qadrini himoya qilish g‘oyalari atrofida mushohada yuritishga undaydi. Shu tariqa, ilmiy-ommabop va tarixiy-badiiy asarlar mutolaasi o‘quvchi ongida tarixiy xotira, milliy g‘urur va ma’naviy mas’uliyatni shakllantirib, uni o‘zligini anglagan, kelajakka ishonch bilan qaraydigan shaxs sifatida tarbiyalaydi.

Mutolaa madaniyatini shakllantirishda til masalasi ham alohida o‘rin tutadi. Ona tilida o‘qilgan asar o‘quvchining qalbiga chuqurroq singadi, uning tafakkurini milliy ruhda shakllantiradi. Ona tili orqali milliy qadriyatlar, mentalitet va dunyoqarash uzatiladi. Shu sababli o‘quvchilarni ona tilidagi adabiyotlar bilan muntazam tanishtirib borish ijtimoiy-ma’naviy jihatdan muhim vazifadir.

Zamonaviy davrda mutolaa madaniyatini rivojlantirishda an’anaviy va innovatsion yondashuvlarni uyg‘unlashtirish zarur. Elektron kitoblar, audio asarlar va raqamli kutubxonalar o‘quvchilarning o‘qishga bo‘lgan qiziqishini oshirishi mumkin. Biroq mazmun masalasi har doim ustuvor bo‘lib qoladi. Qaysi

shaklda bo‘lishidan qat’i nazar, mutolaa milliy va ma’naviy jihatdan boy asarlarga tayanishi lozim. Shundagina u o‘quvchi shaxsini barkamol etib tarbiyalaydi.

Ijtimoiy-ma’naviy muhit mutolaa madaniyatining rivojida bevosita va hal qiluvchi rol o‘ynaydi. Jamiyatning kitobga bo‘lgan e’tibori, yozuvchi va shoirlarni qadrlashi, kutubxona va madaniyat muassasalarining faoliyati o‘quvchilar ongida kitobga nisbatan chuqur hurmat va mehr uyg‘otadi. Kitob shunchaki o‘qiladigan varaqlar to‘plami emas, balki inson ruhini boyituvchi, tafakkurini kengaytiruvchi va ijtimoiy ongini shakllantiruvchi muhim vosita ekanligi jamiyat tomonidan qadrlanganda, yoshlar ham mutolaani hayotining ajralmas qismi sifatida qabul qiladi. Jamiyatda kitobxonlikka bo‘lgan ijtimoiy e’tibor o‘quvchi shaxsida intellektual qiziqish va ma’naviy barkamollikni uyg‘otadi. Masalan, yozuvchi va shoirlarning nufuzga ega bo‘lishi, ularning asarlarini jamoatchilik e’tiboriga havola qilinishi, ijtimoiy tadbirlarda kitob va adabiyotning ulug‘lanishi o‘quvchi qalbida kitobga hurmat va unga bo‘lgan mehrni mustahkamlaydi. Shu bilan birga kutubxonalar faoliyati, kitob almashinuvi, adabiy klublar va kitob festivallari yoshlarni kitob o‘qishga jalb qilib, mutolaa madaniyatini tizimli ravishda rivojlantiradi.

Kitob o‘qish ijtimoiy nufuzga ega bo‘lgan jamiyatda yoshlar kitobni faqat bilim manbai sifatida emas, balki hayotiy yo‘l-yo‘riq, axloqiy va ma’naviy tarbiya vositasi sifatida qabul qiladi. Ular o‘z hayotini kitob orqali shakllantirishga, undagi ezgulik va donolik namunalarini kundalik harakatlarida tatbiq etishga intiladi. Natijada mutolaa madaniyati nafaqat shaxsiy, balki jamiyat miqyosida ham milliy qadriyatlarning mustahkamlanishiga xizmat qiladi. Insonlar o‘rtasida hurmat, vijdonlilik, mehr-oqibat va mas’uliyat kabi fazilatlar rivojlanadi, jamiyatning ma’naviy poydevori mustahkamlanadi. Shu jihatdan, kitob va mutolaa nafaqat bilim olish vositasi, balki jamiyatning ruhiy va ma’naviy barqarorligini ta’minlovchi ijtimoiy institutga aylanadi. Kitobxonlik qadriyatini hurmat qiladigan jamiyatda yoshlar nafaqat o‘zligini

anglaydi, balki milliy xotirani asrash, ajdodlar merosini qadrlash va kelajak avlod uchun boy ma’naviy zamin yaratishga mas’uliyat bilan yondashadi. Mutolaa orqali shakllangan madaniyat, inson shaxsini barkamol etadi va milliy qadriyatlarning uzluksizligini ta’minlaydi, jamiyatning ijtimoiy-ma’naviy rivojlanishiga hissa qo‘shadi.

Tavsiyalar sifatida quyidagilarni keltirmoqchiman:

- O‘quvchilarda kitob o‘qishga qiziqish va odatni shakllantirish uchun maktab va oilada muntazam kitob mutolaa mashg‘ulotlarini tashkil etish lozim. Shu bilan birga, bolalarni turli janrdagi asarlar bilan tanishtirish, ularni savol-javob va muhokamalar orqali fikrlashga o‘rgatish muhimdir.
- Kutubxonalar, madaniy markazlar va ilmiy-ommabop tadbirlar faoliyatini kengaytirish, kitobxonlikni ijtimoiy nufuzli faoliyat sifatida targ‘ib qilish zarur. Bu yoshlar ongida kitobga hurmat va mutolaani hayotning ajralmas qismi sifatida qabul qilish hissini uyg‘otadi.
- O‘quvchilarni o‘z xalqining tarixiy shaxsiyati, adabiy merosi va milliy qadriyatlari bilan tanishtirish muhimdir. “O‘tkan kunlar”, “Mehrobdan chayon”, “Kecha va kunduz”, “Ulug‘bek xazinasi” kabi tarixiy va badiiy asarlar orqali milliy o‘zlik, vatanparvarlik va ma’naviy barkamollikni shakllantirish mumkin.
- Mutolaa jarayonida o‘quvchilarga matnni tahlil qilish, asosiy g‘oya va qadriyatlarni ajratib olish, muallif fikrini tushunish hamda mustaqil xulosalar chiqarish ko‘nikmalarini rivojlantirish tavsiya etiladi.
- Mahalliy va xorijiy yozuvchi, shoir va olimlarning hayoti va ijodi bilan tanishtirish, ularning asarlarini o‘quv dasturiga kiritish orqali o‘quvchilarda milliy g‘urur, ijodiy qiziqish va ma’naviy tarbiya hissi kuchayadi.
- Oila a’zolarini mutolaa jarayoniga jalb qilish, oilada kitobxonlik muhiti yaratish va ijtimoiy muhit orqali kitobga hurmatni kuchaytirish orqali yoshlarning ma’naviy barkamolligi ta’minlanadi.

- Elektron kitoblar, ilmiy-ommabop videolar, onlayn kutubxonalar va interaktiv platformalar orqali o‘quvchilarning mutolaa madaniyatini kengaytirish, ularni zamonaviy bilim va milliy qadriyatlarni uyg‘un tarzda qabul qilishga o‘rgatish mumkin.

XULOSA

Xulosa qilib aytganda, o‘quvchilarda mutolaa madaniyati asosida milliy qadriyatlarni shakllantirish murakkab, ammo nihoyatda muhim ijtimoiy-ma’naviy jarayondir. Bu jarayon oiladan boshlanib, maktab va jamiyat miqyosida davom etadi. Kitob orqali o‘quvchi o‘z xalqining ma’naviy xazinasi bilan tanishadi, o‘zligini anglaydi va kelajakka mas’uliyat bilan qarashni o‘rganadi. Mutolaa madaniyati rivojlangan jamiyatda milliy qadriyatlar barqaror bo‘ladi, ma’naviy barkamol avlod voyaga yetadi. Ana shunday avlod esa millatning kelajagi, uning ma’naviy va madaniy davomiyligining eng ishonchli kuchi va boyligidir.

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THE MORPHO-SYNTACTIC AND FUNCTIONAL FEATURES OF ACTIVE AND PASSIVE VOICE IN ENGLISH AND UZBEK

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***Abstract**: This article examines the morpho-syntactic and functional characteristics of active and passive voice constructions in English and Uzbek. While the active voice is typically considered the unmarked and default form in both languages, the passive voice introduces structural and pragmatic variation through syntactic and morphological transformations. Drawing on theoretical frameworks proposed by Quirk et al., Huddleston and Pullum, and Uzbek linguists such as Nurmonov and Nuritdinova, the study explores how voice distinctions reflect differences in grammatical structure, communicative focus, and language typology. The analysis demonstrates that English relies primarily on syntactic mechanisms, whereas Uzbek employs agglutinative morphology to express voice distinctions. The findings highlight the importance of considering both structural and functional aspects in comparative linguistic analysis.*

***Keywords:** active voice, passive voice, morpho-syntax, English linguistics, Uzbek linguistics, comparative analysis, verb voice.*

INTRODUCTION

The category of voice plays a central role in the grammatical organization of sentences, determining the relationship between the action, the subject, and other participants. In both English and Uzbek, voice distinctions reflect not only structural differences but also communicative priorities such as emphasis, focus, and information structure.

Traditionally, the active voice has been regarded as the default or unmarked construction, while the passive voice introduces marked variation through structural transformation. However, modern linguistic studies suggest

that voice alternation is not merely a formal phenomenon but also a functional and pragmatic one. Scholars such as Quirk et al. (1985, pp. 159-162) and Huddleston and Pullum (2002, pp. 1421-1424) emphasize that voice choice is closely linked to discourse context and communicative intent.

In comparative linguistics, analyzing voice systems in typologically different languages—such as English (analytic) and Uzbek (agglutinative)—provides valuable insights into how grammatical meanings are encoded. This article aims to examine the morpho-syntactic and functional features of active and passive voice in both languages, highlighting their similarities, differences, and communicative roles.

Active Voice in English and Uzbek

In English, the active voice is characterized by a direct relationship between the subject and the action, where the subject functions as the agent. According to Quirk et al. (1985, pp. 164-166), it represents the unmarked form of the verb, typically realized in a Subject–Verb–Object (SVO) structure.

The butler murdered the detective.

In this construction, the subject (*the butler*) performs the action, while the object (*the detective*) receives it. Huddleston and Pullum (2002, pp. 1426-1428) argue that such constructions emphasize the agent and contribute to clarity in communication. This explains why the active voice is dominant in everyday speech and informal writing, as noted by Murphy (2012, pp. 84-86) and Azar (2007, pp. 210-212). From a morphological perspective, Embick (1998, pp. 45-49) highlights that the active voice in English lacks explicit marking, reinforcing its status as the default grammatical form. Hewings (1999, pp. 52-54) further notes that this structural simplicity enhances communicative efficiency.

In Uzbek, the active voice similarly indicates that the subject performs the action. It is considered the primary or main voice (*asosiy nisbat*) and does not require special affixes.

Bola kitob o‘qiyapti (*‘The boy is reading a book.’*).

Here, the subject (*bola*) clearly functions as the agent. Uzbek linguists such as Nurmonov (2014, 88-92-b.) and Nuritdinova (2021, 44-48-b.) emphasize that the active voice serves as the base form within a broader system of verb voices, including passive, reflexive, causative, and reciprocal forms. Thus, in both languages, the active voice is structurally simple, functionally dominant, and pragmatically associated with clarity and directness.

The passive voice shifts the focus from the agent to the action or its recipient, thereby altering the informational structure of the sentence. In English, passive constructions are formed using the auxiliary verb *to be* and the past participle of the main verb.

The detective was killed by the butler.

In this sentence, the subject (*the detective*) represents the recipient of the action, while the agent may be optionally expressed or omitted. Huddleston and Pullum (2002, pp. 1430-1435) note that the omission of the agent is a defining feature of passive constructions. Functionally, the passive voice is widely used in formal, academic, and scientific contexts. Murphy (2012, pp. 88-90) and Azar (2007, pp. 215-218) observe that it allows speakers and writers to maintain an impersonal tone and emphasize results rather than agents. Hewings (1999, pp. 56-58) and Dooley and Evans (2006, pp. 112-115) also highlight its frequent use in journalism. According to Embick (1998, pp. 52-56), passivization involves both syntactic restructuring and the introduction of auxiliary verbs, illustrating the analytic nature of English grammar.

In Uzbek, the passive voice is expressed through morphological means, typically by adding affixes such as *-il*, *-in*, or *-l* to the verb stem:

Kitob o‘qildi (*‘The book was read.’*).

As noted by Nurmonov (2014, 95-98-b.) and Nuritdinova (2021, 52-56-b.), Uzbek passive constructions do not require auxiliary verbs, reflecting the agglutinative nature of the language. Similar to English, the agent is often omitted when it is unknown or irrelevant. This contrast demonstrates a key

typological difference: English relies on syntactic mechanisms, whereas Uzbek uses morphological marking. Despite this difference, both languages employ the passive voice for similar pragmatic purposes, such as emphasizing results, omitting agents, and structuring discourse.

CONCLUSION

The comparative analysis of active and passive voice in English and Uzbek reveals both structural similarities and typological differences. In both languages, the active voice functions as the unmarked and default construction, characterized by simplicity and clarity. The passive voice, on the other hand, introduces marked variation through syntactic or morphological means and serves important communicative functions.

English primarily relies on syntactic transformations and auxiliary verbs to express passivity, while Uzbek utilizes affixation within its agglutinative system. Despite these differences, both languages use voice alternation to manage focus, highlight information, and adapt to different communicative contexts. Overall, the study demonstrates that voice is not merely a grammatical category but a functional tool that reflects broader linguistic and communicative principles. Understanding these features contributes to comparative linguistics, language teaching, and translation studies.

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THE DEFENSIVE SYSTEM OF THE HAZARASP FORTRESS AND THE FORMATION OF URBAN PLANNING IN SOUTHERN KHOREZM (FROM THE 6TH CENTURY BC TO THE EARLY MIDDLE AGES)

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Abstract. *This paper analyses the archaic- and ancient-period defensive structures of the Hazarasp fortress, the administrative centre of the southern Khorezm oasis, their architectural features, the system of archaeological sites that formed around the fortress, and the factors behind the formation of urban culture in the region, on the basis of the results of archaeological research and written sources. The paper examines the double corridor-type defensive wall of the Hazarasp fortress, its system of pilasters and loopholes, the stages of its reconstruction, and its connection with such sites as Chingiztepa, Sandiqlibobo, Qirqqiz and Qalajik.*

Keywords: *Hazarasp, southern Khorezm, defensive wall, pilaster, loophole, archaic period, ancient period, Achaemenids, wall-breaking machine, Chingiztepa, Qalajik, urban planning.*

INTRODUCTION

The southern Khorezm oasis is considered one of the territories of Central Asia in which ancient urban culture took shape. Although Achaemenid rule was established in Central Asia in the 6th century BC, the archaeological research carried out in the southern Khorezm oasis has revealed no evidence confirming Achaemenid rule in this territory. On the contrary, the analysis of written sources has yielded materials proving that a large number of people who were dissatisfied with the invasions of Cyrus II and Darius I and with their policies migrated to this territory. Information about the population that occupied the

southern Khorezm oasis has also been preserved in the works of Herodotus, and in them there is no mention of Achaemenid rule; on the contrary, it is stated that the population migrated away and did not submit. The Kuzaliqir site, located in the north-west of the Khorezm oasis, functioned in this period as a state dependent on the Achaemenids, and, in the opinion of researchers, it is precisely the population of Kuzaliqir that is depicted in the Behistun rock inscriptions and in the images at Persepolis and Susa.

In the 6th–4th centuries BC, the Hazarasp fortress continued its activity as the administrative centre of the region, while Khumbuztepa supplied handicraft products to the state. The purpose of the present study is to characterise the defensive system of the Hazarasp fortress in the archaic and ancient periods, to determine the place of this fortress within the network of fortified sites of southern Khorezm, and to identify the historical factors that conditioned the formation of urban planning in the region from the 6th century BC to the early Middle Ages.

MATERIALS AND METHODS

The study is based on three groups of sources. The first group comprises the materials of the archaeological research carried out at the Hazarasp fortress, above all the excavations of 1958–1961, which made it possible to establish the original layout of the fortress and the structure of its fortifications, as well as the published results of the investigations of the sites surrounding Hazarasp — Chingiztepa 1–3, Tuyatortar, Qoratosh 1–2, Toshqala-2, Sandiqlibobo, Qirqqiz, Qalajik, Little Qalajik, Qushchaqirgan-qala, Raimbobo and Goyibota (the works of S.B. Bolelov, Q. Sobirov, M. Mambetullaev, Sh. Matrasulov, A. Allaberganov, Ya.G. Gulyamov and others). The second group consists of comparative archaeological data from other regions of Central Asia, in particular the materials of G.A. Pugachenkova on the Durnali site in Margiana and the finds of academician E.V. Rtveladze at the Kyzyltepa, Bandykhan 2 and Kyzylcha VI sites in Surkhandarya. The third group comprises written sources: the works of

Herodotus for the archaic period, and the accounts of al-Maqdisi and Yaqut for the medieval period.

The research employs the comparative-historical and typological methods: the parameters and construction techniques of the defensive structures (wall type, building material, towers, loopholes, moats and additional walls) are compared across the sites and across chronological periods; the interpretation of the archaeological data is verified against the evidence of the written sources. Dating rests primarily on the analysis of pottery assemblages and stratigraphic observations published for the sites concerned.

RESULTS

The research carried out at the Hazarasp fortress has made it possible to establish its original layout. The fortress was rectangular in plan, its western and eastern sides measuring 280 metres and its southern and northern sides 294 metres. It was surrounded by a double defensive wall built of pakhsa (rammed earth), with a shooting gallery located between the walls. On the outer surface of the exterior defensive wall, pilasters were used as decoration. Between the pilasters, arrowhead-shaped loopholes were set in two rows: the loopholes of the lower row were cut at a level corresponding to half of a human body and were intended for fighting in a kneeling position, while the upper loopholes, of a man’s height, were intended for fighting in a standing position. The second storey of the defensive wall, whose roof was closed, also served for archery. The third storey above it was open and protected by merlons. At the four corners of the fortress, open square towers in the form of four pilasters were built; along the walls, three open rectangular four-pilaster structures were made on each side, all of them projecting from the wall. In the southern section of the defensive wall there were four towers, between which the fortress gate was set.

The defensive walls of the Hazarasp fortress were built on a high, solid foundation, and to strengthen the main wall further, an additional “screening” wall of brick was constructed. The defensive walls were thick and high. The

fortress was also protected by a moat: the earth required for building the wall was taken from around the fortress, and this formed the moat, yet another element of the defensive system. Researchers have suggested that the moat around Hazarasp was very wide. Although the question of what kind of construction the site had in the 6th century BC remains open, it has been established that the fortress was rebuilt in the 5th–4th centuries BC. In later periods, the walls of the fortress were enclosed by an even stronger brick wall, the earlier walls remaining on its inner side. A pottery workshop was also found inside the fortress; its activity began in the archaic period and continued into the Middle Ages. It has not been possible to reconstruct archaeologically the medieval layout of the fortress, since it was demolished during the rebuilding of the 19th–20th centuries; however, according to al-Maqdisi and Yaqut, in the Middle Ages Hazarasp was also a strong fortress that had expanded territorially, with a new defensive wall, strengthened with towers and a moat, built at a considerable distance from the ancient one.

Around Hazarasp, a whole system of sites of the ancient and medieval periods took shape. Eighteen kilometres east of Hazarasp, in the Toshsoqa area, lies the Chingiztepa site, where three mounds bearing this name have been investigated; they are topographically connected with Khumbuztepa and were raised from gravel. Chingiztepa-1 (Great Chingiztepa) is 10 metres high and preserved in conical form, the circumference of its upper part being 20 metres and of its lower part 70 metres; the pottery found around the mound dates to the 4th–2nd centuries BC and to the 12th–13th centuries AD. Three hundred metres to its north lies Chingiztepa-2 (Little Chingiztepa), with a circumference of 21 metres and a height of 3.5 metres. The Chingiztepa-3 site is 3 metres high and 30 metres in diameter, circular in plan, in antiquity surrounded by a double defensive wall with round towers. Owing to the distinctive construction of Chingiztepa, a popular legend connected with the size of Genghis Khan’s army

arose around it; archaeological research refutes this legend, but to this day there is no consensus among researchers regarding the function of the site.

Three kilometres west of Great Chingiztepa, the Tuyatortar site was found — rectangular in plan, measuring 375 x 318 metres, surrounded by a defensive wall of pakhsa. Four kilometres south of Khumbuztepa the circular Qoratosh-1, and 20 kilometres east of Hazarasp the quadrangular Qoratosh-2 sites were identified. The Toshqala-2 site in the Tuproqqala district is square in plan, with a total area of 50 x 50 metres; the fortress is surrounded by a corridor-type defensive wall, the corridor being 2 metres wide, the outer wall 170 cm and the inner wall 150 cm thick, and the wall is reinforced with lance-shaped loopholes and semicircular towers.

The Sandiqlibobo fortress, 3.5 kilometres south-west of Hazarasp in the territory of the village of Mukhomon, is rectangular in plan, measuring 90 x 105 metres; it was surrounded by a defensive wall 9–10 metres thick, protected by round towers projecting five metres from the wall, built of mud bricks measuring 40 x 40 x 10 cm, and dated to the 4th century BC; it was also enclosed by a moat 10–15 metres wide. The Qirqqiz fortress, 8 kilometres north-west of Hazarasp in the territory of the village of Qorayontoq, existed from the 4th century BC to the 2nd century AD; it is quadrangular in plan and was protected by a moat 2 metres wide and 1.5 metres deep.

The Qalajik site, located 21 kilometres west of Bogot district and also known among the people as “Dovud-qala”, has been dated to the 5th–2nd centuries BC. It was built on sand 9 metres high and surrounded by a double defensive wall with a shooting gallery. The outer wall was 1.78–2 metres thick, and at a distance of 3.5 metres from it an additional wall, 0.78 metres thick and 1.5 metres high, was built in order to prevent wall-breaking machines from approaching. On the outer side of the defensive wall, lance-shaped loopholes were placed at intervals of 1–1.15 metres, and the entrance door of the fortress was set 68–70 centimetres above floor level. The fortress was abandoned in the

1st–2nd centuries AD and re-occupied in the 6th–8th centuries, when a castle (koshk) measuring 15 x 20 metres, with pakhsa walls, was built in the middle of the northern wall. In the 9th–11th centuries agriculture developed around Qalajik; the fortress was repaired anew, and in place of the old wall a pakhsa stronghold 12–17 metres high and 5–7 metres wide was built. In this period the population did not reside permanently inside the fortress — the inhabitants of the surrounding villages came here for protection in times of invasion.

In the early and developed Middle Ages, urban development in southern Khorezm expanded further. The defensive wall of Qushchaqirgan-qala, located 6 kilometres north of the town of Bogot and dating to the 6th–8th centuries, was 10 metres high, with the lower part of the wall 25 metres wide. One and a half kilometres north-east of Qalajik lies Little Qalajik, which existed in the 9th–11th centuries and occupied an area of 2 hectares. In Bogot district, the Raimbobo site of the 10th–11th centuries and the Goyibota site of the 9th–12th centuries — believed to be mentioned under the name “Zardukh” in the works of al-Maqdisi and al-Istakhri — have also been identified. In the Afrighid period, the defensive system of the Hazarasp fortress was further strengthened; the southern border of Khorezm shifted as far as the area of Bir Ota (Dargon Ota); between it and Hazarasp, fortresses such as Jigarband, Kaparos and Sadvar were built, and between Hazarasp and Khiva, fortresses such as Qirqqiz, Qushchaqirgan and Tepa Avliyo were erected.

DISCUSSION

The construction of such a strong, large fortress as Hazarasp in the 5th–4th centuries BC, interpreted historically, is connected with the strengthening of the state. It may be that precisely in this period the population of the southern Khorezm oasis grew, the organ of administration was strengthened, and the Hazarasp fortress was chosen as the centre of the region. As a result of Khorezm gaining independence at the end of the 5th and the beginning of the 4th centuries

BC and of the policy of strengthening the state borders, numerous fortresses were also built in the territory of southern Khorezm.

The decoration of defensive walls with pilasters remains one of the questions little studied by researchers. Before the archaeological research at Hazarasp began, G.A. Pugachenkova had identified such a construction technique at the Durnali site in Margiana, dating to the 1st–2nd centuries BC, and on this basis put forward the view that this architectural style first took shape in Margiana. However, the archaeological research carried out at Hazarasp in 1958–1961 substantiated the conclusion that the decoration of outer defensive walls with pilasters had been applied in southern Khorezm considerably earlier than in Margiana. The Hazarasp materials thus revise the accepted view of the origin of this architectural device and indicate the local roots of the Khorezmian fortification tradition.

The fact that in the archaic period the Hazarasp fortress was built so strong and high indicates that wall-breaking machines were used in battle at that time, since only walls built high and wide could withstand their assault. It has been archaeologically confirmed that Cyrus II made extensive use of precisely such machines in his attacks on Margiana and Bactria: academician E.V. Rtveladze found traces of a great fire, sling stones, thick ash layers and remains of arrows in the 6th-century-BC layers of the Kyzyltepa, Bandykhan 2 and Kyzylcha VI sites in Surkhandarya, and numerous sling stones weighing 10–20 kg and more were found in the shooting galleries and tower of Bandykhan II. This proves the use of wall-breaking machines in assaults on fortresses; the Bandykhan II site, destroyed in that period, was never rebuilt. The parameters of the Hazarasp fortifications should therefore be understood as a response to the military technology of the age.

Of particular significance is the conclusion, reached as a result of archaeological research, that the reason for the reconstruction of the Hazarasp defensive wall was neither battle nor the deterioration of the walls: the

population rebuilt the city in order to provide it with an even stronger defence. This information in itself shows that no state of war was observed in the territories of southern Khorezm during the 6th–4th centuries BC. Some researchers connect the rebuilding of the defensive wall of the Hazarasp fortress with the invasion of Alexander the Great. In our interpretation, however, the construction of Hazarasp and of the other cities of southern Khorezm is connected with the Khorezmian state's gaining of independence; this process began before Alexander's invasion, and by that period a solid defensive system had already taken shape in Khorezm.

Finally, the development of urban construction in southern Khorezm from the 4th century BC onwards had a dual motivation. On the one hand, it served to strengthen the southern border of the ancient Khorezmian state; on the other hand, it was connected with securing a worthy place in international trade, since commerce flourished in the border cities of the state, and the creation of adequate conditions for merchants became one of the important tasks. The continuity of the fortification tradition — from the archaic double corridor-type walls of Hazarasp to the Afrighid-period border fortresses of Jigarband, Kaparos and Sadvar — demonstrates the stable, locally rooted character of the urban culture of southern Khorezm.

CONCLUSION

From the 4th century BC, the construction of cities developed intensively in southern Khorezm. The architectural solutions of the Hazarasp fortress — the double corridor-type wall, the pilasters, the two-tier system of loopholes, the moat and the additional screening walls — testify to the high level of development of the defensive architecture of ancient Khorezm and confirm that the urban-planning traditions of the region took shape on a local basis, in conditions free of external invasions. The system of sites that formed around Hazarasp — Chingiztepa, Tuyatortar, Qoratosh, Toshqala-2, Sandiqlibobo, Qirqqiz, Qalajik and the early medieval fortresses — reflects the uninterrupted

development of urban culture in southern Khorezm from the 6th century BC to the early Middle Ages.

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HOZIRGI O‘ZBEK TILIDA AYRIM O‘ZLASHMA SO‘ZLARNING LEKSIK-SEMANTIK XUSUSIYATLARI (ATTORLIK NOMLARI MISOLIDA)

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Annotatsiya*. Ushbu maqolada hozirgi o‘zbek tilidagi attorlik, ya’ni parfyumeriya va kosmetika nomlari tizimidagi o‘zlashma so‘zlarning leksik-semantik va pragmatik xususiyatlari tahlil qilinadi. Chet tillardan kirib kelgan ushbu nomlarning ona tili lug‘at tarkibiga moslashish jarayonlari hamda iste'molchiga ta'sir o‘tkazish kuchi ilmiy asoslab berilgan. Do‘konlar peshlavhalari va mahsulot yorliqlaridan olingan misollar yordamida o‘zlashma birliklarning matnda estetik joziba yaratishi hamda reklama funksiyalarini bajarishi ochib berilgan. Olingan natijalar tilshunoslikning leksikologiya va onomastika yo‘nalishlari uchun amaliy ahamiyat kasb etadi.*

Kalit so‘zlar. *O‘zbek tilshunosligi, o‘zlashma so‘zlar, attorlik nomlari, parfyumeriya leksikasi, kosmetika terminlari, leksik-semantik tahlil, eronimlar, reklama tili.*

Annotation. *This article analyzes the lexico-semantic and pragmatic characteristics of loanwords in the system of perfumery and cosmetic names (eronyms) of the modern Uzbek language. The processes of adaptation of these names in the vocabulary of the native language and their power of influence on the consumer are scientifically grounded. Based on examples taken from shop signs and product labels, the functions of loan units in creating aesthetic appeal and performing advertising tasks are revealed. The results obtained are of practical importance for such branches of linguistics as lexicology and onomastics.*

Keywords: *Uzbek linguistics, loanwords, perfumery names, perfumery lexicon, cosmetic terms, lexico-semantic analysis, eronyms, advertising language.*

Аннотация. *В данной статье анализируются лексико-семантические и прагматические особенности заимствованных слов в системе парфюмерно-косметических наименований (эронимов) современного узбекского языка. Научно обоснованы процессы адаптации этих наименований в словарном составе родного языка и сила их воздействия на потребителя. На примерах, взятых из вывесок*

магазинов и этикеток продуктов, раскрыты функции заимствованных единиц по созданию эстетической привлекательности и выполнению рекламных задач. Полученные результаты имеют практическое значение для таких разделов языкознания, как лексикология и ономастика.

Ключевые слова: *узбекское языкознание, заимствованные слова, парфюмерные наименования, лексика парфюмерии, косметические термины, лексико-семантический анализ, эронимы, язык рекламы.*

KIRISH

Hozirgi o‘zbek tilshunosligida globallashuv va xalqaro marketing aloqalarining kengayishi natijasida lug‘at tarkibining keskin boyishi hamda faollashishi kuzatilmoqda. Bugungi kunda o‘zbek tili leksikasida eng tez va dinamik o‘zgarayotgan sohalardan biri bu savdo va reklama tizimiga tegishli nomalardir. Ayniqsa, aholining kundalik ehtiyojiga aylangan attorlik, ya’ni kosmetika va parfyumeriya mahsulotlari hamda ularni sotuvchi do‘konlarning nomlanishi o‘zbek tili lug‘at tarkibiga chet tillaridan o‘zlashgan qatlamning oqib kelishini kuchaytirdi. Mazkur o‘zlashma so‘zlar tilimizga shunchaki yangi tushunchani olib kirib qolmasdan, balki o‘ziga xos leksik-semantik va pragmatik xususiyatlarni ham namoyon etmoqda. Mavzuning dolzarbligi shundaki, an’anaviy leksikologiyada o‘zlashma so‘zlar ko‘proq ilmiy-texnikaviy yoki adabiy terminlar doirasida o‘rganilgan bo‘lib, kundalik iste’mol bozoridagi brendlar va attorlik nomlarining (eronimlarning) lisoniy tabiati tizimli tadqiq etilmagan. Bugungi kunda savdo do‘konlari peshlavhalarida va parvarish vositalarida uchraydigan “piling”, “praymer”, “skrab”, “konsiler” yoki “shampun” kabi yuzlab o‘zlashma so‘zlar iste'molchilar nutqiga chuqur kirib keldi. Ushbu so‘zlarning o‘zbek tili muhitiga moslashishi, ma'no qirralari va xaridorga ta'sir o‘tkazish kuchi tahlili tilshunoslik uchun juda muhimdir. Shu sababli, ushbu tadqiqotning bosh maqsadi hozirgi o‘zbek tilida attorlik nomlari sifatida qo‘llanilayotgan o‘zlashma so‘zlarning leksik-semantik xususiyatlarini ilmiy jihatdan aniqlashdan iboratdir.

TADQIQOT METODOLOGIYASI

Hozirgi o‘zbek tilida attorlik nomlari sifatida qo‘llanilayotgan o‘zlashma so‘zlarning leksik-semantik xususiyatlarini aniqlashga qaratilgan ushbu tadqiqot tizimli leksikologiya va onomastika prinsiplariga tayanadi. Tadqiqot materiallarini to‘plashda kuzatish va maqsadli tanlash metodidan foydalanildi. Bu orqali zamonaviy savdo majmualari, attorlik do‘konlari peshlavhalari hamda mahsulot yorliqlaridan 30 dan ortiq eng faol o‘zlashma terminlar tahlil uchun ajratib olindi.

To‘plangan materiallarning qaysi tillardan kirib kelganini aniqlash va ularni guruhlashda lisoniy-tavsifiy metod qo‘llanildi. O‘zlashma so‘zlarning o‘zbek tili muhitidagi ma’no o‘zgarishlarini tadqiq etishda semantik tahlil usuliga tayanildi. Shuningdek, ushbu nomlarning xaridorga ta’sir o‘tkazish xususiyatlarini baholashda pragmatik tahlil metodidan foydalanildi. Mazkur metodologik yondashuv o‘zlashma attorlik nomlarining lisoniy va funksional tabiatini aniq baholash imkonini berdi.

NATIJALAR

Hozirgi o‘zbek tili lug‘at tarkibidagi attorlik nomlari, ya’ni parfyumeriya va kosmetika sohasiga oid o‘zlashma so‘zlarni leksik-semantik jihatdan tahlil qilish natijasida tilimizda yangi funksional-terminologik tizim shakllangani aniqlandi. Zamonaviy savdo do‘konlari, marketing vositalari va mahsulot yorliqlaridan yig‘ilgan leksik birliklar o‘zbek tili iste’moliga asosan ingliz, fransuz, rus va arab tillaridan kirib kelgan. Tahlillar shuni ko‘rsatadiki, bu so‘zlar shunchaki chet tili birliklari bo‘lmay, o‘zbek tili qonuniyatlariga ko‘ra lisoniy assimilyatsiyaga (moslashishga) uchragan va mano jihatidan ma’lum bir tizimga solingan. To‘plangan materiallar semantik xususiyatlariga ko‘ra to‘rtta asosiy leksik-tematik guruhga ajratildi: yuz va tana terisini parvarish qilish vositalari nomlari, makiyaj va pardoz vositalari nomlari, soch parvarishi terminlari hamda parfyumeriya va hid taratuvchi vositalar nomlari. Yuz va tana terisini parvarish qilish vositalari guruhida ingliz tilidan olingan “skrab” (scrub – ishqalamoq), “piling” (peeling – qobiqni shilmoq), “tonik” (tonic –

tetiklashtiruvchi) va “loson” (lotion – yuvish) so‘zlari eng faol leksik birliklar hisoblanadi. Komponent tahlil usuli orqali aniqlanishicha, “skrab” va “piling” so‘zlari o‘zbek tili muhitida o‘zining birlamchi umumiy ma'nosidan torayib, faqatgina “terini chuqur tozalovchi maxsus kosmetik vosita” degan tor terminologik semani ifodalay boshlagan. Shuningdek, “penka” (ruscha – ko‘pik) va “gel” (lotincha – quyqa) kabi o‘zlashmalar o‘zbek tilidagi “ko‘pik” va “shira” so‘zlarining sematik maydonini siqib chiqarib, savdo muloqotida mutlaqo mustaqil leksik birlikka aylangani ma’lum bo‘ldi. Bu holat o‘zlashma so‘zlarning tilimizda yangi tushunchalarni nomlashdagi differensial (farqlovchi) rolini ko‘rsatadi. Makiyaj va pardoz vositalari guruhida leksik-semantik o‘zgarishlar yanada yorqinroq namoyon bo‘ladi. Masalan, ingliz tilidan o‘zlashgan “praymer” (primer – birinchi, asosiy), “konsiler” (concealer – yashiruvchi, berkituvchi), “haylayter” (highlighter – yorituvchi, bo‘rttiruvchi) va “bronzer” (bronzer – bronza tus beruvchi) so‘zlari o‘zbek tili leksikasida mutlaqo yangi semantik maydonni shakllantirgan. Pragmatik tahlillar natijasiga ko‘ra, “konsiler” so‘zi etimologik jihatdan “yashirish” ma'nosini anglatsa-da, o‘zbek iste’molchisi ongida “ko‘z atrofidagi qoralik va teridagi mayda nuqsonlarni berkituvchi kremsimon vosita” degan aniq predmetli ma'no (denotat) bilan bog‘langan. Shuningdek, fransuz tilidan rus tili orqali o‘tgan “pudra” (poudre – chang, bordon) va “rumyana” (ruscha – qizartiruvchi) so‘zlari ham o‘zbek muloqotida o‘z semantikasini saqlab qolgan holda faol qo‘llanilmoqda.

Parfyumeriya va hid taratuvchi vositalar nomlanishida arab va fransuz tillarining ta’siri kuchli ekanligi aniqlandi. Xususan, o‘zbek tiliga qadimda arab tilidan kirib kelgan “attor” (parfumer) va “atr” (hid) so‘zlari bugungi kunda “attorlik” (kosmetika va parfyumeriya do‘koni) va “atir” (xushbo‘y suyuqlik) shaklida o‘zbek tilining o‘z so‘zlaridek semantik jihatdan to‘liq assimilyatsiya bo‘lgan. Fransuz tilidan kirgan “odekolon” (eau de Cologne – Kyoln suvi) va “duxi” (ruscha – rux, hid) so‘zlari esa o‘zbek tili stilistikasida o‘zaro semantik

farqlanishga ega bo‘lgan. Ya’ni, “odekolon” ko‘proq erkaklar parvarish vositasini, “duxi” (yoki atir) esa ayollar xushbo‘ylik vositalarini ifodalashga ixtisoslashgan. Do‘konlar peshlavhalaridagi “Parfums”, “Fragrance” kabi inglizcha o‘zlashmalar esa pragmatik jihatdan xaridorga estetik joziba va mahsulotning yuqori sifatli (brend) ekanligini bildirish uchun reklama tili ko‘rsatkichi sifatida qo‘llanilmoqda. Tadqiqot natijalari shuni ko‘rsatadiki, barcha o‘zlashma attorlik nomlari o‘zbek tili lug‘at tarkibini boyitish bilan birga, reklama va ommaviy nutq madaniyatiga ham o‘z ta'sirini o‘tkazmoqda. Ko‘pgina o‘zlashma so‘zlar o‘zbek tilining ichki grammatik qoidalariga bo‘ysunib, so‘z yasalish jarayonlarida ishtirok etmoqda (masalan: shampunlamoq, piling qilmoq, skrablamoq). Bu esa o‘zlashma qatlamning ona tilimiz leksik tizimi bilan naqadar chuqur integratsiyalashayotganidan dalolat beradi. Olingan natijalar hozirgi o‘zbek savdo onomastikasi va terminologiyasining leksik-semantik tarkibini to‘g‘ri baholashga, shuningdek, reklama va iste'mol madaniyatida til me'yorlarining saqlanishini ta’minlashga xizmat qiladi.

O‘tkazilgan qo‘shimcha lisoniy tahlillar hozirgi o‘zbek tilidagi attorlik nomlari nafaqat individual tushunchalarni ifodalashini, balki matn ichida o‘ziga xos funksional-semantik mikrotizimni yuzaga keltirishini ko‘rsatdi. Kosmetika va parfyumeriya sohasidagi o‘zlashma so‘zlarning lisoniy tabiati ularning o‘zbek tili lug‘at tarkibida sinonimik munosabatlarga kirishish xususiyati bilan ham xarakterlanadi. Masalan, ingliz tilidan kirib kelgan “pomada” (fransuzcha "pommade" – olma malhami) va “blesk” (ruscha – yaltiroq) so‘zlari o‘zbek tilidagi "lab bo‘yog‘i" birikmasi bilan ma'nodoshlik hosil qiladi. Biroq, komponent tahlil usuli qo‘llanilganda, bu so‘zlar o‘rtasida jiddiy semantik farqlanish (differensiyatsiya) mavjudligi ma'lum bo‘ldi. Ya’ni, “lab bo‘yog‘i” barcha turdagi vositalar uchun umumiy nom (giperonim) bo‘lib kelsa, “pomada” qattiq va rang beruvchi vositani, “blesk” esa suyuq va asosan yaltiroqlik beruvchi attorlik mahsulotini ifodalovchi xos so‘zlar (giponimlar) sifatida

mustaqillashgan. Bu holat o‘zlashma leksikaning tilimiz ichki ma'no tizimini yanada aniqlashtirish va boyitishga xizmat qilayotganidan dalolat beradi. Shuningdek, so‘nggi yillarda o‘zbek tili iste'moliga Osiyo madaniyati, xususan, Janubiy Koreya va Yaponiya kosmetika sanoatining rivojlanishi natijasida mutlaqo yangi tipdagi o‘zlashma so‘zlar ham kirib kelayotgani aniqlandi. Bunga ingliz tili orqali xalqaro termin sdarajasiga ko‘tarilgan “tinter” (tint – tus, rang berish), “kuon” (cushion – yostiqcha) hamda “patchi” (patch – yopishtirgich, plastir) kabi so‘zlarni misol keltirish mumkin. Ushbu birliklar o‘zbek tili so‘z yasash tizimiga ham ta'sir ko‘rsatmoqda. Xususan, “piling qilmoq”, “skrablamoq”, “maska qo‘ymoq” kabi fe'liy birikmalarning nutqda faollashishi o‘zlashma attorlik nomlarining o‘zbek tili grammatik qonuniyatlari asosida to‘liq o‘zlashtirilayotganini ko‘rsatadi. Savdo majmualari va internet do‘konlaridagi “Krasota”, “Beauty”, “Parfum” kabi eronimlar (do‘kon nomlari) esa iste’molchi ongiga vizual va pragmatik ta’sir o‘tkazish, ularda mahsulotning xorijiy va yuqori sifatli ekanligi haqida ijobiy subyektiv baho shakllantirish uchun marketing-lingvistik qurol sifatida qo‘llanilmoqda. Hozirgi o‘zbek tilidagi attorlik leksikasini yanada chuqurroq tadqiq etish jarayonida o‘zlashma so‘zlarning nutqda gender xususiyatlarini, ya’ni erkaklar va ayollar muloqot madaniyatidagi farqlarni ko‘rsatuvchi sotsiolingvistik ko‘rsatkich sifatida namoyon bo‘lishi ham aniqlandi. Tahlillar shuni ko‘rsatadiki, ingliz va fransuz tillaridan kirib kelgan “tonalniy krem”, “praymer”, “konsiler”, “kollagen”, “serum” (zardob) kabi o‘ta ixtisoslashgan parvarish va makiyaj terminlari asosan xotin-qizlar guruhiga oid nutqiy mikromuhitda faol qo‘llaniladi va ularning faollik darajasi yuqoridir. Erkaklar nutqiy sferasida esa attorlik mahsulotlariga oid o‘zlashma leksikaning miqdori birmuncha cheklangan bo‘lib, unda asosan ingliz tilidan kirgan “shampun”, “gel”, “balzam” yoki fransuzcha “odekolon” kabi universal va gigiyenik xarakterdagi so‘zlar ustunlik qiladi. Bu holat o‘zlashma attorlik nomlarining jamiyatda jinsiy-ijtimoiy guruhlar kesimida turlicha o‘zlashtirilayotganini va nutqda tabaqalanishni yuzaga keltirayotganini

ko‘rsatadi. Bunga qo‘shimcha ravishda, parfyumeriya va kosmetika sohasidagi o‘zlashma so‘zlarning o‘zbek tili lug‘at tarkibida semantik differensiyatsiya (ma'no parchalanishi) jarayonini keltirib chiqarishi ham kuzatildi. Masalan, xalqaro leksikaga oid “anti-eyj” (anti-age – qarishga qarshi), “lifting” (lifting – tortish, ko‘tarish) va “detoks” (detox – toksinlardan tozalash) kabi so‘zlar o‘zbek tili iste’moliga shunchaki yangi so‘z bo‘lib kirmasdan, reklamalarda mahsulotning yoshi va funksiyasini aniqlovchi semantik markerlar vazifasini bajarmoqda. Ushbu birliklar an’anaviy o‘zbek tilidagi “yoshartiruvchi” yoki “tozalovchi” so‘zlarining semantik maydonini qisman toraytirib, ularga zamonaviy, ilmiy-tibbiy va professional tus beradi. Natijada, savdo va reklama matnlarida iste’molchiga ta’sir o‘tkazishning yangicha lisoniy modellari yuzaga keladi va bu holat hozirgi o‘zbek tilining leksik-semantik tizimi tashqi lingvistik ta’sirlarga naqadar ochiq va moslashuvchan ekanligini fundamental jihatdan tasdiqlaydi.

XULOSA

Hozirgi o‘zbek tilida attorlik nomlari sifatida qo‘llanilayotgan ayrim o‘zlashma so‘zlarning leksik-semantik xususiyatlarini tizimli tadqiq etish natijasida shakllangan ilmiy-nazariy umumlashtirishlar tilimiz lug‘at tarkibining tashqi manbalar hisobiga boyish qonuniyatlarini aniqlash imkonini beradi. Olingan natijalar shuni to‘liq tasdiqlaydiki, parfyumeriya va kosmetika sohasiga oid o‘zlashma birliklar o‘zbek tili muhitida shunchaki chet tili elementlari bo‘lib qolmasdan, balki ona tilimizning ichki qonuniyatlariga ko‘ra lisoniy assimilyatsiyaga uchrab, mustaqil funksional-terminologik tizimni shakllantirgan. Ingliz, fransuz, rus va arab tillaridan kirib kelgan ushbu leksik qatlam o‘zbek tili lug‘at tarkibida tushunchalarni aniqlashtirish, professional muloqotni ta'minlash va yangi semantik maydonlarni yuzaga keltirishda muhim o‘rin tutadi.

Tadqiqot davomida aniqlangan eng muhim lisoniy xususiyatlardan biri – o‘zlashma attorlik nomlarining nutqda semantik differensiyatsiya (ma'no

farqlanishi) jarayonini yuzaga keltirishi va gender omili bilan bog‘liq sotsiolingvistik ko‘rsatkich sifatida namoyon bo‘lishidir. Bu so‘zlar o‘zbek tilining so‘z yasalish tizimiga ham faol integratsiyalashib, yangi fe’liy va otli birikmalarning shakllanishiga xizmat qilmoqda. Shu bilan birga, zamonaviy savdo va reklama peshlavhalarida o‘zlashma brend nomlarining (eronimlarning) qo‘llanilishi iste'molchi ongiga vizual va pragmatik ta’sir o‘tkazish, ularda mahsulot sifatiga nisbatan ijobiy subyektiv baho shakllantirishning asosiy lingvomarketing quroli bo‘lib xizmat qiladi. Yakuniy xulosa sifatida ta'kidlash lozimki, o‘zlashma attorlik leksikasining leksik-semantik va amaliy xususiyatlarini o‘rganish hozirgi o‘zbek tilshunosligida neologizmlar nazariyasi, onomastika va sotsiolingvistika sohalarini yangi hayotiy materiallar bilan boyitadi. Ushbu tadqiqot natijalari kelajakda savdo terminologiyasi, reklama tili va kundalik iste’mol sohasidagi boshqa nomlarning ham lisoniy tabiatini, adabiy til me’yorlari doirasida rivojlanishini tahlil qilish uchun muhim amaliy manba bo‘lib xizmat qiladi.

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BIRINCHI SHARQ RENESSANSI DAVRIDA MARKAZIY OSIYO XALQLARI HAYOTIDA MA'NAVIY TARBIYANING USTUVORLIGI

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Annotatsiya. *Mazkur maqolada Birinchi Sharq renessansi davri (IX asr oxiri XII asr boshlari) Markaziy Osiyo xalqlari ijtimoiy hayotida ma'naviy tarbiyaning tutgan o'rni tahlil qilinadi. Tadqiqot tarixiy manbalar va zamonaviy ilmiy adabiyotlarni qiyosiy tahlil qilish asosida olib borilgan bo'lib, unda hech qanday eksperimental yoki empirik tadqiqot usullaridan foydalanilmagan. Tadqiqot natijalari shuni ko'rsatadiki, o'sha davrda ma'naviy tarbiya nafaqat shaxsning axloqiy kamolotini, balki jamiyatning ilmiy va ijtimoiy taraqqiyotini ham belgilovchi asosiy omil sifatida qaralgan.*

Kalit so'zlar: *Birinchi Sharq renessansi, ma'naviy tarbiya, Markaziy Osiyo, mutafakkirlar, ta'lim tizimi, ma'naviyat, o'rta asr sivilizatsiyasi.*

Аннотация. *В данной статье анализируется роль духовно-нравственного воспитания в общественной жизни народов Центральной Азии в период Первого Восточного ренессанса (конец IX начало XII века). Исследование проведено на основе сравнительного анализа исторических источников и современной научной литературы, при этом какие-либо экспериментальные или эмпирические методы исследования не использовались. Результаты исследования показывают, что в тот период духовно-нравственное воспитание рассматривалось как основной фактор, определяющий не только нравственное совершенствование личности, но и научный и социальный прогресс общества.*

Ключевые слова: *Первый Восточный ренессанс, духовно-нравственное воспитание, Центральная Азия, мыслители, система образования, духовность, средневековая цивилизация.*

Abstract. *This article analyzes the role of moral and spiritual upbringing in the social life of the peoples of Central Asia during the period of the First Eastern Renaissance (late 9th early 12th centuries). The research was conducted on the basis of a comparative analysis of historical sources and contemporary scholarly literature, without the use of any experimental or empirical research methods. The findings of the study indicate that during this period, moral and spiritual upbringing was regarded as a fundamental factor determining not only the moral development of the individual but also the scientific and social progress of society.*

Keywords: *First Eastern Renaissance, moral and spiritual upbringing, Central Asia, thinkers, education system, spirituality, medieval civilization.*

KIRISH

Markaziy Osiyo xalqlarining tarixiy taraqqiyotida IX asr oxiri XII asr boshlarini qamrab olgan davr jahon fani va madaniyati tarixida Birinchi Sharq renessansi nomi bilan mashhur bo‘lib, bu davr insoniyat sivilizatsiyasi rivojiga ulkan hissa qo‘shgan. Ushbu davrning o‘ziga xos xususiyati shundaki, ilmiy bilimlarning yuksalishi bilan bir qatorda jamiyatda ma’naviy tarbiyaga alohida e'tibor qaratilgan edi. Zamonaviy davlat siyosati hujjatlarida ham ta’kidlanishicha, mamlakatda amalga oshirilayotgan keng qamrovli islohotlar va bunyodkorlik ishlari natijasida xalqning ongu tafakkuri, dunyoqarashi tobora o‘zgarib bormoqda va bu jarayonda "Milliy tiklanishdan milliy yuksalish sari" g‘oyasining ahamiyati kundan kunga ortib bormoqda [1]. Shu bilan birga, ma’naviy ma’rifiy jarayonlarni tashkil etishda yaxlit tizimning yetishmasligi, ayniqsa yosh avlodni turli ma’naviy tahdidlardan himoya qilish borasida yetarlicha ilmiy tadqiqot ishlarining olib borilmayotgani zamonaviy tuzilmalarda ham muammo sifatida qayd etiladi, bu esa tarixiy tajribaga, xususan ilk Sharq renessansi davridagi ma’naviy tarbiya tizimiga murojaat qilish zaruratini yanada kuchaytiradi [1].

Turdiyev B.S. tadqiqotlarida qayd etilganidek, ilk Sharq renessansi davrida Markaziy Osiyo mutafakkirlarining siyosiy qarashlari ham ma’naviy tarbiya g‘oyalari bilan chambarchas bog‘liq holda shakllangan, chunki davlat boshqaruvi va adolat masalalari axloqiy kamolot bilan uzviy bog‘liq deb hisoblangan [2]. Abdilazizova Sh.X. esa Renessans davrining ikki bosqichga bo‘linishini asoslab, har ikki davrdagi allomalarning ilmiy hamda ma’naviy merosini qiyoslar ekan, birinchi davrga xos xususiyat sifatida bilim olish va ma’naviy kamolotning ajralmas birlikda kechganini alohida ta’kidlaydi [3]. Mazkur tadqiqotning dolzarbligi shundan iboratki, bugungi globallashuv sharoitida yosh avlod tarbiyasida milliy va umuminsoniy qadriyatlarni

uyg‘unlashtirish zarurati kuchayib bormoqda, bu esa o‘z navbatida tarixiy tajribaga, xususan Birinchi Sharq renessansi davri merosiga murojaat qilishni taqozo etadi. Tadqiqotning maqsadi ushbu davrda ma’naviy tarbiyaning jamiyat hayotidagi ustuvor o‘rnini ilmiy adabiyotlar asosida tizimli tahlil qilish va zamonaviy ta’lim tizimi uchun amaliy xulosalar chiqarishdan iborat.

METODOLOGIYA VA ADABIYOTLAR TAHLILI

Tadqiqotda tarixiy-qiyosiy tahlil, mazmun tahlili va tizimli yondashuv usullaridan foydalanilgan. Ishda hech qanday sinov tajribalar, kuzatuvlar yoki intervyular o‘tkazilmagan, balki mavjud ilmiy adabiyotlar, tarixiy manbalar va zamonaviy tadqiqotlar chuqur tahlil qilingan holda umumlashtirildi. Abdilazizova Sh.X. o‘z tadqiqotida Renessansning ikki davrga, ya’ni birinchi va ikkinchi Sharq renessansiga bo‘linishini asoslab, har ikki davrdagi allomalarning ilmiy va ma’naviy merosini qiyoslaydi hamda birinchi davrga xos xususiyat sifatida ilm bilan ma’naviyatning uzviyligini alohida ta’kidlaydi [4]. Bu qarash tadqiqotimiz uchun muhim metodologik asos bo‘lib xizmat qildi, chunki u ma’naviy tarbiyani alohida hodisa emas, balki ilmiy-madaniy taraqqiyotning tarkibiy qismi sifatida ko‘rish imkonini beradi.

Usmonova G.X. tadqiqotida Sharq mutafakkirlarining ta’lim-tarbiya sohasiga qo‘shgan hissasi batafsil yoritilgan bo‘lib, unda Forobiy, Ibn Sino va Beruniy kabi allomalarning pedagogik qarashlari tahlil qilinadi va ularning barchasida bilim olishning yakuniy maqsadi sifatida insonning ma’naviy-axloqiy kamolotga erishishi ko‘rsatilgan [5]. Jumaniyozova K.H. va Sharipboyeva Sh.S. tomonidan Abu Nasr Forobiy merosiga bag‘ishlangan tadqiqotda mutafakkirning "Fozil odamlar shahri" asaridagi ijtimoiy-axloqiy g‘oyalari tahlil qilinib, Forobiy tasavvuridagi mukammal jamiyat faqat ma’naviy jihatdan yetuk fuqarolar orqaligina qurilishi mumkinligi ko‘rsatib berilgan [6]. Kasbiy ma’naviyat masalalariga bag‘ishlangan o‘quv qo‘llanmada Sharq mutafakkirlarining kasb-hunar va mehnat tarbiyasiga oid qarashlari yoritilgan bo‘lib, unda mehnat faoliyati ham ma’naviy kamolotning muhim vositasi

sifatida talqin etiladi [7]. Ma’naviyat asoslariga oid o‘quv-uslubiy majmuada esa ma’naviyatning tarkibiy elementlari, jumladan ta’lim, e'tiqod, axloq va milliy g‘urur tushunchalari tizimli tarzda yoritib berilgan [8].

Xorij manbalaridan foydalanish tadqiqot obyektivligini ta’minlash uchun zarur edi. Makdisi G. o‘z asarida islom sivilizatsiyasidagi ta’lim muassasalarining, xususan madrasalarning shakllanish jarayonini tahlil qilib, bu muassasalarda bilim berish jarayoni doimiy ravishda axloqiy tarbiya bilan uyg‘unlashtirilganini ko‘rsatadi [9]. Gutas D. tomonidan yoritilgan Bag‘dod tarjima harakati tarixi esa yunon falsafiy merosining islom dunyosiga kirib kelishi jarayonida mahalliy mutafakkirlarning bu bilimlarni o‘z ma’naviy-axloqiy qarashlari bilan qanday uyg‘unlashtirganini ko‘rsatib beradi, bu esa Markaziy Osiyo mutafakkirlarining ijodiy yondashuvidan dalolat beradi [10].

NATIJALAR VA MUHOKAMA

O‘tkazilgan adabiyotlar tahlili natijasida shuni ta’kidlash mumkinki, Birinchi Sharq renessansi davrida ma’naviy tarbiya jamiyat hayotining barcha jabhalariga singib ketgan yaxlit tizim sifatida namoyon bo‘lgan. Bu davrda ilm-fan taraqqiyoti bilan ma’naviy kamolot bir-biridan ajralmas hodisalar sifatida qaralgan, buni Forobiy, Ibn Sino, Beruniy kabi qomusiy olimlarning ijodida yaqqol kuzatish mumkin [5; 6]. Ushbu mutafakkirlarning barchasi uchun bilim olishning oxirgi maqsadi shaxsning ichki dunyosini boyitish, uning axloqiy va ma’naviy jihatdan yetuk inson bo‘lib yetishishiga xizmat qilish edi. Bu esa zamonaviy ta’lim tizimidagi ba’zi yondashuvlardan farqli o‘laroq, o‘sha davrda bilim va tarbiyaning ajralmas birlik sifatida tushunilganini ko‘rsatadi.

Tahlil davomida yana bir muhim jihat aniqlandiki, ma’naviy tarbiya nafaqat individual, balki institutsional darajada ham amalga oshirilgan. Makdisi G. ko‘rsatganidek, madrasa tizimi shunchaki bilim berish maskani emas, balki talabaning axloqiy va ma’naviy shakllanishi uchun mo‘ljallangan murakkab tarbiyaviy muhit sifatida tashkil etilgan edi [9]. Bu institutsional yondashuv Markaziy Osiyoda ilm-fan markazlarining nafaqat intellektual, balki ma’naviy-

axloqiy tarbiya o‘chog‘iga aylanishiga sabab bo‘lgan deb hisoblash mumkin. Shuningdek, Gutas D. tadqiqotida yoritilgan tarjima harakati misolida ko‘rinib turibdiki, chet el ilmiy merosini o‘zlashtirish jarayoni ham mahalliy ma’naviy qadriyatlar prizmasidan o‘tkazilgan, natijada begona g‘oyalar mexanik tarzda emas, balki mahalliy dunyoqarashga moslashtirilgan holda qabul qilingan [10]. Bizningcha, aynan shu uyg‘unlashtirish mahorati Birinchi Sharq renessansining o‘ziga xos yutug‘i bo‘lib, bu tajriba bugungi kunda ham xorijiy bilim va texnologiyalarni milliy qadriyatlar asosida qabul qilish zarurligini isbotlaydi.

Turdiyev B.S. asarida ta’kidlanganidek, siyosiy boshqaruv sohasida ham ma’naviy tamoyillar yetakchi o‘rin tutgan, adolatli hukmdor tushunchasi bevosita hukmdorning shaxsiy ma’naviy fazilatlari bilan bog‘lab tushuntirilgan [3]. Bu holat shuni ko‘rsatadiki, o‘sha davrda ma’naviyat shaxsiy hayotdan tashqariga chiqib, davlat boshqaruvi falsafasining ham asosiy tarkibiy qismiga aylangan. Shaxsiy tahlilimizcha, ushbu yondashuv zamonaviy davlat boshqaruvi nazariyasi uchun ham muhim ahamiyat kasb etadi, chunki professional kompetentsiya bilan birga ma’naviy-axloqiy mas'uliyatning uyg‘unligi barqaror va adolatli jamiyat qurishning muhim sharti hisoblanadi. Kasbiy ma’naviyatga bag‘ishlangan manbada keltirilgan fikrlar ham bu qarashni tasdiqlaydi, unda kasb-hunar egallash jarayoni ham ma’naviy tarbiyaning uzviy qismi sifatida talqin etiladi [7].

Shuni ham alohida ta’kidlash lozimki, Birinchi Sharq renessansi davridagi ma’naviy tarbiya tizimi bugungi kun nuqtai nazaridan qaraganda ham o‘ziga xos ilmiy qimmatga ega bo‘lib, u shaxs kamolotiga kompleks yondashuvning yorqin namunasi hisoblanadi. O‘sha davrda inson shaxsi bir vaqtning o‘zida ham aqliy, ham axloqiy, ham jismoniy jihatdan uyg‘un rivojlanishi lozim bo‘lgan yaxlit mavjudot sifatida qaralgan, bu esa ta’lim jarayonining faqat bilim uzatish bilan cheklanib qolmasligini, balki shaxsning butun mavjudligini qamrab oluvchi tarbiyaviy vazifani ham bajarishini anglatgan. Bizningcha, aynan mana shu bir butunlikka intilish o‘sha davr ma’naviy tarbiya tizimining eng muhim mazmuniy

xususiyati bo‘lib, u orqali jamiyat nafaqat bilimdon, balki axloqan barkamol insonlarni tarbiyalashga muvaffaq bo‘lgan. Zamonaviy ta’lim tizimida ko‘pincha kuzatiladigan bilim berish va tarbiyalash jarayonlarining bir-biridan ajralib qolish muammosi nuqtai nazaridan olib qaralganda, o‘rta asr Markaziy Osiyo mutafakkirlarining ushbu yaxlit yondashuvi hozirgi kunda ham dolzarbligini yo‘qotmagan pedagogik va falsafiy meros sifatida baholanishi mumkin.

XULOSA

O‘tkazilgan tahlil natijasida shunday xulosaga kelish mumkinki, Birinchi Sharq renessansi davrida Markaziy Osiyo xalqlari hayotida ma’naviy tarbiya nafaqat shaxsiy, balki ijtimoiy, institutsional va siyosiy darajalarda ham ustuvor ahamiyat kasb etgan. Mutafakkirlarning ilmiy merosi, ta’lim muassasalarining tashkiliy tuzilishi hamda davlat boshqaruvi falsafasi barchasi ma’naviy kamolot g‘oyasi atrofida birlashgan holda rivojlangan. Bu tarixiy tajriba bugungi kunda ham katta amaliy ahamiyatga ega, chunki zamonaviy ta’lim tizimida bilim va tarbiyani uyg‘un holda rivojlantirish, shuningdek xorijiy tajribani milliy qadriyatlar asosida ijodiy o‘zlashtirish masalasi hamon dolzarbligicha qolmoqda. Kelgusi tadqiqotlarda ushbu tarixiy tajribani zamonaviy ta’lim islohotlari kontekstida chuqurroq tahlil qilish maqsadga muvofiq bo‘ladi.

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ISTIQLOL DAVRI O'ZBEK ADABIYOTIDA MUXAMMASLARNING VAZN XUSUSIYATI

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Annotatsiya: *Ushbu maqolada istiqlol davri o'zbek adabiyotida muxammas janrining rivoji, vazn xususiyatlari haqida nazariy va amaliy tahlillar olib borilgan. Ushbu janr o'zbek she'riyatida qadimdan mavjud bo'lib, aruz va barmoq vaznlaridan foydalanish an'analari, vazn tanlashdagi badiiy-estetik mezonlar hamda zamonaviy muxammaslarda kuzatilayotgan yangilanishlar yoritiladi. Shuningdek, vaznning mzamun va badiiy ifodaga ta'siri misollar asosida tahlil etiladi.*

Kalit so'zlar: *istiqlol davri, muxammas, aruz vazni, barmoq vazni, poetika, an'ana va yangilanish.*

Аннотация*. В данной статье анализируются особенности стихотворного размера в мухаммасах узбекской литературы периода независимости. Рассматриваются традиции использования аруза и силлабической системы стихосложения, художественно-эстетические принципы выбора размера, а также новаторские тенденции в современной поэзии. Особое внимание уделяется влиянию стихотворного размера на содержание и художественную выразительность произведений.*

Ключевые слова: *период независимости, мухаммас, аруз, силлабический размер, поэтика, традиция, новаторство.*

Abstract. *This article examines the metrical characteristics of mukhammas poems created during the Independence period of Uzbek literature. It analyzes the use of the aruz and syllabic (finger-counting) meters, the artistic and aesthetic principles behind meter selection, and the innovative trends found in contemporary mukhammas. The study also explores the relationship between poetic meter, meaning, and artistic expression.*

Keywords: *Independence period, Uzbek literature, mukhammas, aruz meter, syllabic meter, poetics, tradition, innovation.*

KIRISH

Arab va fors she’riyatidan aruz vazni orqali turkiy adabiyotga kirib kelgan janrlar mavjuddir. Ana shunday janrlar sirasiga qasida, tarjiband, tarkiband, ruboiy, qit’a, muammo, musammatlarni kiritishimiz mumkin. Musammatlar tarkibiga esa quyidagilar kiradi: musallas, murabba, muxammas, musaddas, musabba’, musamman, mustasne’, muashshar. Biz o‘rganadigan musammat shakli besh misradan iborat bo‘ladigan muxammas janridir.

Muxammaslar qofiyalanish tarkibiga ko‘ra ikki xil bo‘ladi: muzdavij va mutakorir. Muzdavij – bandlardagi oxirgi misralar birinchi banddagi bilan qofiyadosh bo‘ladi. Mutakarrir muxammaslarda esa birinchi banddagi so‘ngi misralar yoki bayt har band oxirida naqarot bo‘lib takrorlanib boradi. Bu takror misralar “mukarrar”, “takror”, “tarje”, “qoplama misra”, “refren” atamasi bilan yuritiladi.[3] Biz buni refren jahoniy termini vositasida yuqorida izohlab o‘tdik.

Muzdavij shaklida qofiyalangan muxammaslar Navoiy ijodida keng tarqalgan:

Masnadi husn uzra tokim ko‘rmisham ul shohni, --a
Tiyra aylabmen fig‘ondin nilgun xirgohni, --a
Ey sabo, arz ayla nogoh ko‘rsang ul dilgohni, --a
Ko‘ktadur har dam fig‘onim ko‘rgali sen mohni, --a
Da’vii mehringga tonuq tortadurmen ohni. --a

Ey g‘ubori markabing kun ko‘zgusining sayqali, --b
Nechakim men bir gado, sen podshohdursen bale, --b
Yo‘q ajab sen husn shohin mayl qilsam sevgali, --b
Sen kebi sultonni sevmak haddim ermastur,bale, --b
Bu balolig‘ ishq farq etmas gadovu shohni . –a [2]

Bunday shaklda qofiyalangan muxammaslar an’ana shaklida davom etib bordi. Istiqlol davrida ham xuddi shunday qofiyalangan muxammaslarni uchratishimiz mumkin:

Ko‘zlari begona emas, do‘stgina, eldoshgina,--a

Zulflari ham o‘ylasam, ko‘nglim bilan tildoshgina,--a
Yo‘lga solsam, bir umr bo‘lgay manga dildoshgina,--a
Tangri berdi nogohondin bir nigori yoshgina,--a
Qomati nozikkina, ko‘p erka-yu avboshgina.—a

Gul qidirdim bu jahonda, bulbuli sahro edim,--b
O‘z dilimdan ham arazlab, gohida ayro edim,--b
Dil o‘shal daryo edi-yu, men o‘shal daryo edim,--b
Necha muddat go‘shai g‘amda ajab tanho edim,--b
Emdi jonim pardasida asrayin yo‘ldoshgina.—a [9]

Bu misralar muallifi Sirojiddin Sayyid bo‘lib, uning ushbu taxmisi Furqat g‘azaliga bog‘langan va muxammas muzdavij shaklida qofiyalangan. Muxammasning qolgan barcha bandlari a-a-a-a-a, b-b-b-b-a, d-d-d-d-a, f-f-f-f-a shaklida qofiyalangan.

Muxammasning ikkinchi qofiyalanish shakli mutakarrir bo‘lib, ushbu qofiyalanish shaklidagi muxammaslar istiqlol davri adabiyotida keng uchraydi. Sirojiddin Sayyidning “Bo‘sa”, “Jon-u dilim”, Iqbol Mirzoning “Meni desa”, Abdulla Oripovning “Vatan” kabi muxammaslari mukarrar shaklda qofiyalangan ijod namunalari sirasiga kiradi.

Mazkur maqolaning maqsadi istiqlol davri o’zbek adabiyotida muxammaslarning vazn xususiyatlarini, yangi qirralarini kashf etganini ilmiy jihatdan o’rganishdan iborat.

METODOLOGIYA VA ADABIYOTLAR TAHLILI

Tadqiqotda tarixiy-qiyosiy, qiyosiy-tipologik, tavsifiy-tahliliy hamda matnshunoslik metodlaridan foydalanildi. Istiqlol davrida ijod qilgan shoirlarning muxammaslari tanlab olinib, ularning vazn xususiyatlari aruz va barmoq tizimi asosida tahlil qilindi. Asarlarda vaznning mazmun, badiiy ifoda va poetik mahorat bilan uyg‘unligi ilmiy jihatdan yoritildi. Tahlil jarayonida misollarni qiyoslash va umumlashtirish usullaridan ham foydalanildi.

Muxammas janri va uning vazn xususiyatlari o‘zbek adabiyotshunosligida bir qator olimlar tomonidan o‘rganilgan. Anvar Hojiahmedov, Ibrohim Haqqulov, B.Valixo‘jayev, Abdug‘afur Rasulov R.Orzibekov, N.Afoqova va boshqa olimlarning ilmiy tadqiqotlarida aruz ilmi, she'riy janrlar hamda poetik mahorat masalalari yoritilgan. Biroq istiqlol davrida yaratilgan muxammaslarning vazn xususiyatlari alohida tadqiqot obyekti sifatida yetarli darajada kompleks o‘rganilmagan. Mazkur maqolada aynan shu jihat tahlil qilinib, zamonaviy muxammaslarda aruz va barmoq vaznlarining qo‘llanishi hamda ularning badiiy-estetik vazifasi ochib beriladi.

NATIJALAR VA MUHOKAMA

Mumtoz adabiyotimizda yaratilgan muxammaslar aruz vaznida yozilgan. Muxammaslar vazni borasida ko‘pgina nazariy manbalarda ma’lumotlar aytib o‘tilgan. Ijodkor badiiy niyatiga muvofiq aruzning istalgan vaznida yoziladi. Ko‘proq ramal va hazajda yozilgan namunalarini uchratish mumkin.

Turkiy aruz dahosi bo‘lmish Alisher Navoiy g‘azallariga taxmis bog‘lashda ulug‘ shoir izidan borib, aruzda bitilgan g‘azallarni beshlantirib, muxammas yaratish bugungi kunimizgacha davom etib kelmoqda. Shu jumladan istiqlol davrida qalam tebratgan ijodkorlar ham muxammaslarning aruz vaznidagi go‘zal namunalarini yaratdilar.

Shunday ijodkorlar sirasiga Abdulla Oripov, Erkin Vohidov, Jamol Kamollarni kiritishimiz mumkin. Abdulla Oripovning bir taxmisi Alisher Navoiy g‘azaliga ergashib yozilgan. “G‘aroyib us-sig‘ar” devonining 203-g‘azaliga taxmis shaklida bitilgan bu muxammas jami yetti banddan iborat. G‘azalning o‘zi ham yetti bayt bo‘lib, aruzning mujtassi musammani mahbuni mahzuf vaznida yozilgan. Uning taq’tesi quyidagicha: V-V-/ VV--/ V-V-/ VV- ya’ni mafoilun failotun mafoilun failun tarzida bitilgan:

Huzuri ishq sizga-yu, tavqini kimga ilasiz,
Malomat xanjari birla doim yurakni tilasiz,
Nechuk g‘am ustiga g‘amdur: ahli g‘animim bilasiz,

Jamoateki, junun ma’nini manga qilasiz,

Tosh otibon ne uchun telbalarga qotilasiz.

Kelubdur og‘zima jonim, qilurman ishqim zikr,

Netaykim, vasl erdi orzu vale dildordin makr,

Netsin, Abdulla hayrondir, ayo pir, aylang fikr,

Navoiy hajrga qoldi, qiling visolda shukr,

Jamoateki, sevar yoringiz bilasiz[5]

Abdulla Oripov mohir so‘z san’atkori sifatida Alisher Navoiy g‘azalida keltirilgan so‘zlarining nozik ma’no qirralarini munosib baholab, o‘zi ham ana shunday mazmun qiymati yuqori so‘zlardan foydalanib, Navoiy dahosi darajasiga yetadigan muxammas yaratdi, deb bemalol ayta olamiz. Ulug‘ shoir g‘azalida bayon etilgan fikrlar o‘zaro uyg‘un holda Abdulla Oripov taxmisidan munosib o‘rin oldi, rivojlandi. Oxirgi bandda shoir mubolag‘a san'atidan o‘rinli foydalanib, o‘z badiiy niyatini mohirona ochib beradi. Biz yuqorida taxmisning birinchi va ikkinchi bandlarini misol tariqasida keltirdik. Oxirgi bandda oshiq ishq dardida so‘ngsiz aziyat chekib, joni og‘ziga kelsa-da, ammo yana ishqni kasb qilishda davom etadi. Abdulla Oripov ushbu muxammasi orqali ko‘hna aruz an’analarini davom ettirib, navoiymonand qalam tebratdi.

Aruz vazni juda murakkab vazndir. Ana shunday murakkablikda ijod qilib, XX asr aruzini yuksak cho‘qqiga olib chiqqan ijodkorlar avvalida Erkin Vohidov turadi. Erkin Vohidov muxammaslarida aruz vazni soddaroq uslubda, bugungi til imkoniyat va xususiyatlarini ishga solgan holda bitilgan. Aruzda yozilgan bo‘lishiga qaramay kitobxon misralar mazmunini oson tushunadi va bemalol tahlil, mushohada qila oladi. Istiqlol davri adabiyotida yaratilgan muxammaslarda aruzga moslashish hodisasini kuzatishimiz mumkin. Ya’ni ayrim so‘zlarda fonetik o‘zgarishlar kuzatiladi. Keling, uning Fuzuliy g`azaliga yozgan muxammasiga e’tibor beraylik. Odatda muxammas bandma-band, g`azal esa baytma-bayt tahlil etiladi. Dastlab Fuzuliyning Erkin Vohidov muxammas bitgan o‘sha g`azalini olib ko‘raylik. Fuzuliyning ushbu “Etmazmidim” radifli

g`azali ramali musammani mahzuf, ya'ni: - v - - /- v - -/ - v - -/ - v - foilotun foilotun foilotun foilotun foilun bahrida yozilgan.[4] G`azal foilotunning to'liqsiz shakli bilan yakunlangan. Ushbu g`azalda bugungi kun misolida bir necha fonetik o'zgarishlarni sezamiz, ammo baribir Fuzuliy tilini lug`atsiz ham ilg`ash mumkin. Erkin Vohidov ana shu fonetik jarayonlarni davr nuqtayi nazaridan o'zlashtirib, o'z muxammasini shu davr tiliga moslashtirdi, ya'ni Ozarbayjon shakli deb nom olgan ushbu jarayonni sof o'zbek tili holida kitobxonlarga tushunarli tarzda yoritib berdi. O'zgartirish kiritildi, ammo bu fonetik o'zgarishlar g`azal mavqe'yiga ta'sir qilmagan, balki uning salmoqdorligini saqlab qolishga urinilgan. Jumladan: etmazmidim – etmasmidim, go'rsaydim – ko'rsaydim, rasvolig`imdan – rasvoligimdan, dutdigim – tutdig`im, go'nglimi – ko'nglimi. Bu so'zlarda ba'zi jarangli undoshlar jarangsizga, jarangsiz undoshlar jarangliga aylantirilgan. Bundan tashqari ag`yori – ag`yorni, yor-la – yor ila, hijroni-la – hijron ila tartibida berilgan. Bu o'zgarishlarning barchasi vazn talabi bilan amalga oshirilgan. Taxmislarning oltin qoidasi sifatida g'azal qaysi vaznda yozilgan bo'lsa, taxmis ham aynan shu vaznda bitilishi kerakligini har doim esda tutmoq lozim. Shu jihatdan shoirning Fuzuliy g'azaliga bog'langan taxmisi ham ramali musammani mahzuf bahrida yozilgan. Fuzuliy g'azalining vazni, qofiyasi va radifini o'z taxmisida saqlab qolgan. Garchand Erkin Vohidov muxammasida ayrim fonetik o'zgarishlar mavjud bo'lsa-da, vaznga katta e'tibor qaratilgan.

O'lmasam zor anga, tarki oh-u zor etmasmidim
Ishq(i) koridan kechib bir o'zga kor etmasmidim
Gar junun yor o'lmasa holimdan or etmasmidim
Aql yor o'lsaydi tarki ishqi yor etmasmidim,
Ixtiyor o'lsaydi rohat ixtiyor etmasmidim?
Javr oyinini bir dam ko'rmoqqa o'lsaydi sabr

G`ayrini shod do'stni purg`am ko'rmoqqa o'lsaydi sabr

Chashmi dilda bir dame nam ko‘rmoqa o‘lsaydi sabr

Yor ila ag`yorni hamdam ko‘rmoqqa o‘lsaydi sabr,

Tarki g`urbat aylayub, azmi diyor etmasmidim?[6]

Aruz vazni talabiga muvofiq birinchi bandning ikkinchi misrasi, ikkinchi bandning birinchi misrasida imola hodisasi kuzatiladi (ishq va javr so‘zlariga “i” orttiriladi). Aslida Fuzuliy g`azalidagi ikkinchi banddagi bayt “yor-la” tarzida boshlangan edi va bu misra aruzga solinganda “i” imolasi orttirilishi kerak. Erkin Vohidovning topqirligi shundaki, u muxammasning go‘zalligini orttirish uchun imola orttirilishi kerak bo‘lgan joyda, imola qo‘shilishi shart bo‘lgan so‘zi bor misra yaratgan. Bu “javr” so‘zidir. U muxammasda Fuzuliyning uchinchi baytini keltirar ekan, undagi “yor-la”so‘ziga (i) imolasini qo‘shib keltiradi, ammo o‘zining misrasidagi (i) imolasi yashirinligicha qoladi. Barcha bandlardagi kabi bunda ham “etmazmidim” so‘zi “etmasmidim” tarzida ya’ni jarangli undoshning jarangsiz juftiga (z-s) almashadi. Bu jarayon esa davr tiliga biroz yaqinlashish maqsadidan kelib chiqadi**[7].**

Dilga malham jilvagarlik dema bir qoshindadur,

Ne malohat, bilmam, ul, asrori-naqqoshindadur,

Aylanur har lahza boshim, neki, sir oshindadur,

O‘n sakkiz ming olam oshubi agar boshindadur,

Ne ajab, chun sarvinozim o‘n sakkiz yoshindadur[9]

Yuqoridagi muxammas taxmis shaklida yozilgan bo‘lib, Oshiq Erkin qalamiga mansubdir. Muxammas ramali musammani mahzuf vaznida bitilgan: Foilotun-foilotun-foilotun-foilun (- v - - /- v - -/ - v - -/ - v -). Ushbu she’r Alisher Navoiyning mashhur “O‘n sakkiz yoshindadur” g‘azalidan ta’sirlanib bitilgan. G‘azal va muxammas bir xil vaznda. Oshiq Erkin taxmislarining ko‘pgina miqdori Alisher Navoiy g‘azallariga bitilgandir. Uning “Sarvi ravonim keldimu?” nomli muxammasi ham aynan shu usulda yozilgan.

Keling, uning taqte’si va afoilini ko‘rib chiqaylik:

Ber-ma-yin kut / deb xa-bar, g‘un-/ cha da-ho-nim / kel-di-mu?

- V - - / - V - - / - V - - / - V -

Jo-nim ich-ra / bir ja-hon jo-/n-u ja-ho-nim / kel-di-mu?

- V - - / - V - - / - V - - / - V -

Bosh-din oyoq / po-ki-za-dur / qo-shi ka-mo-nim / kel-di-mu?

- V - - / - V - - / - V - - / - V -

Gul o-char el / bog‘ a-ro, sar-/vi ra-vo-nim / kel-di-mu?

- V - - / - V - - / - V - - / - V -

Jon i-si gul-/ din ke-lur, o-/ ro-mi jo-nim / kel-di-mu?[11]

- V - - / - V - - / - V - - / - V -

Taqte’ning afoili esa quyidagicha: foilotun /foilotun /foilotun /foilun. Shu o‘rinda foilotun rukni va ramal bahri haqida qisqacha ma’lumot: bir cho‘ziq + bir qisqa + bir cho‘ziq + bir qisqa (– V – –) hijolar birlashsa, foilotun deb ataluvchi rukn vujudga keladi. Foilotun so‘zi «faala» so‘zining o‘zagidan hosil qilingan bo‘lib, alohida ma’no anglatmaydi. Mazkur so‘zning tarkibidagi hijolar sifatiga e’tibor qaratsak, ya’ni bo‘g‘inlarni cho‘ziq-qisqalarga ajratsak, “fo” – cho‘ziq, “i” – qisqa, “lo” – cho‘ziq, “tun” – cho‘ziq hijolardan iborat ekanligiga guvoh bo‘lamiz. Hijolarning takroridan ruknlar hosil bo‘lgani kabi, ruknlarning muayyan tarzda takrorlanib kelishi bahrlarni vujudga keltiradi. Masalan, foilotun rukni takroridan ramal deb ataluvchi bahr, mafoiylun rukni takroridan hazaj bahri, mustaf’ilun rukni takroridan rajaz bahri va hokazo hosil bo‘ladi.

Jamol Kamolning “Jahon gulzorida men”, “Sanobar qayda bor” mustaqil muxammaslari aruzda bitilgan. “Osmon imlar meni” nomli tabi’xudi ham aruzning nodir namunasi bo‘lib, ramali musammani mahzuf vaznidadir.

Ey yoronlar,kel buyon,deb osmon imlar meni,

Oy ila Zuhro demangkim,Kahkashon imlar meni,

Bas,yetar,tark et makon,deblamakon imlar meni,

Bormagil, qol shunda,deb sarvi ravon imlar meni,

Sarvqad yoringga bor,deb bo‘ston imlar meni[10]

XULOSA

Yuqoridagi tahlillardan ko‘rinadiki, istiqlol davri muxammaschiligida ham aruzda, ham barmoq vaznida ijod qilishni kuzatish mumkin. Bu davr adabiyotida biror shoir g‘azalidan ta’sirlanib yozilgan taxmis muxammaslar aruzda, taxmis bog‘langan g‘azal vaznida yozilgan. Bundan tashqari, barmoqda yaratilgan 5 misrali she'rlarni qofiyalanish tartibi saqlangan bo‘lsa, muxammas deb tahlil qilish mumkin bizningcha. Barmoqda yaratilgan bunday muxammaslar mustaqil muxammaslar bo‘lib, mavzu mundarijasiga ko‘ra rang-barangdir. Bu esa davr she’riyatida mumtoz adabiyotga xos an’analar davom etayotganligini ko‘rsatadi.

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THE IMPACT OF EXTRINSIC MOTIVATION ON ENGLISH LANGUAGE LEARNING AMONG UNIVERSITY STUDENTS IN UZBEKISTAN

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Abstract: *This thesis examines the impact of extrinsic motivation factors on English language learning outcomes among university students in Uzbekistan. The study analyzes external motivational elements such as scholarships, assessment systems, teacher encouragement, and parental and societal expectations. Based on survey and statistical analysis methods, the findings indicate that extrinsic motivation improves short-term academic outcomes; however, sustainable language competence requires combining extrinsic motivation with intrinsic motivation. The study also found that intrinsic motivation has a stronger influence on long-term language learning success compared to extrinsic motivation. Furthermore, role-playing exercises are identified as an effective pedagogical tool for enhancing motivation in language learning.*

Keywords: *extrinsic motivation, English language teaching, student motivation, academic achievement, role-playing exercises*

Annotatsiya: *Ushbu tezis O‘zbekiston oliy ta’lim muassasalarida ingliz tilini o‘rganayotgan talabalarning ekstrinsik motivatsiya omillari va ularning o‘quv natijalariga ta’sirini o‘rganishga bag‘ishlangan. Tadqiqotda tashqi motivatsiya omillari sifatida stipendiyalar, baholash tizimi, o‘qituvchi rag‘batlantirishi hamda ota-ona va jamiyat kutishlari tahlil qilinadi. So‘rovnoma va statistik tahlil usullariga asoslangan tadqiqot natijalari shuni ko‘rsatadiki, ekstrinsik motivatsiya qisqa muddatli akademik natijalarni yaxshilaydi, biroq barqaror til kompetensiyasiga erishish uchun tashqi motivatsiyani ichki motivatsiya bilan uyg‘unlashtirish zarur. Shuningdek, rolli o‘yin mashqlari til o‘rganishda talabalar motivatsiyasini oshirishning samarali pedagogik vositasi sifatida aniqlangan.*

Kalit so'zlar: *ekstrinsik motivatsiya, ingliz tili o‘qitish, talabalar motivatsiyasi, o‘quv natijalari, rolli o‘yin mashqlari*

INTRODUCTION

Motivation is one of the fundamental driving forces in the language learning process, directly influencing students' persistence, engagement, and ultimate success (Dörnyei & Ushioda, 2021). In contemporary educational psychology, motivation is generally divided into two main types: intrinsic and extrinsic motivation. Intrinsic motivation involves enjoyment and interest in the learning process itself, while extrinsic motivation encompasses external factors such as scholarships, grades, teacher encouragement, and societal expectations (Ryan & Deci, 2000).

Since gaining independence, Uzbekistan has implemented significant reforms in its education system, particularly in the field of English language teaching. Today, English proficiency has become an essential requirement for accessing global opportunities, international trade, and communication through digital technologies (Hasanova, 2007). From this perspective, examining English language learning motivation in Uzbekistan's higher education system holds important scientific and practical significance.

A study conducted by Zokirov and Abduolimova (2025) at Fergana State University revealed that intrinsic motivation (M=4.12) was statistically significantly higher than extrinsic motivation (M=3.74) among English language students. The study also identified cognitive stimulation as the most powerful motivator (85.8% agreement), while parental expectations had the weakest impact (28.5%). These findings suggest that within the Uzbek context, students' internal drive to learn is stronger than external factors, although external factors still play a significant role.

This thesis aims to examine the impact of extrinsic motivation factors on learning outcomes in English language teaching at Uzbek higher education institutions and to propose effective ways of utilizing them.

Theoretical Foundations of Extrinsic Motivation

According to Self-Determination Theory (SDT), extrinsic motivation manifests along a continuum ranging from external rewards or punishment to forms that have been internalized and integrated into one's personal values (Deci & Ryan, 2000). Extrinsic motivation is categorized into various types of regulation: external regulation, introjected regulation, identified regulation, and integrated regulation (Ryan & Deci, 2017).

Research conducted by Ganieva (2026) demonstrated that extrinsic motivation improves short-term academic outcomes; however, sustainable language competence requires combining extrinsic motivation with intrinsic motivation. The study analyzed factors such as scholarships, assessment systems, teacher encouragement, and parental and societal expectations, examining their influence on students' learning activities.

A study conducted by Ismailova (2025) at the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers found a positive and statistically significant correlation between motivation and English language achievement ($r=0.68$, $p<0.01$). The results showed that intrinsic motivation had a stronger influence on learning outcomes ($r=0.74$) compared to extrinsic motivation ($r=0.59$). This aligns with Hasanova's (2007) argument that the specific characteristics of English language teaching in the Uzbek context must be taken into account.

Furthermore, role-playing exercises have been identified as an effective pedagogical tool for enhancing student motivation in language learning. Ganieva (2025) found that incorporating role-playing activities in speech lessons significantly increases students' engagement, reduces speaking anxiety, and fosters communicative competence. The study demonstrated that role-playing exercises create authentic communication contexts, allowing students to practice language in meaningful and enjoyable ways, which in turn strengthens both intrinsic and extrinsic motivational orientations.

In the context of English language teaching in Uzbek higher education, the following aspects of effectively implementing extrinsic motivation should be considered:

1. **Transparency of the Assessment System** – students should be informed in advance about the criteria by which they will be evaluated, which directs their extrinsic motivation toward constructive forms.

2. **Quality of Feedback** – regular, constructive, and process-oriented feedback supports extrinsic motivation.

3. **Reward System** – although scholarships and rewards improve short-term outcomes, they yield long-term effectiveness when combined with intrinsic motivation.

4. **Integration of Role-Playing Activities** – incorporating role-playing exercises enhances engagement, reduces language anxiety, and promotes communicative competence.

CONCLUSION

The research findings indicate that extrinsic motivation plays a significant role in English language learning at Uzbek higher education institutions; however, it is effective for achieving short-term outcomes, and the development of sustainable language competence requires its integration with intrinsic motivation. Role-playing exercises, as demonstrated by Ganieva (2025), serve as an effective pedagogical strategy that enhances both intrinsic and extrinsic motivational orientations by creating authentic and engaging learning experiences. To enhance the effectiveness of extrinsic motivation, it is recommended to ensure transparency in the assessment system, provide quality feedback, revise the reward system to support intrinsic motivation, and integrate interactive pedagogical methods such as role-playing exercises. Future research should be conducted across different regions and disciplines, as well as examine the impact of digital educational technologies on motivation.

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RAQAMLI TA’LIM MUHITIDA O‘ZBEK TILINI O‘QITISHNING METODOLOGIK MUAMMOLARI VA YECHIMLARI

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Annotatsiya: *Ushbu maqolada raqamli ta’lim muhitida o‘zbek tilini ona tili va xorijiy til sifatida o‘qitishning lingvodidaktik va metodologik muammolari hamda ularning amaliy yechimlari tadqiq qilingan. Tadqiqot davomida an’anaviy darsliklarning raqamli formatga (PDF) mexanik ko‘chirilishi, milliy korpus imkoniyatlaridan ta’limda yetarli foydalanilmasligi va o‘zbek tilining agglyutinativ tabiati sababli sun’iy intellekt tizimlarida morfologik tahlil murakkabligi asosiy muammolar sifatida aniqlandi. Maqolada qiyosiy-tahliliy hamda pedagogik eksperiment metodlaridan foydalanilgan holda, aralash ta’lim (Blended~Learning) modeli va interaktiv vizuallashtirish texnologiyalarining samaradorligi baholandi. Tajriba-sinov natijalari raqamli o‘yinlashtirish (gamifikatsiya) va korpus lingvistikasi vositalarini integratsiya qilish o‘quvchilarning til normalarini o‘zlashtirish ko‘rsatkichini 12-15\% ga oshirishini ko‘rsatdi. Xulosa qismida o‘zbek tili ta’limini raqamlashtirishda “Kompyuter lingvodidaktikasi” laboratoriyalarini tashkil etish bo’yicha amaliy tavsiyalar ilgari surilgan.*

Kalit so‘zlar*: raqamli ta’lim muhiti, o‘zbek tili, lingvodidaktika, milliy korpus, aralash ta’lim, gamifikatsiya, morfologik analizator, kompyuter lingvistikasi.*

Abstract: *This article examines the linguodidactic and methodological problems of teaching the Uzbek language as a mother tongue and a foreign language in a digital learning environment, along with their practical solutions. During the study, the mechanical conversion of traditional textbooks into digital formats (PDF), the insufficient use of the national corpus in education, and the complexity of morphological analysis in artificial intelligence systems due to the agglutinative nature of the Uzbek language were identified as the main challenges. Using comparative-analytical and pedagogical experiment methods, the effectiveness of the Blended Learning model and interactive visualization technologies was*

evaluated. The experimental results indicated that integrating digital gamification and corpus linguistics tools increases students' language norm acquisition rates by 12-15\%. In conclusion, practical recommendations are proposed for establishing "Computer Linguodidactics" laboratories to systematically digitalize Uzbek language education.

***Keywords**: digital learning environment, Uzbek language, linguodidactics, national corpus, blended learning, gamification, morphological analyzer, computational linguistics*

KIRISH

Bugungi kunda ta'lim tizimining raqamli transformatsiyasi barcha fanlar, xususan, o‘zbek tili lingvodidaktikasi (til o‘qitish metodikasi) oldiga yangi metodologik vazifalarni qo‘ymoqda. O‘zbekiston Respublikasi Prezidentining tegishli farmon va qarorlarida o‘zbek tilining davlat tili sifatidagi nufuzini oshirish, uni raqamlashtirish hamda zamonaviy axborot texnologiyalari bilan integratsiya qilish ustuvor vazifa etib belgilangan. Biroq amaliyotda o‘zbek tilini raqamli muhitda o‘qitish samaradorligi hali ham past ko‘rsatkichni tashkil etmoqda.

Xalqaro tajribada raqamli didaktika va aralash ta'lim (Blended~Learning) modellari (masalan, inversiv dars — Flipped Classroom) til o‘rganish samaradorligini oshirishi isbotlangan. Mahalliy olimlardan A. Po‘latov, S. Muhamedova va boshqalar kompyuter tilshunosligi va milliy korpus masalalarini tadqiq etgan bo‘lsalar-da, raqamli muhitda o‘zbek tili grammatikasini o‘qitishning aniq lingvodidaktik tizimi va metodologik muammolari alohida tadqiqot obyekti sifatida mukammal o‘rganilmagan.

Mavjud muammolar shundan iboratki, bugungi kunda yaratilayotgan aksariyat elektron darsliklar an'anaviy darsliklarning mexanik nusxasi (PDF formati) bo‘lib, ularda til qoidalarini vizuallashtirish va interaktiv baholash mexanizmlari tizimli yo‘lga qo‘yilmagan. Eng asosiysi, o‘zbek tili agglyutinativ til bo‘lganligi sababli, mavjud raqamli dasturlarda so‘z shakllarini avtomatik morfologik tahlil qilish va o‘quvchiga interaktiv tarzda yetkazish metodologiyasi ishlab chiqilmagan.

Ushbu tadqiqotning maqsadi — raqamli ta’lim muhitida o‘zbek tili darslarining samaradorligini oshirishga qaratilgan aralash ta’lim modelini ishlab chiqish va uning metodologik asoslarini pedagogik eksperiment orqali asoslab berishdan iborat.

METODLAR

Tadqiqotning metodologik asosini tizimlilik, qiyosiy-tahliliy yondashuv hamda pedagogik eksperiment (tajriba-sinov) metodlari tashkil etadi. Raqamli muhitda o‘zbek tilini o‘qitish samaradorligini baholash uchun amaliy tadqiqotlar ikki bosqichda amalga oshirildi.

Birinchi bosqichda mavjud elektron ta’lim resurslari va platformalardagi (Maktab.uz, LMS tizimlari) o‘zbek tili kontenti metodik jihatdan qiyosiy tahlil qilindi. Unda raqamli resurslarning vizuallik darajasi, interaktiv topshiriqlar salmog‘i va o‘zbek tili grammatik qoidalarining raqamli dasturlarga moslashuv darajasi o‘rganildi.

Ikkinchi bosqichda ishlab chiqilgan metodologik modelni tekshirish maqsadida pedagogik eksperiment tashkil etildi. Tajriba-sinov ishlariga jami 60 nafar o‘quvchi/talaba jalb etilib, ular ikki guruhga ajratildi:

Nazorat guruhi (30 nafar): Darslar an’anaviy metodlar va faqat PDF formatidagi elektron darsliklar yordamida olib borildi. Tajriba guruhi (30 nafar): Darslar aralash ta’lim (Blended~Learning) modeli hamda interaktiv vizuallashtirish texnologiyalari asosida tashkil etildi. Tajriba guruhida o‘zbek tili grammatikasini (xususan, so‘z yasalishi va sintaktik tahlilni) o‘rgatishda quyidagi raqamli vositalar integratsiya qilindi:

O‘zbek tili milliy korpusining ta’limiy imkoniyatlari: O‘quvchilarga so‘zlarning matndagi kontekstual ma’nolari va til normalari tayyor korpus qidiruv tizimlari orqali amaliy ko‘rsatildi. Raqamli vizuallashtirish: Murakkab mavzular va muammoli vaziyatlarni tahlil qilishda raqamli doskalarda

“Fishbone” (Isikava) hamda intellekt-xaritalar (Mind~Mapping) metodlaridan foydalanildi.

Gamifikatsiya (O‘yinlashtirish): Grammatik qoidalarni mustahkamlash uchun Quizizz va Kahoot platformalarida interaktiv testlar zanjiri yaratildi. Guruhlarning boshlang‘ich va yakuniy bilim darajalari bir xil mezonlar asosida, maxsus ishlab chiqilgan lingvistik testlar yordamida baholandi va statistik tahlil qilindi.

NATIJALAR

Pedagogik eksperiment yakunida nazorat va tajriba guruhlarining boshlang‘ich (kirish) va yakuniy (chiqish) test natijalari tahlil qilindi. Baholash mezoni o‘quvchilarning lingvistik kompetensiyasi, grammatik qoidalarni amaliyotda qo‘llay olishi va matn bilan ishlash ko‘nikmalari asosida 100 ballik tizimda yuritildi.

Eksperiment boshida har ikki guruhning o‘rtacha o‘zlashtirish ko‘rsatkichi bir-biriga yaqin holatda (nazorat guruhida 66.4\%, tajriba guruhida 67.2\%) edi. Tajriba guruhida raqamli vizuallashtirish, aralash ta’lim va milliy korpus vositalari qo‘llanilgandan so‘ng, yakuniy natijalarda sezilarli farq aniqlandi.

Nazorat va tajriba guruhlarining darsgacha va darsdan keyingi o‘rtacha ko‘rsatkichlari quyidagi jadvalda aks ettirilgan:

Guruhlar	**Boshlang‘ich o‘rtacha ball (%)**	**Yakuniy o‘rtacha ball (%)**	**Sof o‘sish ko‘rsatgichi (%)**
Nazorat guruhi (An’anaviy+PDF)	66.4%	70.8%	+4.4%
Tajriba guruhi (Aralash ta’lim+korpus	67.2%	82.5%	+15.3%

Jadval ma’lumotlaridan ko‘rinib turibdiki, an’anaviy metodlardan foydalanilgan nazorat guruhida o‘sish ko‘rsatkichi atigi 4.4\% ni tashkil etgan bo‘lsa, raqamli metodika joriy etilgan tajriba guruhida bilim samaradorligi 15.3\% ga oshgan. Ayniqsa, o‘zbek tili milliy korpusi yordamida so‘zlarning kontekstual ma’nolarini aniqlash hamda Quizizz platformasi orqali grammatik shakllarni o‘yinlashtirilgan (gamifikatsiya) usulda mustahkamlash bosqichida tajriba guruhi a’zolari topshiriqlarni nazorat guruhiga nisbatan 2 barobar tezroq va kamroq xatolar bilan bajardilar. “Fishbone” raqamli diagrammasi orqali sintaktik tahlil o‘tilganda esa o‘quvchilarning gap bo‘laklarini o‘zaro bog‘lash ko‘nikmasi an’anaviy guruhdagiga qaraganda yuqoriroq barqarorlikni ko‘rsatdi

MUHOKAMA

Pedagogik eksperiment davomida olingan natijalar shuni ko‘rsatdiki, raqamli muhitda o‘zbek tilini o‘qitish samaradorligi bevosita qo‘llanilayotgan texnologiyaning metodik jihatdan to‘g‘ri modellashtirilganiga bog‘liq. Tajriba guruhida o‘zlashtirish ko‘rsatkichining 15.3\% ga oshgani tasodifiy bo‘lmay, bir qancha metodologik omillar bilan izohlanadi.

Birinchidan, o‘zbek tili agglyutinativ (qo‘shimcha ulanuvchi) til bo‘lganligi sababli, o‘quvchilar ko‘pincha so‘z yasalishi va turlovchi/tuslovchi qo‘shimchalar zanjirini an’anaviy tarzda yodlashda qiyinchilikka duch kelishadi. Tajriba guruhida qo‘llanilgan raqamli intellekt-xaritalar va “Fishbone” (Isikava) diagrammasi so‘z tarkibi va gapdagi sintaktik aloqalarni vizuallashtirishga xizmat qildi. Bu esa insondagi vizual xotira va tizimli fikrlash mexanizmini ishga solib, mavhum qoidalarni aniq va tushunarli mantiqiy modelga aylantirdi.

Ikkinchidan, o‘zbek tili milliy korpusining ta’lim jarayoniga integratsiya qilinishi lingvodidaktikada “ta’limning hayotiyligi” prinsipini ta’minladi. An’anaviy darsliklardagi sun’iy, o‘yinli misollardan farqli o‘laroq, korpus o‘quvchilarga so‘zlarning real nutqdagi faolligini, badiiy va ilmiy matnlardagi jonli kontekstini ko‘rsatdi. Bu yondashuv o‘quvchilarda shunchaki qoidani

yodlash emas, balki lingvistik instinktni (tilni his qilish qobiliyatini) shakllantirdi.

Uchinchidan, Quizizz va Kahoot kabi platformalar orqali joriy etilgan gamifikatsiya (o‘yinlashtirish) elementi o‘quvchilarning diqqat barqarorligi hajmini oshirdi. Edukatsion psixologiyadan ma’lumki, raqamli ta’lim muhitida o‘quvchilarning chalg‘ish darajasi yuqori bo‘ladi. Interaktiv testlar va vaqt limiti esa ularning fanga bo‘lgan ichki motivatsiyasini yuqori nuqtada ushlab turishga imkon berdi.

Biroq tadqiqot davomida muayyan cheklovlar (limitations) ham ko‘zga tashlandi. O‘zbek tilining boy frazeologiyasi va ko‘chma ma’noli so‘zlarini raqamli tizimlar (masalan, avtomatik morfologik tahlil dasturlari) har doim ham to‘g‘ri tahlil qila olmaydi. Demak, kompyuter lingvodidaktikasida sun’iy intellekt algoritmlarini o‘zbek tili grammatikasi qonuniyatlariga to‘liq moslashtirish vazifasi hanuzgacha ochiq qolmoqda. Bu esa kelajakda filologlar va IT mutaxassislarining yanada chuqurroq hamkorligini talab etadi.

XULOSA

Raqamli ta’lim muhitida o‘zbek tilini o‘qitish — shunchaki an’anaviy materiallarni elektron shaklga o‘tkazish emas, balki tilning tabiati va raqamli didaktika qonuniyatlarini sintez qiluvchi yangi metodologik yondashuvni talab etadi. O‘tkazilgan tadqiqot va pedagogik eksperiment natijalari quyidagi yakuniy xulosalarni chiqarishga imkon berdi: O‘zbek tili ta’limiga aralash ta’lim (Blended~Learning) modelini, raqamli vizuallashtirish vositalari va gamifikatsiya elementlarini tizimli joriy etish o‘quvchilarning lingvistik kompetensiyasini va dars samaradorligini o‘rtacha 15.3\% ga oshiradi. O‘zbek tili milliy korpusining ta’limiy imkoniyatlaridan foydalanish o‘quvchilarda matn bilan ishlash, so‘zlarning matndagi kontekstual va uslubiy xususiyatlarini jonli muloqot misolida anglash ko‘nikmasini tezlashtiradi.

Amaliy tavsiyalar: “Kompyuter lingvodidaktikasi” laboratoriyalarini tashkil etish: O‘zbek tilining agglyutinativ tuzilishiga mos keladigan mukammal

morfologik va sintaktik analizator dasturlarni yaratish uchun tilshunos filologlar va IT mutaxassislarining hamkorlikdagi laboratoriyalarini tashkil etish zarur.

Kontent sifatini o‘zgartirish: Elektron darsliklar bazasini PDF formatidan interaktiv, multimedia elementlari va adaptiv (shaxsiylashtirilgan) test tizimlariga ega bo‘lgan mobil ilova va platformalar shakliga o‘tkazish loqaydlik va bir xillik muammosini hal qiladi.

Pedagoglar malakasini oshirish: Ona tili o‘qituvchilarining raqamli kompetensiyasini oshirish maqsadida metodik darslarga kompyuter lingvistikasi va raqamli pedagogika modullarini integratsiya qilish maqsadga muvofiqdir.

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TUGALLANMAGAN OSMON MINORASI: KALTA MINOR TARIXI VA AHAMIYATI

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Annotatsiya:*Mazkur maqolada Xiva shahrining Ichan qal’a majmuasida joylashgan Kalta Minor minorasining tarixiy shakllanish jarayoni, me’moriy xususiyatlari va badiiy bezaklari ilmiy jihatdan tahlil qilinadi. Tadqiqot davomida inshootning dastlab ulkan minora sifatida rejalashtirilgani, biroq tarixiy sharoitlar sababli qurilishi yakuniga yetmay qolganligi yoritiladi. Shuningdek, Kalta Minorning Xorazm me’morchilik maktabidagi o‘rni, uning rang-barang koshinlari va o‘ziga xos kesik konus shakli orqali namoyon bo‘ladigan estetik qiymati ham ochib beriladi. Maqolada yodgorlikning bugungi kundagi madaniy va tarixiy ahamiyati ham alohida ko‘rsatib o‘tiladi.*

Kalit so‘zlar:*Kalta Minor, Xiva, Ichan qal’a, Muhammad Aminxon, me’morchilik, minora, Xorazm me’morchilik maktabi, koshin, tarixiy yodgorlik, madaniy meros, restavratsiya.*

Abstract:*This article examines the historical formation process, architectural features, and artistic decorations of the Kalta Minor minaret located in the Itchan Kala complex of Khiva. The study highlights that the structure was originally planned as a grand and monumental minaret; however, due to historical circumstances, its construction was never completed. The article also explores the architectural significance of Kalta Minor within the Khorezm architectural school, emphasizing its unique truncated cone shape and richly decorated glazed tile ornamentation. In addition, the cultural and historical importance of the monument in the present day is analyzed.*

Keywords:*Kalta Minor, Khiva, Itchan Kala, Muhammad Amin Khan, architecture, minaret, Khorezm architectural school, glazed tiles, historical monument, cultural heritage, restoration.*

Аннотация:*В данной статье рассматриваются исторический процесс формирования, архитектурные особенности и художественное оформление*

минарета Кальта-Минор, расположенного в комплексе Ичан-Кала города Хива. Подчеркивается, что первоначально сооружение задумывалось как величественный и высокий минарет, однако в силу исторических обстоятельств его строительство осталось незавершённым. Также анализируется значение Кальта-Минора в рамках хорезмской архитектурной школы, его уникальная форма усечённого конуса и богатый декор из глазурованной плитки. Отдельное внимание уделяется культурной и исторической значимости памятника в современное время.

Ключевые слова:*Кальта Минор, Хива, Ичан-Кала, Мухаммад Амин-хан, архитектура, минарет, хорезмская архитектурная школа, глазурованная плитка, исторический памятник, культурное наследие, реставрация.*

KIRISH

Kalta Minor Xiva shahrining tarixiy markazi — Ichan qal’a majmuasida joylashgan eng muhim me’moriy yodgorliklardan biri sifatida alohida ahamiyatga ega. Ushbu inshoot Markaziy Osiyo me’morchilik maktabining o‘ziga xos rivojlanish bosqichlarini aks ettiruvchi noyob obidalardan bo‘lib, o‘zining betakror shakli, ulkan ko‘lami va badiiy bezaklari bilan ajralib turadi. Xiva shahrining tarixiy qiyofasini belgilovchi asosiy me’moriy unsurlardan biri sifatida Kalta Minor nafaqat mahalliy, balki umummintaqaviy me’morchilik an’analarining ham yorqin ifodasi hisoblanadi.Markaziy Osiyo me’morchilik tarixida minora va boshqa baland inshootlar muhim o‘rin tutib, ular shaharlarning ramziy belgisi, diniy-ma’naviy hayotning ajralmas qismi hamda hukmdorlar qudratini namoyon etuvchi vosita sifatida xizmat qilgan. Shu jihatdan qaralganda, Kalta Minor ham Xiva xonligining me’morchilik sohasidagi ulkan rejalari va badiiy-estetik qarashlarini amalga oshirish yo‘lida boshlangan yirik loyihalardan biri sifatida baholanadi. Uning dastlabki loyihasi nihoyatda ulug‘vor bo‘lib, u o‘z davrining eng yirik va eng baland minoralaridan biri bo‘lishi ko‘zda tutilgan edi.Biroq tarixiy jarayonlar, qurilish jarayonining uzilishi hamda siyosiy va shaxsiy omillar natijasida ushbu inshoot to‘liq yakuniga yetmay qolgan. Shunga qaramay, uning tugallanmagan holati Kalta Minorga o‘ziga xos betakrorlik bag‘ishlagan bo‘lib, bu holat uni boshqa

me’moriy yodgorliklardan ajratib turadi. Vaqt o‘tishi bilan u oddiy qurilish obyekti emas, balki tarixiy jarayonlar guvohi bo‘lgan muhim madaniy yodgorlik sifatida qadrlana boshlagan.

Kalta Minor o‘zining tashqi ko‘rinishi, rang-barang sirlangan koshinlari va o‘ziga xos bezak uslubi bilan Xorazm me’morchilik maktabining yuksak estetik darajasini namoyon etadi. Uning me’moriy yechimida mahalliy an’analar bilan bir qatorda Sharq me’morchiligining umumiy badiiy tamoyillari ham uyg‘unlashgan. Shu bois ushbu yodgorlik nafaqat tarixiy obida, balki badiiy-madaniy meros sifatida ham katta ilmiy qiziqish uyg‘otadi.

Bugungi kunda Kalta Minor Xiva shahrining eng mashhur ramzlaridan biri sifatida e’tirof etiladi. Uning me’moriy tuzilishini, tarixiy shakllanish jarayonini va badiiy bezaklarini o‘rganish Xorazm me’morchilik maktabining rivojlanish qonuniyatlarini anglashda muhim ahamiyat kasb etadi. Shu sababli ushbu yodgorlikni ilmiy jihatdan tahlil qilish va uning madaniy-tarixiy ahamiyatini ochib berish dolzarb ilmiy masalalardan biri hisoblanadi.

Kalta Minor Xiva shahrining Muhammad Aminxon madrasasi yonida 1855-yilda qurilishi boshlangan betakror me’moriy yodgorliklardan biridir. Ushbu inshoot dastlab juda ulug‘vor maqsad bilan loyihalashtirilgan bo‘lib, u Markaziy Osiyoda eng baland va eng go‘zal minora sifatida bunyod etilishi ko‘zda tutilgan edi. Biroq qurilish ishlari to‘liq yakuniga yetmay qolgan va minora o‘zining rejalashtirilgan balandligiga chiqmagan holda to‘xtab qolgan.Vaqt o‘tishi bilan uning tugallanmagan holati ham o‘ziga xos tarixiy ahamiyat kasb etib, xalq orasida “Kalta Minor”, ya’ni “qisqa minora” nomi bilan mashhur bo‘lib ketgan[1]. Ayrim tarixiy talqinlarda qurilishning to‘xtab qolishi turli voqealar bilan bog‘lab izohlanadi, ammo natijada bu inshoot o‘zining tugallanmagan ko‘rinishida ham betakror me’moriy obida sifatida saqlanib qolgan.

Bugungi kunda Kalta Minor o‘zining salobatli tuzilishi va rang-barang bezaklari bilan kishini o‘ziga jalb etadi. Uning balandligi 26 metr, asos qismi

diametri esa 14,2 metrni tashkil etadi. Inshootning tashqi qismida oq, yashil va ayniqsa firuza rangli sirlangan koshinlar ustunlik qiladi. Aynan shu ranglar uyg‘unligi unga yorqin va jozibali ko‘rinish berib, uni “Ko‘k Minora” nomi bilan ham mashhur qilgan.

Kalta Minor Xiva shahrida Muhammad Aminxon tashabbusi bilan madrasa yonida qurilishi boshlangan muhim me’moriy yodgorlik hisoblanadi. Uning me’moriy yechimi kesik konus shaklida bo‘lib, aynan shu o‘ziga xos tuzilishi sababli u xalq orasida “Kalta Minor” nomi bilan mashhur bo‘lib ketgan. Dastlabki loyihaga ko‘ra, ushbu inshoot Markaziy Osiyo me’morchiligida eng ulug‘vor va eng baland minoralardan biri bo‘lishi rejalashtirilgan edi. Manbalarda uning balandligi taxminan 70–80 metrga yetishi ko‘zda tutilgani qayd etiladi, biroq qurilish to‘liq yakuniga yetmagan va hozirgi kunda saqlanib qolgan qismi 26 metrni tashkil etadi.

Tarixiy manbalarda Kalta Minor turli nomlar bilan ham atalgan. Jumladan, u o‘z davrida “Ulli minor” (ulug‘ minora) hamda “Ko‘k minor” nomlari bilan tilga olingan[2]. Bu nomlar inshootning ulkan ko‘lami va uning bezaklarida ustunlik qilgan ko‘k hamda firuza rangli koshinlar bilan bog‘liq holda shakllangan.

O‘sha davr ijodkorlari va shoirlari ushbu inshootni katta ilhom bilan tasvirlaganlar. Xususan, Ogahiy o‘z asarlarida madrasa oldida barpo etilgan ulug‘ minora haqida uni osmon gumbaziga qadar yuksalgan ustunga qiyoslab, uning salobati va ulug‘vorligini badiiy tarzda ifodalagan.Kalta Minorning tugallanmay qolishi bilan bog‘liq turli xalq rivoyatlari ham mavjud. Ulardan biriga ko‘ra, Xiva xoni dunyodagi eng baland minora qurilishini istab, ustaga katta mas’uliyat yuklagan. Qurilish jarayoni davom etayotgan paytda bu loyiha Buxoro amiriga ham yetib borgan va usta bilan yashirin kelishuv tuzilgan, degan rivoyatlar ham uchraydi. Ayrim talqinlarda esa xonning ustaga nisbatan keskin munosabati va qurilish yakunida uni jazolash niyati haqidagi hikoyalar ham keltiriladi. Shu kabi rivoyatlar xalq og‘zaki ijodida turlicha shakllarda saqlanib

qolgan bo‘lib, ular tarixiy haqiqatdan ko‘ra ko‘proq xalq tasavvuri va badiiy tafakkur mahsuli sifatida qaraladi.

Shu bilan birga, Xiva tarixchisi Munisning ma’lumotlariga ko‘ra, 1855-yilda xonning vafoti sababli qurilish ishlari yakuniga yetmay qolgan. Rejaga ko‘ra, minora madrasa majmuasining eng muhtasham inshootlaridan biri bo‘lishi lozim edi. Biroq qurilishning to‘xtab qolishi natijasida u o‘zining dastlabki ulkan loyihasiga erisha olmadi va tugallanmagan holatda saqlanib qoldi.

Xiva shahrining me’moriy muhitida Kalta Minor alohida o‘rin tutadi. Shaharda ko‘plab masjid va minoralar mavjud bo‘lib, ular tarixiy shahar manzarasining ajralmas qismini tashkil etadi. Biroq Kalta Minor o‘zining shakli va tugallanmagan ko‘rinishi bilan boshqa inshootlardan keskin farq qiladi. Kalta Minor sirlangan koshinlar bilan bezatilgan bo‘lib, unda ko‘k va yashil ranglar ustunlik qiladi[3]. Bu bezaklar Xorazm me’morchilik an’anasiga xos estetik qarashlarni aks ettiradi va inshootga o‘ziga xos badiiy joziba bag‘ishlaydi. Vaqt o‘tishi bilan esa u Xiva shahrining eng taniqli ramzlaridan biriga aylangan.

Kalta Minor me’moriy bezaklarida geometrik naqshlar va nafis ornamentlar ustunlik qiladi. Ushbu bezak uslubi Xorazm me’morchilik maktabiga xos an’anaviy estetik qarashlarning yuqori darajada rivojlanganini ko‘rsatadi. Inshootning ichki tuzilishi ikki qavatli bo‘lib, uning yuqori qismiga ichki yog‘och zinapoya orqali ko‘tarilish mumkin. Ushbu zinapoya vaqt o‘tishi bilan bir necha bor ta’mirlangan bo‘lib, bu minora uzoq yillar davomida foydalanilganini va unga doimiy e’tibor qaratilganini bildiradi.Minoraning tashqi qiyofasi sirlangan koshinlar bilan bezatilgan bo‘lib, unda oq, yashil va ayniqsa firuza ranglar uyg‘unlashgan. Aynan firuza rangning ustunligi sababli Kalta Minor xalq orasida “Ko‘k Minora” nomi bilan ham mashhur bo‘lib ketgan[4]. Bu ranglar uyg‘unligi inshootga yorqinlik va nafislik bag‘ishlab, uning uzoqdan ham darhol ko‘zga tashlanadigan betakror me’moriy timsolga aylanishiga sabab bo‘lgan.

Vaqt o‘tishi bilan koshinlar va yozuvlarning ayrim qismlari yemirilib, asl ko‘rinishidan uzoqlasha boshlagan. Biroq 1996–1997-yillarda Xivaning 2500 yilligi munosabati bilan Kalta Minorni restavratsiya qilish ishlari amalga oshirildi. Ushbu jarayonda sirlangan koshinlarda aks etgan yozuvlar qayta tiklanib, ularning asl ko‘rinishi imkon qadar saqlab qolindi. Xususan, Ogahiy asarlarida uchraydigan nasta’liq uslubidagi yozuvlar ham qayta tiklash jarayonida muhim manba sifatida foydalanildi. Bu ishlar usta Rustam Toirov boshchiligida amalga oshirilib, yodgorlikning tarixiy-badiiy qiyofasini tiklashga xizmat qildi.

Kalta Minor o‘zining to‘liq sirlangan koshinlar bilan qoplangan noyob tuzilishi, tugallanmagan me’moriy shakli va betakror bezaklari bilan Markaziy Osiyo me’morchiligida alohida o‘rin egallaydi. Uning aynan shu “tugallanmaganlik” holati ham uni yanada jozibador va tarixiy jihatdan qiziqarli yodgorlikka aylantiradi. Bugungi kunda u Xiva shahrining eng muhim ramzlaridan biri sifatida nafaqat sayyohlar, balki ilmiy tadqiqotchilar e’tiborini ham o‘ziga tortib kelmoqda.

XULOSA

Xulosa qilib aytganda, Kalta Minor Xiva shahrining Ichan qal’a me’moriy majmuasida joylashgan eng noyob va ramziy yodgorliklardan biri hisoblanadi. U dastlab ulkan va nihoyatda baland minora sifatida rejalashtirilgan bo‘lsa-da, tarixiy jarayonlar natijasida qurilishi yakuniga yetmay qolgan va shu holati bilan ham o‘ziga xos tarixiy-badiiy ahamiyat kasb etgan.Shunga qaramay, Kalta Minor o‘zining betakror shakli, rang-barang sirlangan koshinlari va Xorazm me’morchilik an’analariga xos nafis bezaklari bilan bugungi kungacha saqlanib qolgan muhim madaniy meros obidasi sifatida qadrlanadi. Uning tugallanmaganligi esa uni oddiy me’moriy inshoot emas, balki tarixiy jarayonlar va xalq xotirasini aks ettiruvchi noyob ramzga aylantiradi.

Umuman olganda, Kalta Minorni o‘rganish Xiva me’morchilik maktabining yuksak darajasini, shuningdek, Markaziy Osiyo shaharsozlik an’analarining rivojlanish jarayonini chuqurroq anglash imkonini beradi.

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QORAQALPOG‘ISTON AHOLISINING TABIIY KO‘PAYISHIDAGI O‘ZGARISHLAR

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Annotatsiya: *Maqolada Qoraqalpoǵiston respublikasi hududlarining aholi dinamikasi, uning tug‘ilish, o‘lim, tarkibiy va hududiy harakatlariga bog‘liqligi, 2013, 2018 va 2026-yillardagi aholi sonining taqqoslangani va Qoraqalpoǵiston Respublikasi aholisi qanday sabablarga ko‘ra o‘zgarganligi haqida aytilgan.*

Kalit so‘zi: *Ijtimoiy-iqtisodiy omillar, tuǵilish, o‘lim, migraciya, demografik omillar, urbanizaciya.*

Аннотация*: В статье рассказывается о динамике численности населения территорий Республики Каракалпакстан, ее зависимости от рождаемости, смертности, структурных и территориальных перемещений, сравнивается численность населения в 2013, 2018 и 2026-годах и по каким причинам изменилось население Республики Каракалпакстан.*

Ключевое слово: *социально-экономические факторы, рождаемость, смертность, миграция, демографические факторы, урбанизация.*

Abstract: *This article examines the population dynamics of the Republic of Karakalpakstan, its dependence on birth rates, death rates, and structural and territorial shifts. It compares the population size in 2013, 2018, and 2026, and analyzes the reasons for the changes in the population of the Republic of Karakalpakstan.*

Keywords: *socio-economic factors, birth rate, mortality, migration, demographic factors, urbanization*

KIRISH

Har bir davlat taraqqiyotini mukammal o‘rganish birinchi navbatda uning aholisini yani demografik jarayonlarni chuqur ilmiy tahlil etishni taqoza etadi. Jamiyatni tashkil etgan ijtimoiy-iqtisodiy guruhlar, tug‘ilish, o‘lim, nikoh va ajralish kabi demografik jarayonlar, ishlab chiqarishning asosi bo‘lgan mehnat resurslari, turli davlatlarda, turli tarixiy davrlarda olib borilgan demografik siyosatlar, jamiyat rivojlanishida asosiy zamin hisoblangan.

“O‘zbekiston Respublikasi Prezidentining 2022-2026 yillarga mo‘ljallangan yangi O‘zbekistonning taraqqiyot strategiyasini «insonga e’tibor va sifatli ta’lim yili»da amalga oshirishga oid davlat dasturi to‘g‘risidagi farmonida kelajagimiz bo‘lgan farzandlarimizga e’tiborni ko‘rishimiz mumkin [1]. Sog‘liq saqlash sohasida va ta’lim sohasidagi g‘amxorliklar bizlarni yanada jiddiyroq yondashuvga chaqiradi. Bu esa o‘z navbatida bir qancha topshiriqlarni belgilab beradi.

Tanlangan mavzuning dolzarbligi shundan iboratki, mamlakatimizda so‘nggi yillarda tug‘lish va o‘lim darajalarida o‘zgarishlar yuz bermoqda. So‘nggi paytlarda ko‘plab mamlakatlarda demografik muammo avj oldi. Qoraqalpoǵistonda ham bu muomma chetlab o‘tmadi. Qoraqalpoǵiston Respublikasida tuǵilish darajasi o‘rtacha hisoblanadi. Bu ko‘rsatkichni saqlab qolish va o‘rta darajadan past darajaga tushib ketmasligi uchun muammoga atroflicha yondashish lozim.

Aholining demografik vaziyatini o‘rganish, uning umumiy aholi soni va tadrijiy o‘sishini dinamikasini o‘rganishdan boshlanadi. Sababi, bu ko‘rsatkichlar mamlakatning tarixi rivojlanish hususiyatlari va siyosiy vaziyatiga bevosita bog‘lik kelib chiqadi [2, 35].

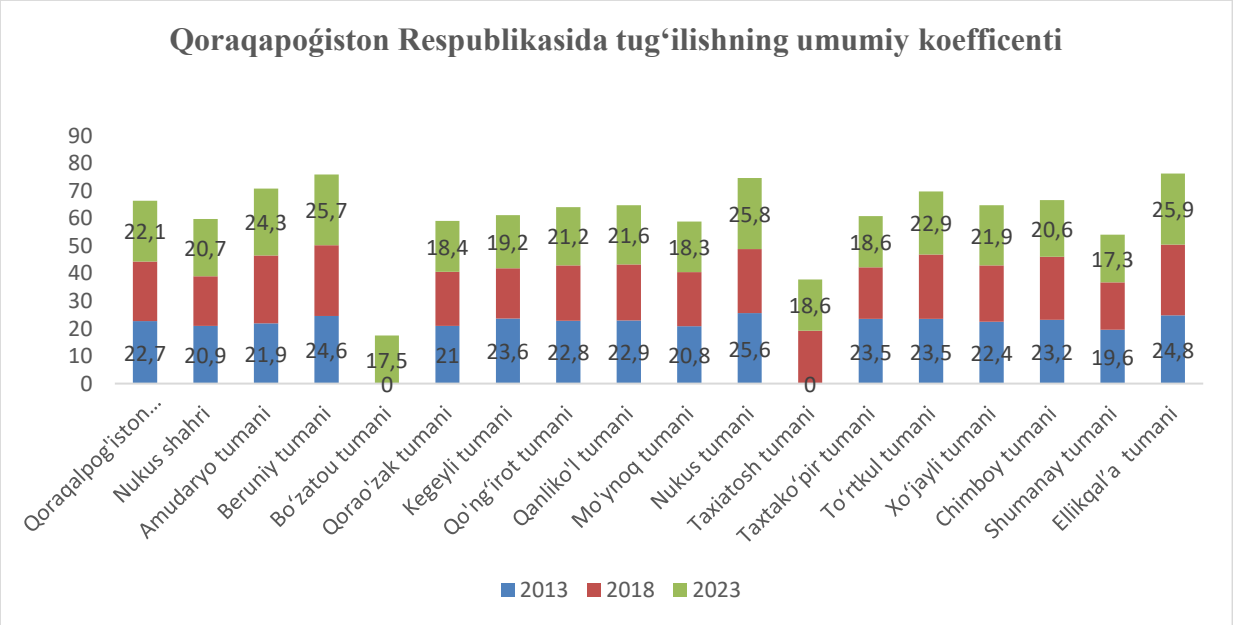
Aholining ko‘payishining bir necha turlari mavjud bo‘lib, ularning har biri tug‘ilish darajasi, o‘lim darajasi, tabiiy o‘sish va boshqa demografik ko‘rsatkichlar bilan tavsiflanadi. Qoraqalpoǵistonda 1979-1989-yillar davomida aholining tabiiy o‘sishi jadal bo‘lganligini ko‘rsatadi. Undan keyingi davrda, ya'ni 1989 - 1999 yillarda tug 'ilish 57,6 % bo‘lgan. Bu jarayon 1999-yildan 2014-yilgacha davom etdi va o’sdi. Ammo uning o‘rtacha yillik ko‘payishi oldingi davrga qaraganda kamroq bo‘lgan. 1989-1999 yillar atrofida ko‘plab ijtimoiy-iqtisodiy omillar ta'sirida tug‘ilish darajasining pasayishi aniqlandi.

2013-yilda tug‘ilishning umumiy darajasi 22,7 ‰ tashkil etgan bo‘lsa, bu 2025-yildagi Qoraqalpoǵistonda aholi va salomatlik tadqiqoti natijalariga ko‘ra, bu ko‘rsatkich 2013 yilga nisbatan 4,1‰ pasaygan, ya'ni tug‘ulish pasayish

darajasiga tushib qolgan. 2018-yilda Qoraqalpoǵiston bo‘yicha aholining tuǵilishi 21,6‰ tashkil topgan bo‘lsa ushbu ko‘rsatgich eng kam Shumanay tumani (12,9‰), eng yo‘qori ko‘rsatgich Beruniy tumani (23,4 ‰) kuzatilgan. 2025-yili Qoraqalpoǵistonda tug‘ilish koeffitsenti 19,2‰, Shumanay va Bo‘zatou tumanlarida 17‰, Beruniy va Ellikqal’a, Nukus tumanlarida 26 ‰ bo‘lgan. Qoraqapoǵiston Respublikasida tug‘ilishning umumiy koefficentini quyidagi 1-diagrammada ko‘rishimiz mumkin.

Binobarin, shahar va tumanlarda aholining tug‘ilishdagi farqlarni aniqlashda uning o‘rtacha ko‘rsatkichidan foydalanish qulay va o‘sha asosda ular quydagi guruhlarg‘a ajiratiladi: birinchi guruhga tug‘ilish darajasi yuqori bo‘lgan Ellikqal’a Nukus tumani, Beruniy, Amudaryo tumanlari; ikkinchi guruhga, yuqoridagi holat o‘rtacha bolgan Chimboy, Nukus shahri, Qo‘ng‘irot, Qanliko‘l, Xo‘jayli, To‘rtkul tumanlari; va uchunchi guruhga aholining tug‘lish past hisoblangan Shumanay, Bozatau, Qarao‘zek, Mo‘ynoq, Taxiyatosh, Taktako‘pir, Kegeyli tumanlari kiradi [3, 37].

1-diagramma



QR statistika boshqarmasi ma’lumotlari asosida mualliflar tomonidan ishlab chiqildi

Demografik jarayonlar bo‘yicha shahar va qishloq joylar keskin farqlanadi. Yuqorida keltirilgan guruhlar urbanizaciya darajasi bo‘yicha ham bir-biridan

keskin farq qiladi. Bu jarayon, o‘z navbatida, aholining tabiiy o‘sishiga tog‘ridan tog‘ri ta'sir etadi. Masalan, 2023 yil holatiga aholining tabiiy o‘sishi yuqori bo‘lgan birinchi guruhda urbanizatsiya darajasi 25%, ikkinchi guruhda o‘rtacha ko‘rsatkichga ega bo’lgan joylarda 43% va uchinchi guruhda 49 % (Nukus shahrisiz) ni tashkil qiladi. 2013 yilda esa birinchi guruhda 25%, ikkinchi guruhda 43%, uchinchi guruhda 32% tashkil etgan. Shunday qilib ikkinchi va uchinchi guruh shahar va tumanlari aholi sonining o‘sishiga urbanizaciya faoliyatidan boshqa geografik joylashuvi, mintaqaning ekologik ahvoli va migraciya ta’sir qiladi. Shuniyam aytib o‘tish kerak, 2023 yilga kelib Bozatau va Taxiyotosh tumanlariga tuman maqomi berilgan (1-jadval).

Aholining tabiiy o‘sishiga ijtimoiy–iqtisodiy omillardan tashqari demografik va ekologik vaziyat ham belgili darajada ta'sir etadi. Sababi, mintaqa aholisining tabiiy o‘sish jarayonida yuz berayotgan o‘zgarishlar nikoh ko‘rsatkichlariga va aholining yosh–jins tarkibiga bog‘lik bo‘lib, 2000-2010 yillar davominda aholining nikohga kirigan har bir ming kishiga 7,5 dan 10,8 kishiga o‘sgan. Unga sabab, mintaqada aholisining tabiiy o‘sish eng yuqori bo‘lgan davrda (1979-1990 yillari aholining tabiiy o‘sishi o‘rtacha 30-35 promille) tug‘ilgan aholi hozirgi kunga kelib bu jarayonda faol qatnashadi. Ekologik holat esa asosan aholining kasallanishi natijasida o‘lim darajasining va bolalar o‘limining yuqori bolishiga ta'sir etadi. Bu jarayonlar Orol dengizidan uzoq hududlarda, yani shimoldan janubga farqlanib boradi [3, 56].

1-jadval

Qoraqalpoǵiston tumanlari va shaharlari aholisining o‘rtacha tabiiy o‘sishi bo‘yicha guruhlanishi (2013-2023-yillar)

Daraja	Aholining tabiiy o‘simi bo‘yicha guruhlar	2013 yil	Urbanizaciya darajasi 2013y (%)	Daraja	Aholining tabiiy o‘simi bo‘yicha	2023 yil	Urbanizaciya darajasi 2023y (%)

I	yuqori (23,7 ‰ va undan yuqori)	Beruniy, Ellikqal'a, Nukus tumani	25 %	I	yuqori (23,2 ‰ va undan yuqori)	Ellikqal'a, Nukus tumani, Beruniy, Amudaryo	25 %
I	o'rtacha (21,7-23,6‰)	Amudaryo, Xo'jayli, Qo'ng'irot, Qanliko'l, Chimboy, Taxtako'pir, To'rtko'l, Kegeyli	43 %	I	o'rtacha (20,2-23,1‰)	Chimboy, Nukus shahri, Qo'ng'irot, Qanliko'l, Xo'jayli, To'rtkul	49 %
II	Past (19,6-21,6‰)	Shumonay, Mo'ynoq, Nukus shahri, Bozatau, Qarao'zek	32 %	II	Past (17,3-20,2‰)	Shumanay, Bo'zatau, Qarao'zek, Mo'ynoq, Taxiyatosh, Taxtako'pir, Kegeyli	43 %

Jadval QR statistika boshqarmasi ma'lumotlari asosida mualliflar tomonidan ishlab chiqilgan.

Demografik vaziyat tug'ilish, o'lim va migraciya ko'rsatkichlari asosida shakllanadi. O'lim darajasi, birinchi navbatda, odamlarning farovonligi, ovqatlanish madaniyati va jamoat sog'liqni saqlash xizmatlarining rivojlanish darajasi bilan bog'liq.

2025 yil holatiga tug'ulishda kutilayotgan o'rtacha umr davomiyligi 72,7. Ushbu ko'rsatkich erkaklar uchun 70,5 yosh, ayollar uchun 75 yoshga to'ǵri keladi. Shu bilan birga, o'rtacha umr ko'rish davri shahar joylarda 69,7 yosh, qishloq joylarda 75,9 yoshni tashkil etmoqda. Insoniyat tarixida tinchlik davrida, maxsus tabiiy ofatlar va epidemiyalarsiz aholining bunday past ko'rsatkich berishiga sabab bo'layotgan muommalari bartaraf qilish zarur.

Aholining mexanik o'sishi-ma'lum bir hududga kelganlar soni va ma'lum bir vaqt ichida undan chiqib ketganlar soni o'rtasidagi farq. Aholining migraciyası bir nechta umumiy va spetsefik qonuniyatlari asosida yuz beradi. Lekin uning tuzilishiga ko'plab omillar ta'sir etib, ular ijtimoiy-iqtisodiy, demografik, etnografik, tabiiy-iqlimiy va h. k. omillar [4, 32].

2-jadvaldan ko‘rib turganimizdek, keltirilgan yillar ichida eng yuqori teris soldoga 2005-yil ega bo‘lgan. 2003-2007 yillar oralig‘ida migraciya soldosi eng yuqori salbiy soldoga ega bo‘lib, unga sabab 2001-2002-yillarda bo‘lib o‘tgan suv tanqisligi, qolaversa qozoq millati vakillarining Qozog‘iston Respublikasiga eng ko‘p ko‘chganligi (agar 1989-yili qozoq millati vakillarining ulishi Qoraqalpog‘istonning milliy tarkibida 27% bo‘lgan bo‘lsa, bu hozirgi kunda 16%ga teng).

2-jadval

Qoraqalpoǵiston Respublikasi aholisining migraciya ko‘rsatkichlari

Yillar	kelgan	ketgan	saldo
2000	12927	16846	-3919
2005	12783	34106	-21323
2010	14275	26971	-12696
2015	10850	16181	-5331
2020	7779	12457	-4678
2022	7754	13270	-5516
2023	8399	15875	-7476
2025	13200	18622	-5422

Jadval QR statistika boshqarmasi ma’lumotlari asosida mualliflar tomonidan ishlab chiqilgan.

Albatta, har bir mamlakatda tabiiy o‘sishiga turli omillar ta'sir qiladi. Bularga ijtimoiy-iqtisodiy turmush sharoiti, ta'lim, tibbiyot, reproduktiv yoshdagi ayollar sonining kamayishi, birinchi marta tug‘ilgan ayollar yoshining o‘sishi, nikohlar sonining kamayishi va ajralishlarning yuqori darajasi, oila va ayollarning jamiyatdagi rolining o‘zgarishi bilan ham boǵliqdir.

XULOSA

Jamiyatni tashkil etgan ijtimoiy-iqtisodiy guruhlar, tug‘ilish, o‘lim, nikoh va ajralish kabi demografik jarayonlar, ishlab chiqarishning asosi bo‘lgan mehnat resurslari, turli davlatlarda, turli tarixiy davrlarda olib borilgan demografik siyosatlar, jamiyat rivojlanishida asosiy zamin hisoblangan.

Xulosa qilib aytganimizda, Qoraqalpog‘iston aholisining kelajagini o‘rganish uchun kompleks dastur ishlab chiqilishi va chuqur tadqiq etilishi lozim. Buning barchasi aholining sifat jihatidan rivojlantirilishiga yunaltirilishi kerak.

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TA’LIM JARAYONIDA INDIVIDUAL YONDASHUVNING IJTIMOIY-FALSAFIY MOHIYATI VA SHAXS IJTIMOIYLASHUVIDAGI O‘RNI

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Аннотация. *В данной статье анализируются социально-философская сущность индивидуального подхода в образовательном процессе, а также его роль в социализации личности, её самореализации и развитии человеческого капитала. Рассматриваются философские основы индивидуализации образования и её влияние на взаимодействие личности, общества и системы образования. Кроме того, с социально-философских позиций раскрывается значение индивидуального подхода в обеспечении общественного развития, укреплении духовно-нравственных основ, формировании ценностей и совершенствовании современной образовательной парадигмы.*

Ключевые слова: *образование, социальный институт, современное образование, социальная философия, социализация личности, образовательная траектория, социальная трансформация.*

Annotation. *This article examines the socio-philosophical essence of the individual approach in the educational process and analyzes its role in the socialization of individuals, self-realization, and the development of human capital. It explores the philosophical foundations of the individualization of education and its influence on the interaction between the individual, society, and the education system. Furthermore, the study provides a socio-philosophical analysis of the significance of the individual approach in promoting social development, spirituality, morality, values, and the advancement of the contemporary educational paradigm.*

Keywords: *education, social institution, contemporary education, social philosophy, individual socialization, educational trajectory, social transformation.*

ВВЕДЕНИЕ

В условиях глобализации, цифровой трансформации и становления экономики знаний образование приобретает новое содержание как один из важнейших социальных институтов, определяющих устойчивое развитие общества. Современная образовательная политика, с одной стороны, ориентирована на достижение международных стандартов качества образования и внедрение инновационных подходов, а с другой — предполагает сохранение национальных ценностей, духовного наследия и культурной самобытности общества. В этой связи утверждение индивидуального подхода в системе образования следует рассматривать не только как педагогическую задачу, но и как социально-философскую проблему, отражающую взаимосвязь личности, общества и государства. Мировой опыт развития образования свидетельствует о том, что индивидуализация образовательного процесса является одним из важнейших факторов интеллектуального развития личности, её самореализации, социализации и формирования человеческого капитала. Сущность индивидуального подхода заключается в создании условий для раскрытия способностей, потребностей и потенциальных возможностей личности, обеспечивающих её полноценное участие в общественной жизни. Поэтому индивидуальный подход целесообразно рассматривать не только как педагогический принцип, но и как социально-философский феномен, тесно связанный с общественной трансформацией, обновлением системы ценностей и современными тенденциями развития образования.

АНАЛИЗ ЛИТЕРАТУРЫ И МЕТОДЫ

Модернизация системы образования не ограничивается исключительно формированием у обучающихся знаний, умений и навыков. Она предполагает создание условий для всестороннего развития личности, формирования самостоятельности, инициативности, ответственности и критического мышления как важнейших социальных

качеств человека. В этой связи личностно-ориентированная модель образования рассматривается как механизм раскрытия индивидуального потенциала личности и её успешной социализации в условиях современного общества. При таком подходе не личность должна адаптироваться к существующей системе образования, а сама образовательная система обязана учитывать индивидуальные особенности каждого человека, включая стремление к свободе, самостоятельности, наличие собственной системы взглядов и потребность в самоутверждении[44]. Это создает необходимые условия для развития индивидуальности личности, её самореализации и непрерывного саморазвития. Сознание человека по своей природе всегда носит субъективный характер. Деятельность выступает одной из фундаментальных основ развития личности и определяет процесс её становления как субъекта общественных отношений. Активность личности тесно связана с её внутренними потребностями, мотивами, эмоциональной сферой и системой индивидуальных ценностей[45]. Именно через мотивацию, эмоциональное восприятие и собственную мировоззренческую позицию личность проявляет свою индивидуальность и реализует свой социальный потенциал. Современная образовательная практика включает разнообразные формы организации учебной деятельности: диалогическое взаимодействие, исследовательско-поисковое обучение, наглядно-иллюстративные и репродуктивные методы, игровые технологии, театрализованные занятия, а также семинары. Одной из ключевых целей исследовательско-поисковой деятельности является создание условий, при которых обучающийся

[44] Самарова, Ш. Р. (2020). Упражнения по формированию интереса учащихся к обучению на основе индивидуального подхода в образовательном процессе. Science and Education: Scientific Journal, 1(4), 258–259.

[45] Хайтметов, Р. К. (2020). Иммануил Кант и педагогика. Academic Research in Educational Sciences, 1(3), 801–806.

самостоятельно находит решение поставленной проблемы. При этом особое значение имеет не совпадение полученного результата с мнением преподавателя или других участников образовательного процесса, а формирование у личности чувства интеллектуальной самостоятельности, удовлетворения от собственного поиска и способности к независимому мышлению. В отличие от традиционной модели образования, ориентированной преимущественно на воспроизведение заранее заданных знаний, исследовательско-поисковый подход основывается на субъект-субъектном взаимодействии участников образовательного процесса. Применяемые методы направлены на развитие самостоятельного приобретения знаний, критического отношения к информации и научным данным, признание принципов плюрализма мнений, а также формирование культуры уважительного отношения к альтернативным точкам зрения. Технология организации образовательного процесса, основанная на исследовательско-поисковом подходе, реализуется в соответствии со следующими алгоритмами:



Первый Президент Республики Узбекистан И. А. Каримов неслучайно отмечал: “Образование невозможно отделить от воспитания, а воспитание — от образования. Это восточный взгляд и восточная философия жизни”[46]. Данная идея отражает целостный характер

[46] Каримов, И. А. (1997). Гармонично развитое поколение — основа прогресса Узбекистана (Т. 2, с. 64). Ташкент: Шарк.

образовательного процесса, в котором обучение и воспитание выступают взаимосвязанными социальными механизмами формирования личности.

РЕЗУЛЬТАТЫ

Управление образовательным процессом в учреждениях образования занимает одно из ключевых мест в системе внутреннего управления образовательной организацией. Его основная цель заключается в организации образовательной деятельности в соответствии с современными общественными требованиями, опираясь на передовой педагогический опыт и эффективные механизмы её дальнейшего совершенствования. В системе высшего образования воспитание молодежи представляет собой важнейший этап непрерывного развития личности. Именно в этот период завершается формирование мировоззрения молодых людей, их ценностных ориентаций и усиливается способность к осознанному саморазвитию и самовоспитанию. В условиях стремительного роста информационных потоков и ускорения процессов информационного обмена особую актуальность приобретает системный подход к формированию духовно-нравственной культуры личности. В этой связи образовательный процесс, воспитательная деятельность и научно-исследовательская подготовка студентов должны рассматриваться как взаимосвязанные компоненты единой системы формирования личности и её успешной социализации в современном обществе[47]. Американская концепция воспитания гражданина основывается на фундаментальной идее признания уникальности каждой личности. Каждый человек рассматривается как носитель индивидуальных способностей и талантов, заслуживающий уважительного отношения как высшая

[47] Сборник нормативно-правовых и методических документов (с. 511). Ташкент: Истиқлол.

социальная ценность. Подобное понимание личности создает благоприятные условия для раскрытия её интеллектуального и творческого потенциала, а также способствует самореализации в различных сферах общественной жизни. Именно поэтому среди граждан США крайне редко встречаются люди, воспринимающие себя как «обычного» или «заурядного» человека. Американское общество исходит из того, что социальный статус, профессиональные достижения и жизненный успех являются результатом личных способностей, интеллектуального потенциала и целенаправленных усилий самого человека. С раннего возраста каждому гражданину прививается стремление рассчитывать прежде всего на собственные силы, инициативу и ответственность, а не на внешнюю поддержку. Такой подход способствует формированию устойчивой уверенности в будущем, самостоятельности личности и её активной жизненной позиции[48].

Среди наиболее развитых стран Востока особое место занимает Япония, где сформирована эффективная система гражданского воспитания молодого поколения. В качестве основного института социализации и воспитания личности рассматривается образовательное учреждение, поскольку именно в процессе обучения человек не только приобретает знания, но и формируется как личность. Гражданское воспитание в Японии реализуется в рамках системы “нравственного воспитания”, которая в официальных документах определяется следующим образом:

- образование, направленное на формирование характера личности;

[48] Рахимова, Ш. А. (2018). Развитие образования в Узбекистане и духовно-идеологическое воспитание молодежи. В М. А. Рахматуллаев (отв. ред.), Перспективы развития высшего образования (Сборник № 6, с. 50). Ташкент.

- деятельность, ориентированная на воспитание нравственных качеств, соответствующих интересам государства;
- формирование основ гражданской нравственности[49].

По мнению многих исследователей, именно система нравственного воспитания составляет одну из мировоззренческих основ социально-экономического развития Японии, поскольку ориентирована на эффективное использование духовного и интеллектуального потенциала личности в общественном производстве.В этой связи особую значимость приобретает высказывание английского философа Томаса Гоббса (1588–1679): “Чтобы судить о государстве, прежде всего необходимо изучить нравственные качества, интересы и характер его граждан”. Согласно одному из основополагающих принципов японского менеджмента, высшей ценностью общества является человек. Трудолюбие, дисциплинированность и коллективизм традиционно рассматриваются как характерные черты японской национальной культуры. Вместе с тем государство не ограничивается признанием этих качеств, а возлагает на систему образования задачу их дальнейшего развития и укрепления. В результате в образовательных учреждениях особое внимание уделяется формированию групповой солидарности, коллективной ответственности и социальной сплоченности. Обучающимся прививается понимание того, что успехи и неудачи коллектива зависят от вклада каждого его члена, что способствует осознанию личной ответственности за выполнение собственной социальной роли и эффективное взаимодействие в обществе.

ОБСУЖДЕНИЕ

Анализ процессов, осуществляемых в Республике Узбекистан в сфере формирования гражданского общества и развития системы

[49] Эргашев, И., и др. (2005). Идея национальной независимости: Учебник для бакалавриата высших учебных заведений Республики Узбекистан. Ташкент: Академия.

образования, свидетельствует о необходимости дальнейшего осмысления роли гражданского воспитания в современных условиях. Несмотря на то, что понятие “гражданское воспитание” не всегда выступает в качестве самостоятельной научной категории, данное направление является одним из приоритетов государственной политики Республики Узбекистан. Его реализация осуществляется прежде всего посредством формирования национальной идеи и системы духовно-нравственных ценностей, интегрированных в образовательный процесс на основе государственных программ. Современная образовательная политика Узбекистана ориентирована на воспитание социально активной, ответственной и инициативной личности, способной эффективно реализовывать свой интеллектуальный потенциал в условиях общественных преобразований. Особое внимание уделяется раскрытию индивидуальных способностей молодого поколения, развитию его творческого потенциала, гражданской ответственности и социальной активности, что рассматривается как одно из важнейших условий устойчивого развития общества.

ЗАКЛЮЧЕНИЕ

Результаты исследования свидетельствуют о том, что индивидуализация образования является одним из ключевых факторов развития современной образовательной системы, способствуя социализации личности, её самореализации и развитию человеческого капитала. Совершенствование индивидуального подхода с социально-философских позиций рассматривается как важное условие модернизации системы образования, развития концепции непрерывного образования, укрепления духовно-нравственных и гражданских качеств молодёжи, а также формирования инновационной образовательной среды. В этой связи образовательная политика должна быть ориентирована на раскрытие индивидуального потенциала личности,

повышение её социальной активности и формирование человеческого капитала, соответствующего потребностям современного общества.

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EVALUATING THE PROFESSIONAL ACCURACY OF AI-GENERATED ESP MATERIALS: CHALLENGES FOR LANGUAGE TEACHERS WITHOUT SUBJECT-SPECIALIST KNOWLEDGE

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Abstract: *Generative artificial intelligence offers teachers of English for Specific Purposes rapid support in producing specialist texts, workplace dialogues, case studies, vocabulary exercises, and professional communication tasks. However, linguistically fluent output may contain inaccurate terminology, unrealistic professional roles, incorrect procedures, fabricated sources, outdated information, or unsuitable genre conventions. These problems are particularly difficult for ESP teachers who possess expertise in language and pedagogy but limited knowledge of the professional fields they teach. This conceptual article examines the distinction between linguistic fluency and professional accuracy in AI-generated ESP materials. It argues that AI can support materials development but should be treated as a drafting tool rather than a reliable source of professional knowledge. To guide responsible evaluation, the article proposes the PROVE-ESP framework, which evaluates purpose and needs alignment, realism, occupational accuracy, verification, educational suitability, ethical and local relevance, specialist review, and post-use evaluation. A risk-based approach is also recommended: low-risk language activities may require routine teacher review, whereas medical, legal, financial, engineering, aviation, and safety-related materials require authoritative verification and specialist scrutiny. The article concludes that effective AI use in ESP depends not only on prompting skills but also on needs analysis, disciplinary awareness, source evaluation, collaboration, and professional judgement.*

Keywords: *English for Specific Purposes, generative artificial intelligence, professional accuracy, materials development, subject knowledge, AI literacy*

INTRODUCTION

Generative artificial intelligence has expanded the range of materials that language teachers can produce. Teachers can use AI systems to generate reading texts, dialogues, role-plays, case studies, model emails, vocabulary exercises, assessment tasks, and differentiated activities. These functions are particularly attractive in English for Specific Purposes, where teachers frequently need materials for specialised groups such as medical students, engineers, bankers, lawyers, tourism employees, pilots, and information technology professionals. ESP materials are often difficult to obtain because commercially available coursebooks may not reflect learners' occupations, institutions, proficiency levels, or local working conditions. Teachers may consequently spend considerable time searching for authentic resources or adapting general English materials. Generative AI appears to provide an efficient alternative because it can quickly produce content that resembles professional discourse. Nevertheless, professionally styled language is not necessarily professionally accurate. An AI-generated medical dialogue may be grammatically correct while assigning a clinical responsibility to the wrong employee. A legal text may present the law of one jurisdiction as a universal rule. A banking scenario may describe an outdated security procedure, while an engineering task may misuse a technical term. Because such content is often expressed fluently and confidently, its inaccuracies may not be immediately visible.

This concern is especially important for ESP teachers who are trained primarily as language educators rather than as doctors, engineers, lawyers, or financial specialists. Their expertise allows them to evaluate grammar, clarity, proficiency level, task design, and classroom suitability. However, they may not always be able to determine whether professional terminology, procedures, responsibilities, and genres are accurately represented.

This conceptual article therefore examines three related issues: the forms of professional inaccuracy that may occur in AI-generated ESP materials, the

difficulties non-specialist language teachers face when evaluating them, and the processes needed to support responsible use. It proposes the PROVE-ESP framework as a practical model for combining pedagogical evaluation with professional verification.

ESP teaching and the problem of professional accuracy. ESP is not simply general English supplemented with technical vocabulary. It is an approach in which course objectives, content, materials, and assessment are shaped by the reasons learners need English (Hutchinson & Waters, 1987). Current understandings of ESP similarly emphasise work- or study-related needs and the teaching of specialised language that enables participation in particular target settings. Needs analysis is therefore fundamental. It identifies the situations in which learners use English, the tasks they must complete, the genres they encounter, and the communication difficulties they experience. A bank employee may need to explain loan conditions, confirm customer information, or respond to complaints. A nurse may need to collect patient information, provide reassurance, and report observations. A tourism employee may need to recommend services, clarify arrangements, and manage customer dissatisfaction. These tasks involve more than linguistic correctness. Professional communication is shaped by institutional purpose, workplace hierarchy, audience, responsibility, and accepted practice. A professionally accurate ESP material should therefore represent at least four dimensions correctly:

- specialist terminology and common professional expressions;
- workplace roles and levels of authority;
- procedures, practices, and institutional requirements;
- professional genres and their communicative purposes.

Professional accuracy should be distinguished from linguistic accuracy. A text may contain correct grammar and natural vocabulary while communicating false or misleading professional information. It should also be distinguished from pedagogical appropriateness. A technically accurate document may be too

difficult for learners, while a simplified text may become inaccurate if essential conditions or qualifications are removed. The objective is not to reproduce the complete complexity of professional practice in every classroom activity. Simplification is often necessary. However, simplification should not distort important terminology, responsibilities, safety principles, or communicative purposes.

The non-specialist ESP teacher. ESP teachers perform several roles, including teacher, needs analyst, course designer, materials developer, evaluator, researcher, and collaborator (Dudley-Evans & St John, 1998). Their expertise in language and pedagogy is central to successful ESP instruction. They can identify learner difficulties, analyse discourse, scaffold tasks, adapt linguistic complexity, and organise meaningful communication. However, language expertise differs from disciplinary expertise. An English teacher may recognise that a medical dialogue is polite and suitable for B1 learners but may not know whether the advice is medically appropriate. Similarly, a teacher may be able to improve the structure of a legal letter without knowing whether its legal claims are accurate. This subject-knowledge difficulty existed before the emergence of generative AI. Wu and Badger (2009) showed that ESP teachers may encounter unexpected classroom problems when learners or materials require disciplinary knowledge that the teacher does not possess. Their study illustrates that subject knowledge is not a theoretical concern but a practical challenge affecting classroom decisions.

Generative AI changes the form of this challenge. Instead of receiving no answer, the teacher receives an immediate and apparently complete one. The fluency of the response can create an impression of authority, even when the information is unsupported. Research on natural-language generation identifies this production of unfaithful, unsupported, or nonsensical information as hallucination (Ji et al., 2023). Non-specialist teachers may struggle to recognise such problems for several reasons. They may lack familiarity with current

professional procedures, have limited access to subject specialists, or be unable to distinguish authentic professional language from plausible imitation. Time pressure also matters. Teachers may use AI precisely because they need materials quickly, creating an incentive to accept the first fluent response without sufficient verification.

The solution is not to require ESP teachers to become complete subject experts. Instead, they need sufficient disciplinary awareness to recognise the limits of their knowledge, identify high-risk information, select appropriate sources, and request specialist support when necessary.

Forms of Professional Inaccuracy

Terminological inaccuracy. AI-generated material may confuse related technical terms, provide imprecise definitions, use an everyday synonym where a specialist term is required, or produce unnatural professional collocations. These errors can be difficult to notice because the overall sentence remains understandable. Terminology should therefore be checked through professional dictionaries, official glossaries, institutional documents, and authentic examples. Checking a term in isolation is not always sufficient; teachers should also examine its collocations, abbreviations, and contextual use.

Procedural inaccuracy. AI may omit a necessary step, place actions in an incorrect order, oversimplify a process, or describe an outdated practice. Such errors are particularly serious in medicine, aviation, engineering, finance, cybersecurity, and other fields involving safety or compliance. A language activity may not be intended as professional training, but learners may remember the procedure together with the language. When detailed procedures are not required for the language objective, they should be removed. When they are necessary, they should be based on current authoritative sources.

Workplace communication depends on who has the authority to provide information, make decisions, and perform particular actions. AI-generated scenarios may assign duties to the wrong professional or misunderstand

workplace hierarchy. For example, a medical receptionist should not be represented as diagnosing a patient, and a general customer-service employee should not be presented as making decisions that require managerial or regulatory authority. Such mistakes can cause learners to practise inappropriate professional behaviour.

Professional genres are defined by purpose and accepted conventions, not only by vocabulary and layout. AI may produce a document that resembles a report, proposal, case note, or complaint response but omits essential information or adopts an unsuitable tone. AI-generated professional language may also be unnecessarily formal or elaborate. In many workplace settings, concise and standardised language is more appropriate. Teachers should therefore compare generated texts with several authentic examples rather than relying on surface appearance.

Contextual and jurisdictional inaccuracy. Professional practices vary across countries, institutions, and organisations. AI may present one legal, medical, financial, or administrative system as universal. It may also introduce unsuitable currencies, organisations, workplace norms, or communication styles. ESP materials should identify the jurisdiction or institutional setting when it affects professional meaning. International examples can be valuable, but they should not be presented as local practice without verification. AI may generate non-existent regulations, false statistics, invented references, inaccurate standards, or organisations that appear plausible but cannot be verified. It may also reproduce practices that have been replaced by newer rules or technologies. Asking an AI system to confirm its own answer does not constitute independent verification. Every important professional claim should be checked against an external, current, and authoritative source.

Not all AI-generated materials require the same level of checking. Evaluation should reflect the consequences of possible inaccuracy. Low-risk materials include grammar exercises, pronunciation practice, basic vocabulary

revision, and general workplace conversations. These still require teacher evaluation, but specialist review is usually unnecessary when the professional content is limited. Medium-risk materials include professional emails, complaint responses, workplace role-plays, reports, interviews, presentations, and customer-service scenarios. These should be compared with authentic models and reviewed by experienced stakeholders where possible. High-risk materials include medical instructions, legal guidance, financial advice, engineering safety procedures, aviation protocols, emergency communication, cybersecurity instructions, and compliance training. Such materials require verification through official sources and, where possible, review by a qualified specialist. The risk level depends on content rather than activity type alone. A vocabulary exercise may become high risk when its terms are used in emergency communication, while a medical dialogue may remain relatively low risk if it focuses only on empathy and information gathering without offering clinical advice.

Dimension	Main evaluation question	Recommended action
P — Purpose and needs alignment	Does the material address an identified target task or learner need?	Connect the activity to needs-analysis findings and a clear language objective.
R — Realism of discourse and roles	Would these professionals communicate and act in this way?	Compare the roles, hierarchy, tone, and interaction with authentic workplace practice.
O — Occupational accuracy	Are the terminology, procedures, responsibilities, and technical claims correct?	Check professional glossaries, manuals, institutional documents, and current standards.
V — Verification	Can important claims and references be confirmed independently?	Open and compare authoritative external sources. Do not rely only on AI-generated references.
E — Educational suitability	Is the material appropriate for the learners' language level and instructional needs?	Adapt the level, add scaffolding, and ensure that simplification does not change the professional meaning.
E — Ethical and local relevance	Does the material respect privacy, copyright, fairness, culture, and jurisdiction?	Remove confidential information, avoid stereotypes, and adapt examples to the local professional context.

Dimension	Main evaluation question	Recommended action
S — Specialist scrutiny	Could inaccurate content create professional, legal, financial, health, or safety consequences?	Obtain review from a qualified subject specialist before using high-risk content.
P — Post-use evaluation	Did classroom use reveal confusion, inaccuracy, or lack of realism?	Collect learner feedback, revise the material, record the sources, and date the updated version.

Purpose and needs alignment. Evaluation should begin with learner needs rather than AI capabilities. A professionally impressive activity has little value if it does not prepare learners for a real target task. Teachers should identify the professional situation, communication objective, audience, and required language before generating the material.

Realism and occupational accuracy. Teachers should ask whether the scenario could realistically occur, whether responsibilities belong to the stated participants, and whether the language reflects genuine professional communication. Important terms and procedures should be checked against authoritative resources rather than general internet summaries. Verification should prioritise government bodies, regulatory organisations, professional associations, recognised standards, institutional manuals, peer-reviewed research, and authentic workplace documents. Sources should be checked for date, jurisdiction, and relevance. Providing AI with a reliable source and asking it to create an activity based only on that document is generally safer than asking it to invent professional content independently. Nevertheless, the generated activity should still be compared with the original because adaptation may alter meaning.

Professional accuracy alone does not make a material teachable. Teachers must also evaluate linguistic difficulty, cognitive demand, scaffolding, task purpose, and learner accessibility. Ethical evaluation includes privacy, confidentiality, copyright, bias, and transparency. Teachers should not upload identifiable patient, client, employee, company, or learner information into public AI systems without appropriate safeguards. UNESCO’s guidance and

teacher competency framework place human agency, ethical responsibility, and critical evaluation at the centre of educational AI use. Subject specialists remain important even when AI assists with materials development. Their contribution can include reviewing terminology, confirming workplace roles, identifying realistic tasks, and checking high-risk procedures. The value of subject-specialist participation has also been demonstrated in occupational language-assessment validation (Knoch, 2014). Evaluation should continue after the lesson. Learners with professional experience may identify unrealistic elements, unclear instructions, or terminology problems. Teachers should record corrections, verification sources, dates, and reviewer comments before reusing the material.

Implications for teacher education and institutions. ESP teacher education should move beyond basic prompt-writing skills. Teachers need to understand the limitations of generative AI, recognise unsupported claims, evaluate sources, analyse professional genres, classify risk, and collaborate with specialists.

AI literacy involves understanding, applying, evaluating, and ethically using AI rather than merely operating a tool. Recent language-teacher education research indicates that generative AI is affecting curriculum, instructional practice, assessment, and teacher preparation, while structured AI-literacy instruction can connect technical skills with critical and ethical awareness (Moorhouse & Kohnke, 2024; Ngo & Hastie, 2025). Educational institutions also have responsibilities. They should provide access to approved professional resources, develop policies for high-risk AI-generated materials, establish collaboration between language and subject departments, and create repositories of verified materials. Materials stored in such repositories should include their verification date, relevant jurisdiction, source information, and revision history. Institutions should also recognise that professional verification requires time. Encouraging teachers to use AI without providing review procedures may increase production while weakening quality control.

CONCLUSION

Generative AI can support ESP teachers by accelerating drafting, adaptation, differentiation, and activity design. However, it does not remove the traditional difficulty created by limited subject-specialist knowledge. Instead, it may conceal that difficulty beneath fluent and professionally styled language. AI-generated ESP materials may contain inaccurate terminology, procedures, roles, genres, references, and contextual assumptions. Because these errors are not always linguistically visible, teachers should not use grammatical correctness or fluency as evidence of professional reliability. The PROVE-ESP framework offers a practical response by integrating needs alignment, realism, occupational accuracy, independent verification, pedagogical suitability, ethical and local relevance, specialist scrutiny, and post-use evaluation. Its risk-based approach recognises that a grammar exercise and a medical procedure cannot be evaluated in the same way. Generative AI should therefore be treated as a materials-development assistant rather than a professional authority. The final responsibility remains with teachers and institutions. Responsible use depends on critical AI literacy, reliable sources, collaboration, disciplinary awareness, and informed professional judgement.

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SOVETLARNING FARG‘ONA VODIYSIDA YURITGAN KOLLEKTIVLASHTIRISH SIYOSATI HAMDA KATTA FARG‘ONA KANALINING BUNYOD ETILISHI.

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Annotatsiya. *Sovetlar hukmronligi davrida yozilgan tarixga oid manbalarda 20-30-yillarda O‘zbekiston mehnatkashlarining moddiy ahvoli “tubdan yaxshilanib brogan”ligi balandparvoz, quruq va yolg‘on raqam va ifodalarda yoritildi. Boshqacha bo‘lishi ham mumkin emasdi. Chunki bor gapni, to‘g‘ri haqiqatni yozish man etilgan, bunga jur’at qilganlar esa xalq dushmani, antisovetchi sifatida jazolanar edi. Haqiqat esa sovetlar davridagi yozilgan manbalarga qaraganda mutlaqo boshqacha edi.*

Kalit so‘zlar. *Sovetlar hukmronligi, O‘zbekiston, qishloq xo‘jaligi, kollektivlashtirish, Oktabr Harbiy to‘ntarishi, Farg‘ona, I.Stalin, Paxtachilik, Usmon Yusupov, Katta Farg‘ona kanali, Norin daryosi, Quyi Qoradaryo, Kampirravot to‘g‘oni.*

Abstract*. In the historical sources written during the Soviet rule, in the 20s and 30s, the material condition of the working people of Uzbekistan "radically improved" was highlighted in lofty, dry and false numbers and expressions. It could not be otherwise. Because it was forbidden to write the whole story, the true truth, and those who dared to do so were punished as enemies of the people and anti-Soviet. The reality was completely different than the written sources of the Soviet era*

Key words. *Soviet rule, Uzbekistan, agriculture, collectivization, October military coup, Fergana, I.Stalin, Cotton industry, Usman Yusupov, Big Fergana canal, Norin river, Lower Karadarya, Kampirravot dam.*

Аннотация*: В исторических источниках, написанных во времена советской власти, в 20-е и 30-е годы, материальное положение трудящихся Узбекистана «радикально улучшилось» подчеркивалось в высоких, сухих и лживых цифрах и выражениях. Иначе и быть не могло. Потому что запрещалось писать всю историю,*

истинную правду, а тех, кто осмелился это сделать, наказывали как врагов народа и антисоветчиков. Реальность совершенно отличалась от письменных источников советской эпохи.

Ключевые слова: *Советская власть, Узбекистан, сельское хозяйство, коллективизация, Октябрьский военный переворот, Фергана, И.Сталин, Хлопчатобумажная промышленность, Усман Юсупов, Большой Ферганский канал, река Норин, Нижняя Карадарья, плотина Кампирравот.*

KIRISH

O‘zbekistonda qishloq xo‘jaligini kollektivlashtirish sobiq Ittifoqda bo‘lgani singari 1927-yil, 2-19-dekabrida bo‘lib o‘tgan VKP(b) XV qurultoyidan so‘ng rasmiy tus oldi. Ammo Oktabr Harbiy to‘ntarishidan so‘ng dastlabki jamoa xo‘jaliklari vujudga kela boshlagan edi. 1921-yilning boshlarida faqat Farg‘ona, Samarqand va Sirdaryo viloyatlarida 8743 xo‘jalikni birlashtirgan 275 jamoa xo‘jaligi tuzilgan edi. Bu davrda ana shu viloyatlarda 74 ta davlat xo‘jaliklari - sovxozlar ham tashkil topgan edi. Yer-suv islohoti yillariga kelganda esa respublikadagi jamoa xo‘jaliklarining soni 522 taga yetdi.

Tadqiqot usullari va materiallari. Kollektivlashtirishni ommaviy ravishda sun’iy tezlashtirish 1929-yildan e’tiboran boshlandi. Bunga I.Stalinning 1929-yil, noyabrda «Правда» gazetasida e’lon qilingan «Buyuk burilish yili» maqolasi o‘ziga xos bir turtki bo‘ldi. Unda «xalqlar dohiysi» xalq xo‘jaligining hamma sohalarida bo‘lgani kabi kollektivlashtirish sohasida ham katta muvaffaqiyatlarga erishilayotgani, qishloq mehnatkashlari ommaviy suratda jamoa xo‘jaliklariga kirayotganliklari ta’kidlangan edi. Kollektivlashtirishdagi kamchilik va nuqsonlar haqida esa maqolada lom-mim deyilmagan edi. Bu kollektivlashtirishni sun’iy suratda tezlashtirishda mahalliy bolsheviklar tashkilotlari rahbarlari uchun o‘ziga xos «namuna» edi.

Kollektivlashtirish davomida amalga oshirilgan bunday adolatsizlik, zo‘ravonlik va odamlaming qadr-qimmatini oyoqosti qilish siyosati xalq ommasining sovetlar hukumatidan noroziligining mislsiz darajada kuchayishiga sabab bo‘ldi va 1930-yil boshlarida O‘zbekistonda dehqonlar urushining kelib

chiqish xavfini tug‘dirdi. 1930- yil, 25-fevralida Farg‘ona okrugining bir qancha tumanlarida mehnatkashlaming ommaviy chiqishlari bo‘lib o‘tdi. So‘ngra bunday harakatlar Andijon, Buxoro, Toshkent, Samarqand va Xorazm okruglarining bir qator tumanlarida ham takrorlandi. Xususan Farg‘ona vodiysi tumanlaridagi xalq ommasining chiqishlari sovetlar hokimiyatiga qarshi siyosiy kurashlar tusini oldi.

NATIJALAR VA MUHOKAMA

Paxtachilik taraqqiyotida suv muammosining o‘rni alohida ahamiyat kasb etadi. O‘zbekiston 1932-yildayoq umumittifoq ko‘rsatkichining 62 foiz paxtasini berayotgan bo‘lsada, markaz bundan qanoat hosil qilmadi. U paxta yetishtirishni yanada ko‘paytirish maqsadlarini ko‘zlab, sun'iy sug‘orish inshootlarini qurish masalasini O‘zbekiston sovet hukumati va kompartiyasi oldiga ko‘ndalang vazifa qilib qo‘ydi. O‘sha davrda bunday inshootlarni barpo etadigan qudratli texnika vositalari yo‘q edi, hamma ish qo‘ Ida, belkurak, ketmon, zambil va g‘altak aravalar yordamida bajarish zarur edi.

Katta Farg‘ona kanali (to‘liq nomi: Usmon Yusupov nomidagi Katta Farg‘ona kanali) - Farg‘ona vodiysida qurilgan eng yirik gidrotexnika inshootlaridan biri. O‘zbekiston (283 km), Tojikiston (62 km) va Qirg‘iziston (13 km) hududidan o‘tadi. Vodiyni shimoli-sharqdan janubig‘arbga kesib o‘tgan. Asosiy o‘zani uzunligi 350 km. Vegetatsiya davrida Norin (420 m3 /s), Qoradaryo (100 m3 /s), So‘x (12 m3 /s) daryolaridan 532 m3 /s suv oladi. Kanal trassasi 2 traktdan iborat. Yuqori Norin trakti (44 km) Norin daryosi (Uchqo‘rg‘on shahri yaqini)dan boshlanib, Kuyganyorgacha yetib boradi. Quyi Qoradaryo trakti (301 km) Qoradaryoga qurilgan Kuyganyor to‘g‘onidan boshlanib Sirdaryo bilan deyarli parallel holda janubdada Tojikiston Respublikasi Xo‘jand shahri yaqinigacha (Qayroqqum suv omboridan quyiroqda) davom etgan. 1939-yil avgustida xalq hashari bilan juda qisqa muddatda (45 kunda) qurib, bitkazildi. 1940-yilda Tojikiston hududida yana uzaytirildi (suv o‘tkazish imkoniyati 150 m3 /s). Kanal qurilishida 160 ming

kishi qatnashdi. 270 km li trassada 17,8 mln m3 tuproq qazib chiqarildi (shundan faqatgina 1,7 mln m3 tuproq mexanizmlar yordamida qazilgan). Ishlar og‘ir bo‘lgan uchastkalarda 14 ekskavator, 245 traktor, 420 avtomashinadan foydalanildi, 42,2 ming m3 beton ishlari bajarildi. 45 yirik va 275 mayda gidrotexnika inshooti qurildi. Kanal 1953 - 62, 1964 va 1967-yillarda rekonstruksiya qilindi. Uzunligi 345 km ga, suv sarfi 180 m3 /s, eng jadal suv sarfi 211 m3 /s ga yetkaziladi. O‘zbekiston va Qirg‘iziston, Tojikistonda 500 ming ga sug‘oriladigan yerlarning suv ta’minoti yaxshilandi, yangi yerlarni o‘zlashtirish imkoniyati paydo bo‘ldi. Kanalda 1000 dan ortiq gidrotexnika inshooti (shulardan 50 tasi yirik), jumladan, 9 to‘g‘on, maksimal yalpi suv olishi 162 m3 /s bo‘lgan 258 suv chiqargich, 7 tashlama, 8 akveduk barpo etilgan. Kanaldan transport o‘tishi uchun 101 ko‘prik qurilgan. Sel, tashlama va sug‘oriladigan maydonlardan chiqadigan drenaj suvlarini oqizib yuborish uchun kanalning chap tomonidan kollektorlar o‘tkazilgan, o‘ng tomondagi drenaj suvlari esa kanal ostidan o‘tgan 170 duker quvur orqali kollektorga ulangan.

Butun O‘zbekiston fuqarolari 1939-yil, l-avgustidan ana shunday ulkan inshootlardan biri - Katta Farg‘ona kanalini qurishga kirishdilar. Uzunligi 270 km bo‘lgan mazkur kanalni o‘zbek xalqi kattajasorat va mardlik ko‘rsatib mislsiz og‘ ir va qiyin sharoitlarda 45 kunda qurib bitkazdilar. Natijada 60 ming ga yangi y o‘zlashtirilib qishloq xo‘jalik oborotiga kiritildi, 500 ming gao yeroing sug‘orish sharoiti yaxshilandi. Xuddi shu singari Shimoliy va Janubiy Farg‘ona, Toshkent kanallari, Kampirravot to‘g‘oni ham qo‘l mehnati evaziga og‘ir mashaqqatlar bilan qurib, ishga tushirildi.

XULOSA

O‘zbekistonda qishloq xo‘jaligini jamoatlashtirish jarayoni tabiiy iqtisodiy rivojlanish bosqichlarini chetlab o‘tib, ma’muriy-buyruqbozlik va zo‘ravonlik usullari bilan amalga oshirilgan. I. Stalinning "Buyuk burilish" g‘oyasi asosida sun’iy ravishda tezlashtirilgan ushbu siyosat, qishloq aholisining

keskin noroziligiga va 1930-yillar boshida respublikaning turli hududlarida dehqonlarning ommaviy chiqishlariga sabab bo‘lgan.

Katta Farg‘ona kanali kabi yirik gidrotexnika inshootlarining qurilishi o‘sha davrdagi texnik imkoniyatlar darajasida emas, balki xalqning ulkan jismoniy kuchi va mardligi hisobiga amalga oshirildi. 160 ming kishining 45 kun ichida, asosan, qo‘l mehnati bilan 270 km dan ortiq masofada kanal qazishi o‘zbek xalqining bunyodkorlik salohiyatini namoyon etuvchi tarixiy voqea bo‘lishi bilan birga, sovet tuzumining inson resurslaridan ayovsiz foydalanganini ham anglatadi.

Umuman olganda, 1930-yillardagi kollektivlashtirish va yirik kanal qurilishlari O‘zbekiston tarixining murakkab va ziddiyatli davri bo‘lib, u bir tomondan agrar sohaning modernizatsiyalashuvi, ikkinchi tomondan esa mustabid tizimning xalq irodasiga qarshi amalga oshirgan islohotlari sifatida xarakterlanadi.

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SOCIAL FUNCTIONS OF CALENDAR-SEASONAL AND RELIGIOUS-SPIRITUAL CEREMONIES

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Abstract. *This article examines the social functions of calendar-seasonal and religious-spiritual rituals through a socio-philosophical perspective. It explores the historical evolution of these rituals, their role in preserving systems of values, strengthening social cohesion, ensuring the continuity of cultural heritage, and contributing to the moral and spiritual development of individuals. Furthermore, the study evaluates the transformation of rituals in the context of globalization and analyzes the theoretical and practical aspects of preserving their educational and moral potential while adapting them to contemporary social needs. The findings highlight the significance of rituals as an essential social institution that reinforces national identity, cultural continuity, and social stability.*

Keywords: *calendar rituals, seasonal rituals, religious rituals, spiritual values, social functions, cultural heritage, globalization.*

INTRODUCTION

In the contemporary era, characterized by accelerating globalization, digital communication, and cultural integration, the scientific study of the role and social functions of calendar-seasonal and religious-spiritual rituals has become increasingly important. These rituals represent significant social institutions that preserve historical memory, reinforce national identity, sustain spiritual values, and ensure the continuity of cultural heritage. They contribute to strengthening social solidarity, maintaining intergenerational continuity, promoting moral norms, and fostering the spiritual development of individuals. At the same time, ongoing social transformation has considerably influenced

both the content and the forms of ritual practices. This article analyzes the socio-philosophical nature of calendar-seasonal and religious-spiritual rituals and evaluates their functional significance for social stability and spiritual development based on theoretical approaches and relevant scholarly sources.

LITERATURE REVIEW

The study of the social functions of calendar-seasonal and religious-spiritual rituals is grounded in both historical and contemporary scholarly sources. Shavkat Mirziyoyev emphasizes that national values and rituals constitute one of the fundamental pillars of spiritual development and social progress. Islam Karimov considers high spirituality to be a key factor in national development and highlights the important role of rituals in strengthening national identity and preserving cultural values. The Joint Resolution of the Oliy Majlis of the Republic of Uzbekistan (2019) establishes the legal framework for organizing family ceremonies and public rituals in a rational, socially responsible, and economically sustainable manner. In Qutadg'u Bilig, Yusuf Khos Khojib discusses morality, ethics, and social relations in close connection with ritual culture and traditional values. Mahmud al-Kashgari's Dīwān Lughāt al-Turk provides valuable lexical and ethnographic information on the customs and ritual practices of Turkic peoples. Likewise, Kaykavus's Qabusnama presents profound reflections on moral education, etiquette, and ceremonial culture, making it an important theoretical source for understanding the contemporary social significance of rituals.

RESEARCH METHODOLOGY

This study was conducted using a systematic, historical, comparative, and socio-philosophical approach to comprehensively examine the social functions of calendar-seasonal and religious-spiritual rituals. The research employed methods of analysis and synthesis, historical-logical analysis, comparative-historical analysis, axiological, hermeneutic, and functional approaches. In addition, normative legal documents, classical sources, and contemporary

scholarly literature were subjected to qualitative content analysis in order to evaluate the integrative, educational, and cultural functions of rituals within society. The research findings were systematized, generalized, and conceptually interpreted to formulate scientifically grounded conclusions.

ANALYSIS AND RESULTS

Calendar-seasonal and religious-spiritual rituals represent one of the most significant social institutions formed throughout the historical development of society. They serve as essential mechanisms for transmitting spiritual values, moral norms, and cultural memory from one generation to another. The social stability of any society depends not only on economic and political factors but also on the system of rituals that regulates its spiritual life. From this perspective, calendar-seasonal and religious-spiritual rituals function as important social mechanisms that reinforce cultural identity, strengthen social cohesion, and regulate social relations [1].

The emergence of calendar-seasonal rituals is closely associated with humanity's interaction with nature, agricultural activities, and the cyclical changes of the seasons. Natural phenomena such as the end of winter, the arrival of spring, harvest celebrations, and the beginning of a new year have traditionally been commemorated through various ritual practices. Initially, these rituals symbolized humanity's relationship with the forces of nature; over time, however, they evolved into cultural traditions promoting social solidarity, cooperation, and collective responsibility. Even today, celebrations such as Navruz, Mehrjon, and other seasonal festivals continue to symbolize the harmonious relationship between humanity and nature while preserving their spiritual significance [5].

Religious-spiritual rituals, in turn, contribute to strengthening moral values and cultivating virtues such as compassion, tolerance, generosity, and social responsibility. These rituals not only express an individual's religious beliefs but also reinforce awareness of social obligations and civic responsibility.

In particular, Ramadan and Eid al-Adha celebrations, collective prayers, charitable activities, and other religious traditions serve as important instruments for promoting social solidarity and mutual assistance. As emphasized by Shavkat Mirziyoyev, the preservation of national and spiritual values constitutes an essential prerequisite for social development, and rituals remain an integral component of spiritual advancement [1].

Historical sources likewise confirm the important role of rituals in social life. In Qutadg'u Bilig, Yusuf Khos Khojib discusses ethics, morality, and principles of governance in close relation to customs, traditions, and ritual culture [4]. Similarly, Mahmud al-Kashgari's Dīwān Lughāt al-Turk contains extensive ethnographic descriptions of the customs, ceremonies, and festive traditions of Turkic peoples. These classical sources demonstrate that rituals should not be viewed merely as religious or domestic practices but rather as fundamental social institutions that contribute to the spiritual and cultural development of society [5].

Furthermore, rituals perform an essential educational function in the process of socialization. Through participation in traditional ceremonies, younger generations internalize national values, ethical principles, respect for elders, kindness toward younger members of society, solidarity, and collective responsibility. Consequently, rituals should be regarded not only as mechanisms for preserving cultural heritage but also as continuous educational instruments that strengthen the moral stability and cultural continuity of society [2][6].

The significance of calendar-seasonal and religious-spiritual rituals is most clearly reflected in their diverse social functions. From sociological and socio-philosophical perspectives, rituals perform integrative, communicative, educational, normative, identificational, and axiological functions. Their integrative function promotes unity by bringing members of society together around shared values and collective goals, while their communicative function ensures the transmission of cultural memory and spiritual heritage across

generations. Therefore, rituals constitute a vital social mechanism that reinforces the dynamic relationship between individuals and society and contributes to maintaining social harmony and cultural continuity [2].

One of the most significant characteristics of religious-spiritual rituals is their capacity not only to enrich individuals morally and spiritually but also to cultivate an atmosphere of mutual respect, compassion, and social solidarity within society. Charitable initiatives organized during the month of Ramadan, communal iftar gatherings, acts of generosity associated with Eid al-Adha, and collective religious worship strengthen social cohesion and reinforce interpersonal trust among citizens. As a result, values such as social responsibility, humanitarianism, and mutual confidence become more deeply rooted in society. This demonstrates that religious rituals possess not only theological significance but also perform essential social functions that contribute to the stability and moral development of society [1].

Calendar-seasonal rituals likewise promote harmony between humanity and nature while fostering ecological awareness and environmental responsibility. In particular, the celebration of Navruz represents a national cultural tradition symbolizing the renewal of nature, the beginning of the agricultural season, and the ideals of creativity, prosperity, and benevolence. Community activities associated with the festival—including voluntary public works (hashar), tree planting, environmental beautification, and collective celebrations—make a substantial contribution to the development of ecological consciousness and civic responsibility. Consequently, calendar-seasonal rituals should be regarded not merely as festive occasions but also as effective instruments of environmental education and social development [5].

The development of contemporary society has significantly influenced both the content of rituals and the forms through which they are practiced. Urbanization, migration, mass media, and digital technologies have transformed the external characteristics of many traditional ceremonies. Nevertheless,

preserving their essential spiritual values and social functions remains a fundamental prerequisite for maintaining the moral stability of society. Therefore, adapting rituals to contemporary social conditions while safeguarding their national and spiritual essence constitutes one of the most important challenges facing modern cultural policy [1][2].

In the Republic of Uzbekistan, the improvement of ritual culture has been recognized as an important direction of state policy. In particular, the Joint Resolution of the Oliy Majlis of the Republic of Uzbekistan of September 14, 2019, "On Further Improving the System for Regulating Weddings, Family Celebrations, Commemorative Gatherings, and Ceremonies," established the legal framework for organizing ceremonies in a rational manner, free from excessive extravagance and unnecessary expenditure [3]. The implementation of this policy contributes to preserving the genuine spiritual meaning of rituals, protecting the economic interests of families, and promoting a culture of moderation and social responsibility in ceremonial practices.

The present analysis indicates that excessive emphasis on the external appearance and material scale of ceremonies often diminishes their educational and spiritual significance. As a consequence, rituals risk becoming instruments of social prestige or material competition rather than expressions of shared cultural and moral values. Such tendencies may gradually weaken the substantive content of national traditions. Therefore, rituals should be evaluated primarily according to their contribution to social development, moral education, and human development rather than by their financial magnitude or visual grandeur [3][6].

In today's rapidly globalizing world, characterized by intensive digitalization and expanding information networks, calendar-seasonal and religious-spiritual rituals are undergoing noticeable transformations in both their content and modes of implementation. On the one hand, globalization facilitates the international dissemination of national cultural traditions; on the other hand,

it may negatively affect the authentic spiritual essence of certain rituals. Consequently, rituals should not be examined as isolated cultural phenomena but rather as integral components of broader contemporary social processes and cultural transformations [1].

From a socio-philosophical perspective, rituals constitute dynamic social phenomena that continuously evolve in response to historical and societal changes. Their external forms, organizational patterns, and communicative practices naturally adapt to the demands of each historical period. However, their underlying value system, ethical principles, and educational purposes should remain stable. Whenever the dialectical balance between form and content is disrupted, rituals gradually lose their primary social functions and risk being transformed from meaningful social institutions into forms of entertainment or displays of material status [2].

Modern mass media and social networking platforms have also exerted a considerable influence on ritual culture. The extensive online dissemination of weddings, family celebrations, and religious ceremonies has, in some cases, shifted public attention from the intrinsic meaning of rituals toward their visual appearance and ceremonial extravagance. Such tendencies may encourage consumerism, social comparison, and excessive financial expenditure. Accordingly, the effectiveness of rituals should be assessed not by their economic scale but by their educational, ethical, and socio-cultural impact on individuals and society as a whole [3].

The scientific significance of historical sources in preserving national rituals under the conditions of contemporary social development is invaluable. In Qutadg'u Bilig, Yusuf Khos Khojib interprets social progress through the concepts of justice, morality, and spirituality, emphasizing that the ethical perfection of individuals constitutes a fundamental prerequisite for social stability [4]. Likewise, Mahmud al-Kashgari's Dīwān Lughāt al-Turk contains rich ethnographic descriptions of the customs, festivals, and ritual traditions of

Turkic peoples, demonstrating the deep historical roots of national ceremonial culture [5]. Similarly, Kaykavus's Qabusnama offers valuable guidance on ethics, family relationships, and ceremonial culture, many aspects of which continue to retain their relevance in contemporary society [6].

The findings of this study indicate that the primary function of calendar-seasonal and religious-spiritual rituals is to strengthen the spiritual unity of society. These rituals unite citizens around shared cultural values while ensuring the continuity of historical traditions across generations. In particular, they play a significant educational role in fostering national identity among younger generations and cultivating such values as patriotism, humanitarianism, tolerance, mutual respect, and civic responsibility [1][2].

The research findings further demonstrate that rituals should not be regarded merely as ethnographic or religious phenomena but rather as complex social institutions. They perform multiple functions by safeguarding society's spiritual security, strengthening social cohesion, reinforcing national identity, and preserving the continuity of cultural heritage. Consequently, the modernization of ritual practices should be implemented on the basis of their historical foundations and national values. Only under such conditions can rituals preserve their social, educational, and spiritual significance while continuing to contribute to societal development in the context of globalization [1][3].

The conducted analysis confirms that calendar-seasonal and religious-spiritual rituals constitute important social institutions that regulate the spiritual life of society, reinforce social stability, and ensure the continuity of national values. They represent not merely components of historical and cultural heritage but also multifunctional mechanisms that strengthen society's moral resilience, promote civic responsibility, and preserve intergenerational continuity. Therefore, their study requires an integrated interdisciplinary approach combining socio-philosophical, axiological, sociological, and ethnographic

perspectives rather than relying exclusively on ethnographic or religious interpretations [1][2].

The study also reveals that the social effectiveness of rituals should be evaluated not by their external appearance or material scale but by their contribution to society's moral and spiritual development. Rituals fulfill their genuine social mission only when they cultivate mutual respect, solidarity, tolerance, generosity, patriotism, and civic responsibility. Conversely, when excessive emphasis is placed on ceremonial extravagance and material display, their educational and spiritual potential is substantially weakened. Under such circumstances, rituals risk losing their functional significance and becoming instruments of social competition and status demonstration [3].

Furthermore, the analysis demonstrates that ritual culture represents a dynamic and continuously evolving social phenomenon. Every historical period and every stage of socio-economic and cultural development influences the organizational forms of rituals. Nevertheless, the universal values embodied in these traditions—including humanism, benevolence, solidarity, and spiritual purification—should remain unchanged. Maintaining a proper balance between form and content is essential for preserving the vitality of rituals within contemporary society. Accordingly, the modernization of rituals should be understood not as the rejection of historical traditions but as the adaptation of national cultural values to contemporary social realities and societal needs [1][4].

Based on the research findings, several scientific and practical directions for improving calendar-seasonal and religious-spiritual rituals have been identified. These include promoting the spiritual significance of rituals through educational initiatives, strengthening the teaching of national ceremonial culture within the educational system, fostering respect for historical heritage and national traditions among younger generations, and expanding the dissemination of scholarly and educational materials that accurately explain the authentic meaning of rituals within the modern information environment. In addition,

organizing ceremonies according to the principles of moderation, rationality, and social responsibility serves both the economic interests of families and the broader spiritual well-being of society [3].

In conclusion, calendar-seasonal and religious-spiritual rituals should be recognized as universal social institutions that ensure the historical continuity of national culture, strengthen social solidarity, and contribute to the moral and spiritual development of individuals. Their significance extends beyond the preservation of traditions, encompassing the promotion of civil society, the reinforcement of national identity, and the consolidation of universal human values. Therefore, the scientific study of rituals, comprehensive analysis of their social functions, and their adaptation to contemporary developmental trends represent important prerequisites for ensuring the sustainable spiritual and social development of the Republic of Uzbekistan [1][5].

CONCLUSION

The findings of this study demonstrate that calendar-seasonal and religious-spiritual rituals perform integrative, educational, communicative, axiological, and identificational functions. They strengthen historical continuity between generations while contributing to the preservation and development of national values. Furthermore, although the organizational forms of rituals are undergoing transformation in the context of globalization and digitalization, preserving their spiritual essence and social significance remains a critical challenge. The study also confirms that the social effectiveness of rituals should be assessed not by their external scale or material grandeur but by their contribution to individual moral development, social cohesion, and the spiritual advancement of society. Therefore, improving calendar-seasonal and religious-spiritual rituals in accordance with contemporary social needs, enhancing their educational potential, and broadly implementing scientific and practical approaches aimed at safeguarding national values are essential for ensuring the sustainable spiritual development of Uzbek society.

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FROM FLUENCY TO CULTURAL FLUENCY: AI-SUPPORTED STORYTELLING AS A SUSTAINABLE INNOVATION IN LANGUAGE TEACHING

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Abstract. *Artificial intelligence is rapidly reshaping foreign language education, yet most existing applications prioritize linguistic efficiency over the cultivation of intercultural understanding. This paper addresses this gap by proposing an AI-Mediated Intercultural Storytelling (AIMIS) model as a sustainable pedagogical innovation for cultivating cultural competence alongside language proficiency. Grounded in sociocultural theory, intercultural communicative competence, and digital storytelling pedagogy, the model reconceptualizes generative AI as a pedagogical mediator rather than a substitute for human interaction, guiding learners through culturally grounded narrative construction, critical reflection, and ethical digital agency. The paper further situates this model within the Sustainable Development Goals, arguing that low-cost, scalable AI-storytelling practices can extend quality, culturally responsive language education to resource-constrained institutions worldwide. Implications for teacher education and global innovation in language pedagogy are discussed, alongside a future research agenda.*

Keywords: *artificial intelligence; intercultural competence; sustainable education; digital storytelling; global innovation; foreign language teaching.*

1. INTRODUCTION

The accelerating diffusion of generative artificial intelligence (GenAI) across educational settings has opened unprecedented opportunities for personalized, scalable language instruction (Kasneci et al., 2023). Within the

broader agenda of sustainable development, particularly Sustainable Development Goal 4 — ensuring inclusive and equitable quality education — AI-supported tools are increasingly promoted as a means of extending high-quality instruction to under-resourced institutions and regions (UNESCO, 2023). However, a critical gap persists in current practice: most AI-driven language-learning applications remain narrowly focused on grammatical accuracy, vocabulary acquisition, or conversational fluency, while the cultivation of intercultural understanding — an equally indispensable competence for learners who will operate in globalized professional and civic contexts — receives comparatively little pedagogical attention (Byram, 1997; Kohnke, Moorhouse & Zou, 2023).

This paper argues that sustainable innovation in language education requires more than technological efficiency; it requires pedagogical models that deliberately integrate cultural competence into AI-supported learning design. Digital storytelling has long been recognized as a powerful vehicle for intercultural learning, narrative identity construction, and reflective practice (Robin, 2008; Yang & Wu, 2012). We propose that reconceptualizing digital storytelling within an AI-mediated framework — one in which generative AI functions as a pedagogical mediator rather than a replacement for human meaning-making — offers a theoretically grounded and practically scalable pathway toward culturally responsive, sustainable language education.

2. THEORETICAL BACKGROUND

The proposed model draws on three converging theoretical strands. First, sociocultural theory (Vygotsky, 1978) frames learning as a socially mediated process in which tools — including, in this case, AI systems — extend learners' capacity to operate within their zone of proximal development. Second, Byram's (1997) model of Intercultural Communicative Competence (ICC) identifies attitudes, knowledge, skills of interpreting and relating, skills of discovery and interaction, and critical cultural awareness as the constituent dimensions of

intercultural competence, providing the substantive content that AI-mediated tasks must target. Third, digital storytelling pedagogy (Robin, 2008) demonstrates that narrative construction — particularly when learners must select, sequence, and voice culturally meaningful content — engages learners cognitively and affectively in ways that decontextualized language drills do not.

Recent scholarship on AI in education cautions that generative tools, if used uncritically, risk homogenizing cultural content or reproducing dominant cultural narratives embedded in their training data (Miao & Holmes, 2023). This concern reinforces the need for a pedagogical model in which the teacher's mediating role — selecting authentic cultural inputs, scaffolding critical reflection on AI-generated content, and guiding ethical evaluation of AI outputs — remains central rather than incidental.

3. The AIMIS Model and Its Relevance to Sustainable Global Innovation

The AI-Mediated Intercultural Storytelling (AIMIS) model organizes the learning process into six interrelated stages: intercultural inquiry, AI-supported exploration of cultural content, collaborative narrative construction, critical AI reflection, dialogic feedback, and the exercise of ethical digital agency. Across these stages, learners use generative AI to access authentic cultural material, draft and revise culturally embedded narratives, and critically evaluate the accuracy, bias, and cultural sensitivity of AI-generated content, while the teacher provides mediation, cultural grounding, and reflective prompts at each stage.

Dimension of sustainability	Contribution of the AIMIS model
Educational equity (SDG 4)	Low-cost, freely accessible AI tools extend culturally responsive storytelling practice to institutions with limited resources
Global partnership (SDG 17)	Cross-cultural narrative tasks connect learners with authentic cultural content from multiple regions, fostering global collaborative competence

Dimension of sustainability	Contribution of the AIMIS model
Professional sustainability	Prepares graduates in globally oriented fields (e.g., architecture, engineering) for culturally competent international collaboration
Pedagogical scalability	The six-stage structure is transferable across institutional contexts, language levels, and disciplinary domains

Table 1. Alignment of the AIMIS model with dimensions of sustainable educational innovation

The model's relevance to global innovation lies precisely in this dual affordance: it leverages a technologically advanced tool (generative AI) while anchoring its use in a pedagogically conservative principle — that meaningful intercultural learning requires human mediation, authentic content, and critical reflection. For learners in globally oriented professional fields, such as architecture, engineering, or international business, this combination is particularly consequential: these learners will be expected not only to communicate fluently in a foreign language but also to negotiate design briefs, present projects, and collaborate with culturally diverse clients and partners across borders. An AI-mediated storytelling approach that embeds professional scenarios within culturally authentic narratives therefore addresses both linguistic and intercultural readiness simultaneously, rather than treating them as separate instructional strands.

4. Implications for Practice and Future Research

For teacher education, the model implies that professional development programs must move beyond training educators to operate AI tools and instead cultivate what may be termed AI-mediated intercultural pedagogical competence — the capacity to select culturally appropriate tasks, scaffold critical engagement with AI-generated content, and model ethical, reflective use of generative technologies (Moorhouse & Kohnke, 2024). For institutional policy, the model suggests that investment in AI-supported language education should be paired with explicit curricular attention to intercultural outcomes, rather than

assuming that technological access alone will yield culturally competent graduates.

Future research should empirically validate the proposed stages through classroom-based intervention studies, examine the model's transferability across diverse linguistic and disciplinary contexts, and investigate longitudinal effects on learners' intercultural sensitivity and professional readiness. Comparative studies across institutions with differing levels of technological access would further clarify the model's viability as a genuinely scalable, sustainable innovation.

5. CONCLUSION

Sustainable innovation in foreign language education cannot be reduced to the adoption of increasingly powerful AI tools; it requires pedagogical frameworks that direct these tools toward the cultivation of both linguistic and intercultural competence. The AIMIS model offers one such framework, repositioning generative AI as a mediator of culturally grounded, reflective, and ethically guided learning. By aligning technological innovation with the goals of educational equity and global collaborative readiness, this approach contributes a theoretically grounded and practically transferable pathway for the future development of AI-supported, culturally responsive language education.

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TALABALARNING KASBIY KOMPETENSIYALARINI RIVOJLANTIRISHDA CHOLG'U SOZLARI (FORTEPIANO) TA'LIMINING ZAMONAVIY YONDASHUVLARI

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Abstract: *This article analyzes the role of the piano in the process of instrumental music education in developing students' professional competencies. It highlights the importance of piano instruction in fostering students' performance, pedagogical, communicative, accompaniment, creative, and aesthetic competencies. In addition, the article presents scientific conclusions regarding the application of innovative methods and approaches in the educational process.*

Keywords: *piano performance, music education, professional competence, pedagogical approach, creativity.*

Annotatsiya: *Ushbu maqolada cholg'u sozlari ta'limi jarayonida fortepiano asbobining talabalar kasbiy kompetensiyalarni shakllantirishdagi o'rni tahlil qilinadi. talabalarning ijrochilik, pedagogik, kommunikativ, jo'rnavozlik, ijodiy va estetik kompetensiyalarini rivojlantirishda fortepiano mashg'ulotlarining ahamiyati yoritiladi. Shuningdek, innovatsion metodlar va yondashuvlarning qo'llanilishi bo'yicha ilmiy xulosalar beriladi.*

Kalit so'zlar: *fortepiano ijrochiligi, musiqa ta'limi, kasbiy kompetensiya, pedagogik yondashuv, ijodkorlik.*

Аннотация: *В данной статье анализируется роль фортепиано в процессе обучения игре на музыкальных инструментах в формировании профессиональных компетенций студентов. Освещается значение занятий по фортепиано в развитии исполнительской, педагогической, коммуникативной, концертмейстерской, творческой и эстетической компетенций студентов. Также представлены научные выводы относительно применения инновационных методов и подходов в образовательном процессе.*

Ключевые слова: *фортепианное исполнительство, музыкальное образование, профессиональная компетентность, педагогический подход, креативность.*

KIRISH

Bugungi kun ta’lim tizimi oldida turgan dolzarb vazifalardan biri kasbiy kompetensiyalarga ega, zamon talablari bilan hamqadam mutaxassislar tayyorlashdir. Xususan, cholg’u sozlari ta’limi jarayonida talabalarning kasbiy kompetinsiyalarini takomillashtirish masalasida fortepiano ijrochiligi alohida o‘rin egallaydi. Fortepiano nafaqat asosiy ijrochilik asbobi sifatida, balki o‘qituvchining kasbiy mahoratini shakllantiruvchi vosita sifatida ham xizmat qiladi. Shu sababli, fortepiano mashg‘ulotlarini samarali tashkil etish orqali bo‘lajak o‘qituvchining kasbiy va shaxsiy sifatlarini rivojlantirish mumkin.Chunki musiqa o‘qituvchisi bir vaqtning o‘zida ijrochi, tashkilotchi va pedagog sifatida faoliyat yuritishi talab qilinadi. Shu nuqtai nazardan, cholg’u sozlarida ijroni rivojlantirish talabalarning kasbiy kompetensiyalarini shakllantirishda muhim vosita sifatida namoyon bo‘ladi. Fortepiano cholg‘usi o‘zining keng diapazoni, polifonik imkoniyatlari va universalligi bilan ajralib turadi. Musiqa ta’limida u quyidagi yo‘nalishlarda qo‘llaniladi: yakka ijrochilikni rivojlantirish; ansambl va xor jo‘rligini shakllantirish; o‘quvchilarda musiqiy tafakkurni va eshitish qobiliyatini rivojlantirish; pedagogik jarayonlarda musiqiy materiallarni oson yetkazish. Fortepiano mashg‘ulotlari jarayonida ijrochi nafaqat texnik mahoratini, balki musiqiy tafakkuri, ritmik sezgisi, badiiy ifoda va estetik didini ham shakllantiradi.

Musiqiy ta’lim talabalarida quyidagi asosiy kasbiy kompetensiyalarni shakllantirish muhim hisoblanadi: 1.Ijrochilik kompetensiyasi yani asarlarni texnik va badiiy jihatdan mukammal ijro etish. 2.Pedagogik kompetensiya (o‘quvchilarga musiqiy materialni tushunarli yetkazish,metodik yondashuvlarni qo‘llash) 3.Kommunikativ kompetensiya esa sahna madaniyati, ansambl va jamoaviy ijro ko‘nikmalarini shakllantirish hisoblanadi.4.Ijodiy kompetensiya

(improvizatsiya, oranjirovka, asarni qayta ishlash orqali talabalarda ijodkorlikni rivojlantirish)5.Estetik kompetensiya musiqiy did va estetik zavqni shakllantirish demakdir.

ASOSIY QISM

Talabalarda jo'rnavozlik qobilyatini yanada rivojlantirish nihoyatda muhim omil hisoblanadi. Chunki, umum ta'lim maktablarida darslarni tashkil qilishda, bolalarni xor sinfida kuylatishda (ayniqsa ashulani dastlabki o'rgatish bosqichlarida) ovoz sozlash mashqlarida fortepianoda jo'r bo'lish lozim. Jo'rnavozlik qilish esa bo'lajak musiqa o'qituvchisidan o'z ustida ishlash, mazkur asbobda yetarlicha erkin va yaxshigina ijro mahorati bo'lishlikni talab etadi. Bunda ritmni his qilish nihoyatda muhim hisoblanadi. Fortepiano asbobida solo asarlarni mahorat bilan ijro etgan ijrochida ritmni yaxshi his qilish qobilyati rivojlanmagan bo'lsa, o'rtacha qiyinlikdagi asarga mukammal jo'r bo'la olmasligi mumkin. Ritmni yaxshi qilishda, jo'rnavozlik qilishni dastlabki bosqichlarida jo'rnavoz asarni o'z qobilyatiga nisbatan ancha osonroq shaklidan boshlagani durustroq. Bunda jo'rnavozning butun diqqati asarning matnida bo'lib qolmaydi va u o'z partiyasidan tashqari xor yoki ovoz, solo asbob partiyasini ham bemalol ijro davomida kuzatib, ulgurib, his qilib bora oladi. Jo'rnavozlik malakalari rivojlana boshlaganini his qilish bilan asarlarni nisbatan murakkabrog'iga o'tish maqsadga muvofiq. Albatta bu qisqa vaqt ichida rivojlanib qolmaydi. Bu jarayon jo'rnavozning mehnati va sabriga, qobilyatiga bog'liq bo'lib bir necha oylarda musiqa asbobda jo'r bo'lish qobilyati takomillashganini kuzatish mumkin. Fortepiano musiqa asbobida deyarli barcha musiqa asboblariga va inson ovoziga jo'r bo'lish mumkin. Bunda musiqa asbobga va inson ovoziga jo'r bo'lish jo'rnavozdan turli malakalarni, his qilishni talab etadi. Masalan, vokalistga yoki xor jamoasiga jo'r bo'lganda kuylovchining nafas olish taktlarni va ritunoto yoki accelerando, stretto qismlarda u bilan bir butun bo'lib ijro etishni o'zlashtirish lozim. Xalq cholg'u asboblariga jo'rnavozlik qilishda esa ritmni his qilish nihoyatda muhim. Albatta

bunday cholg'ular asari ko'pincha klassik musiqadan farq qiladi yani sharqona ohangda bo'ladi. Shuning uchun bu uslubda aksentlar va nuqtali ritmni his qilish lozim. Ijro usullarini yaxshilash asarni yoki gamma, arpedjiolarni ravonligi va bir tekisda, tutilmasdan, to'xtamasdan ijro etish uchun bir qancha pryomlarni ishlatish maqsadga muvofiq. Bunga nuqtali usullarni kiritishimiz mumkin. Albatta buni asarlarda qo'llaganda har bir asarning notalar bo'linishidan kelib chiqib tanlash kerak. Yana bir muhim tomoni bir nuqtali usulni ko'p marotaba ketma-ket ijrosi teskari tarafga ishlashi mumkin yani bundan foyda emas, aksincha zarar olish mumkin. Shuning uchun pryomlar bilan ishlaganda ular haqida ma'lumotlar va bilmlar muhim ahamiyat kasb etadi. Zamonaviy ta'limda fortepiano mashg'ulotlarini yanada samarali qilish uchun innovatsion metodlardan foydalanish dolzarbdir: Multimedia va raqamli texnologiyalar (PianoMarvel, Musescore, Synthesia) orqali mustaqil mashg'ulotlarni tashkil etish. Differensial yondashuv bilan yani bunda talabalar qobiliyatiga mos repertuar tanlash. Integrativ yondashuv bilan esa fortepiano mashg'ulotlarini nazariy fanlar (musiqa nazariyasi, solfedjio, musiqiy tarix) bilan bog'lash. **PianoMarvel** – real vaqt rejimida ijrochining ijrosini baholab, xatoliklarni ko'rsatib boradi, bu esa talabaga xatolarini anglab, ularni tezkor tuzatish imkonini beradi. Bu raqamli fortepiano ta'limi uchun mo'ljallangan interaktiv o'quv platforma bo'lib, pianino chalishni o'rganish jarayonini tizimlashtirish, vizualizatsiya va gamifikatsiya orqali samarali o'rgatishga xizmat qiladi. Platforma 2009-yilda amerikalik musiqa pedagoglari tomonidan ishlab chiqilgan bo'lib, hozirgi kunda u professional musiqachilar, musiqa o'qituvchilari va talabalar tomonidan keng qo'llanilmoqda. Asosiy funksiyalari: Real vaqtlda baholash (assessment) Talabaning har bir notani qanday chalayotgani aniqlanadi, xatolar aniqlanib, darhol tahlil qilinadi. Bu esa reflektiv o'rganishni rag'batlantiradi. Standard Assessment of Sight Reading (SASR) esa notani varaqdan o'qish(sight reading) ko'nikmalarini rivojlantirish uchun yaratilgan avtomatik diagnostika moduli. Bu modul o'qituvchiga talabaning notani

varaqdan chalish darajasini aniqlash imkonini beradi. Gamifikatsiya elementlari orqali darslar o‘yin shaklida taqdim etiladi, bu esa o‘quvchi motivatsiyasini oshiradi. Talaba bosqichma-bosqich mukofotlar, ball va reytinglar orqali o‘z rivojini kuzatadi. Repertuar banki 25 000 dan ortiq klassik va zamonaviy asarlar mavjud bo‘lib, ularning barchasi darajalar bo‘yicha ajratilgan. Bu esa differensial yondashuvni qo‘llash uchun qulaylik yaratadi. PianoMarvel platformasi an’anaviy fortepiano ta’limini zamonaviy texnologiyalar bilan uyg‘unlashtirish imkonini beradi. Mustaqil mashg‘ulotlar uchun samarali bo‘lgan bu tizim talabaining ijro mahoratini, texnik ko‘nikmalarini va musiqiy tafakkurini mustahkamlashga xizmat qiladi. Ayniqsa, individual o‘rganish tezligiga ega talabalar uchun personalizatsiyalashgan ta’lim muhitini yaratadi. PianoMarvel fortepiano ta’limida innovatsion raqamli texnologiyalarni joriy etish bo‘yicha ilg‘or vositalardan biri hisoblanadi. U o‘quvchi motivatsiyasi, mustaqil o‘rganish ko‘nikmalari va texnik ijro malakasini shakllantirishda samarali yordamchi sifatida xizmat qilishi mumkin. Shuning uchun ham u musiqiy-pedagogik jarayonda an’anaviy va interaktiv yondashuvlar integratsiyasining muhim namunasi bo‘la oladi.

XULOSA

O‘tkazilgan kuzatishlar shuni ko‘rsatadiki, fortepiano mashg‘ulotlariga ijodiy yondashuv qo‘llangan talabalarda: musiqiy tafakkur kengayadi; sahna madaniyati shakllanadi; pedagogik faoliyatda erkinlik va ijodkorlik kuchayadi; ansambl va jamoa bilan ishlash ko‘nikmalari rivojlanadi. Fortepiano ijrochiligi musiqa ta’limida kasbiy kompetensiyalarni shakllantirishning samarali vositasidir. U bo‘lajak musiqa o‘qituvchilarining ijrochilik, pedagogik, kommunikativ va ijodiy kompetensiyalarini rivojlantirish bilan bir qatorda, estetik did va musiqiy tafakkurni ham boyitadi. Shuning uchun fortepiano mashg‘ulotlarini zamonaviy metodlar asosida tashkil etish, ularni pedagogik faoliyat bilan integratsiya qilish va ijodiy yondashuvni keng qo‘llash bugungi musiqa ta’limi tizimining eng muhim vazifalaridan biridir. Zamonaviy

metodlardan xususan, PianoMarvel kabi dasturlardan foydalanish bo'lajak musiqa o'qituvchilariga sezilarli natijalar olib kelishi mumkin. Bu o'qituvchidan ortiqcha vaqt, mehnat sarfiga ham ta'sir qiladi albatta. Chunki musiqa o'qituvchilarini ijro mahoratini oshirishda individual yondashish talab etiladi va ushbu dastur orqali bir qancha vaqtni tejash, talabada ijro ko'nikmalarini rivojlantirish kabi maqsadlarga erishish mumkin. Bo'lajak musiqa o'qituvchilarida kasbiy kompetensiyalarni rivojlantirishda musiqa asbobida xususan fortepianoda ijro, kreativlik, pedagogik qobilyatlar nihoyatda muhimdir

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CEFR TALABLARI ASOSIDA INGLIZ TILIDAGI MEHNAT MAVZUSIGA OID MAQOLLARNI O‘QITISH

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Annotatsiya. *Mazkur maqolada filologiya yo‘nalishi talabalari uchun ingliz tilidagi mehnat mavzusiga oid maqollarni o‘qitishning lingvodidaktik asoslari tahlil qilingan. Tadqiqotda CEFR talablari hamda davlat ta’lim standartlari asosida pragmatik va sotsiolingvistik kompetensiyalarni shakllantirish imkoniyatlari yoritilgan. Shuningdek, stilistika fani uchun tavsiya etilgan asosiy darsliklar tahlil qilinib, ularda mehnat mavzusiga oid maqollarning berilish maqsadi, uslubiy vazifalari va o‘qitish imkoniyatlari baholangan. Tahlil natijasida mavjud darsliklarda maqollar asosan misol sifatida keltirilishi, ularni bosqichma-bosqich o‘qitishga qaratilgan metodik topshiriqlar yetarli emasligi aniqlangan. Tadqiqot natijalari ingliz tilidagi mehnat maqollarini CEFR talablari asosida o‘qitishga xizmat qiluvchi metodik tavsiyalar ishlab chiqish uchun ilmiy asos yaratadi.*

Kalit so‘zlar: *mehnat mavzusiga oid maqollar, lingvodidaktika, CEFR, stilistika, pragmatik kompetensiya, sotsiolingvistik kompetensiya, filologiya, darsliklar tahlili.*

Annotation. *This article examines the linguodidactic foundations of teaching English proverbs related to labour to philology students. The study analyzes the opportunities for developing pragmatic and sociolinguistic competence in accordance with the CEFR and national educational standards. It also evaluates the main stylistics textbooks used in higher education with regard to the presentation, functions, and pedagogical value of labour-related proverbs. The findings reveal that proverbs are mainly presented as illustrative examples, while systematic exercises and methodological recommendations for teaching them are insufficient. The results provide a scientific basis for developing effective methodological recommendations for teaching English labour proverbs in accordance with CEFR requirements.*

Keywords: *labour-related proverbs, linguodidactics, CEFR, stylistics, pragmatic competence, sociolinguistic competence, philology students, textbook analysis*.

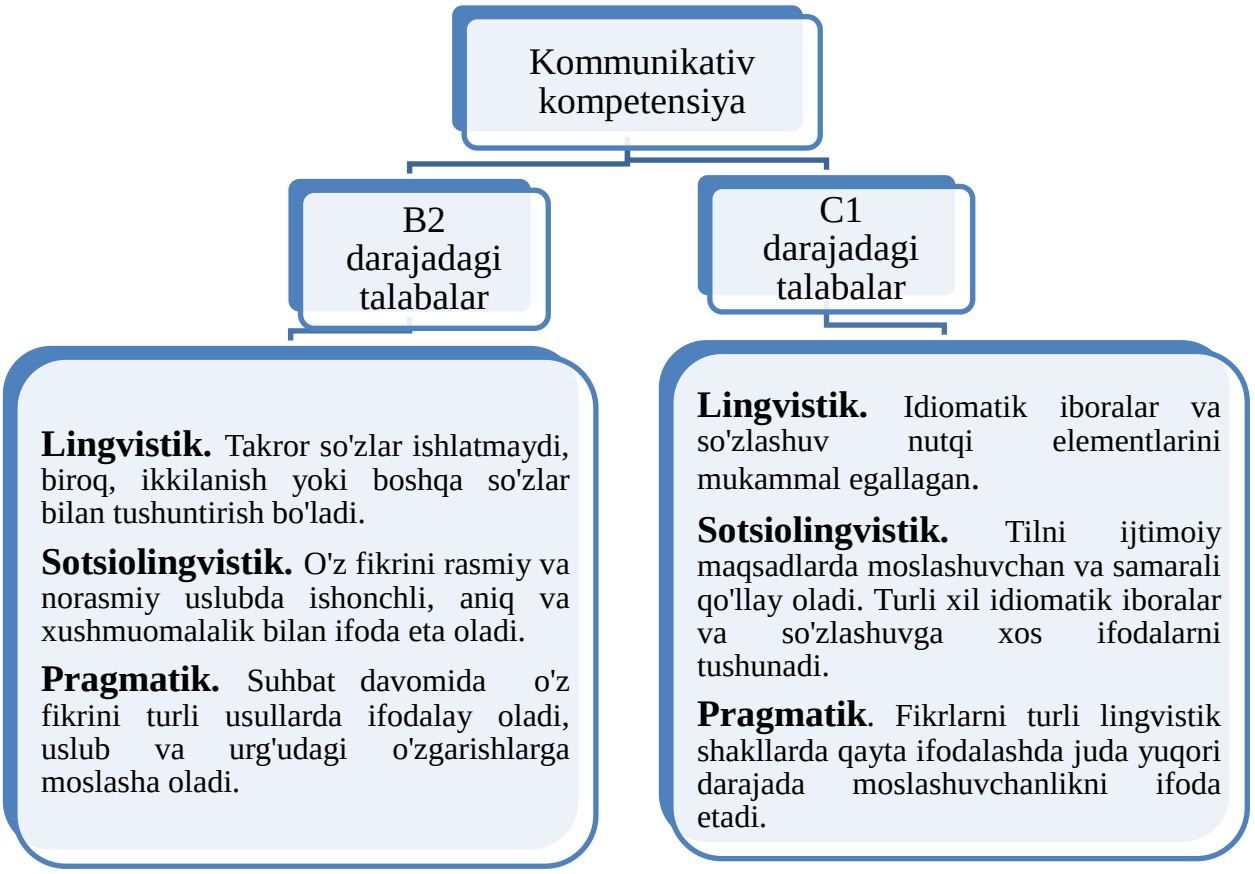
KIRISH

Filologiya yo‘nalishida tahsil olayotgan talabalarning chet tilidagi kommunikativ kompetensiyasini rivojlantirishda paremiologik birliklar, xususan maqollar muhim o‘rin tutadi. Maqollar o‘qitish nafaqat til kompetensiyasini, balki lingvomadaniy, pragmatik va sotsiolingvistik kompetensiyalarni ham rivojlantirishga xizmat qiladi.[3] Shu sababli ingliz tilidagi mehnat mavzusiga oid maqollarni o‘qitishning ilmiy-metodik asoslarini aniqlash dolzarb masalalardan biri hisoblanadi va yuqori kurs filologik yo‘nalishdagi talablar darsliklaridagi maqollarni tahlil qilish muhim ahamiyatga ega hisoblanadi.

Maqollarni dastur va darsliklarda foydalanilish maqsadlarini tahlil natijasida mavjud darsliklarda mehnat mavzusiga oid maqollarni o‘qitishning holati baholanadi, ularning afzallik va kamchiliklari aniqlanadi hamda filologiya yo‘nalishi talabalariga ushbu paremiologik birliklarni CEFR talablari asosida o‘qitish bo‘yicha metodik tavsiyalar ishlab chiqish uchun zarur ilmiy asos yaratiladi.

Dastlabki tahlilga olingan hujjatimiz CEFR (Common European Framework of Reference for Languages) chet tilini bilish darajasini aniqlash va baholashning xalqaro standart tizimidir. U til o‘rganuvchining eshitish va o‘qish hamda gapirish va yozish ko‘nikmalarini butun dunyo bo‘ylab tan olingan yagona standart asosida baholash uchun ishlab chiqilgan. Ushbu hujjat O‘zbekistonda 2001-yildan buyon amalda bo‘lib kelyapdi.

DTS talablariga binoan filologiya talabalarining yuqori kurslariga qo’yilgan ingliz tilidagi daraja B2 va C1 daraja etib belgilangan. Bu ilmiy ishimizda maqollarni aynan pragmatik va sotsiolingvistik kompetensiyasini o‘rgatish maqsad qilib olingan va barcha dastur va darsliklar shu kompetensiyalar asosida tahlil qilingan.



Bizni ilmiy ishimiz stilistika fan doirasida olib borilgani sababli stilistikadan o‘tiladigan darsliklarni tahlil qilishga qaror qildik.[2] O‘rganilayotgan til nazariy aspektlari fanining stilistika moduli uchun quyidagi asosiy adabiyotlar tavsiya etiladi: - Ashurova D.U., Galiyeva M.R. Cultural linguistics Tashkent. 2019 . Ushbu darslik 126 sahifa, nazariy ma’lumotlar berilgan 6 ta bo‘lim, glossari, foydalanilgan adabiyotlardan tashkil topgan.[1]

Darslikni tahlilini boshlaydigan bo‘lsak, darslikni 1.5- bo‘limining sarlavhasi madaniy qadr-qimmat va uning so‘zda ifodalanishi deb nomlangan. 15-sahifasida har bir madaniyatning o‘z qadr qimmatiga ega tushunchalari haqida gap boradi va bu qadr qimmat maqollarda yorqin namoyon bo‘lishini quyidagi misol bilan aytib o‘tgan: **An Englishman’s word is as good as his bond** (*tarjimasi*: Ingliz er yigitining so‘zi uning qarzi bilan teng.)- *o‘zbekcha muqobili.* Yigit so‘zidan qaytmas, sher izidan.[4,5]

Darslikning 16- sahifasida ingliz va o‘zbek millatlari xushmuomalalikni va hurmatni qadrlashi haqida so‘z boradi va shu mavzuga oid maqollar misol

tariqasida keltirib o‘tilgan. Biz faqat ingliz tilidagi mehnatga oid maqollarni tahlil qildik. **Handsome is as handsome does** (t*arjimasi:* Chiroyli ish qilgan odamgina chiroylidir. -*O‘zbekcha muqobili:* Ishing bo‘lsa sharofat hech ko‘rmaysan kasofat.[4,5]

Darslikning 4.4 bo‘limi “Maqol va matallar madaniy belgiga ega bo‘lgan birliklar sifatida” deb nomlangan sarlavha ostida berilgan bo‘lib, bo‘limda turli xil mavzulardagi maqollar keltirib o‘tilgan. Darslikning 75-sahifasida maqollar millatning dunyoqarashini, turmush tarzini, donishmandligi, tarixi, madaniyatini ifodalaydigan eng muhim manba ekanligi ta’kidlangan va quyidagicha misollar berilgan. **A penny saved is a penny earned** (*tarjimasi:* Saqlangan tiyin-foydaga topilgan tiyindir. *O‘zbekcha muqobili:* Tejamkor zoriqmas, tejamsiz boyiqmas. **Business is business** (*tarjimasi:* Biznes biznesligicha qolaveradi). *O‘zbekcha muqobili*: Puldorning ota onasi pul. **If a job is worth doing, it is worth doing well** (*tarjimasi*: Agar biror ishni qilishga arzisa, uni sidqidildan qilish kerak). *O‘zbekcha muqobili*: Ishni qilding puxta, g‘am yemaysan keyingi vaqtda.[4,5]

75- sahifada maqollarni maslahat berish, o‘qitish, ishontirish kabi vazifalari tahlil qilingan. Maqollarda insonlarni sodda turmush tarzi va ularning jamiyatda o‘zaro munosabatlari aks etishi tushuntirilgan va shu mavzularga oid maqolardan 2 tasi mehnat haqidagi maqollar hisoblanadi. **The early bird catches the worm** (*tarjimasi:* Erta uyg‘ongan qush chuvalchang tutadi).- *O‘zbekcha muqobili*: Ertalabki vaqt-naqdgina baxt. **A woman’s work is never done** *(tarjimasi:* Ayol kishining ishi hech qachon tugamaydi. - *O‘zbekcha muqobili:* Xotin kishining ishi tilla qumning ishi.[4,5]

77-betda maqollarning diniy qarashlari bo‘lgan, yunon va rim afsonalardan kelib chiqqan va ingliz adabiyotidan olingan maqollar turlari berilgan. Biz maqollarni mehnat mavzusiga oidlarini tanlab tahlil qildik. **Help me to salt and you help me to sorrow** *(tarjimasi:* Menga tuz uzatganing menga qayg‘u uzatganingdir). *O‘zbekcha muqobili*: Tuyaga yaxshilik qilsang, burningni qonatadi. **Every man must carry his own cross** (*tarjimasi*: Har bir

inson o‘z xochini (og‘ir qismatni) o‘zi ko‘tarishi kerak. *O‘zbekcha muqobili*: Har kim o‘z aravasini o‘zi tortadi. **One doesn’t live only by bread** *(tarjimasi*: Inson faqat non (moddiy narsalar) bilan yashamaydi. *O‘zbekcha muqobili*: Yeyish uchun yashama yashash uchun ye. **A little learning is a dangerous thing**. (*tarjimasi*: Chala bilim xavfli narsadir). *O‘zbekcha muqobillari*: Bilmaganning bilgani boshga balo.[4,5]

79-betda ingliz millati har doim sanoat va savdo rivojlangan mamlakat bo‘lib kelganligi maqollarda ham o‘z aksini topgan deyiladi. Ingliz tilida iqtisod va biznesni aks ettiruvchi juda ko‘p maqollar misol tariqasida berilgan. **Business before pleasure** (*tarjimasi:* Rohatdan oldin ish). *O‘zbekcha muqobili*: Birinchi iqtisod keyin siyosat. **Business is like a car, it will not run by itself except downhill** (*tarjimasi:* Biznes xuddi mashinaga o‘xshaydi u faqat pastlikka qarab o‘zi yurishi mumkin tepaga esa uni haydash kerak). *O‘zbekcha muqobili*: Harakatdan barakat. **Business neglected is business lost** (*tarjimasi:* E’tiborsiz qoldirilgan biznes boy berilgan biznesdir). *O‘zbekcha muqobili:* Egasiz eshakni bo‘ri yer. **One business begets another** (*tarjimasi:* Bir ish ikkinchisini tug‘diradi). *O‘zbekcha muqobili*: Ish ishni chaqiradi. **Business is the salt of life** (*tarjimasi:* Mehnat hayotning tuzidir). *O‘zbekcha muqobili:* Mehnat hayot ziynati. First come, first served. **A bargain is a bargain** (tarjimasi: kelishuv bu kelishuvdir). *O‘zbekcha muqobili*: Mard aytmas aytsa qaytmas. [4,5]

XULOSA

O‘tkazilgan tahlillar shuni ko‘rsatdiki, CEFR (Common European Framework of Reference for Languages) til o‘rganuvchilarning lingvistik, sotsiolingvistik va pragmatik kompetensiyalarini bosqichma-bosqich rivojlantirishni nazarda tutadi. Stilistika fani uchun tavsiya etilgan asosiy darsliklar tahlili shuni ko‘rsatdiki, maqollar asosan misol sifatida keltirilgan bo‘lib, ularni lingvodidaktik yondashuv asosida bosqichma-bosqich o‘rgatishga qaratilgan maxsus mashqlar, metodik tavsiyalar va kompetensiyaga yo‘naltirilgan topshiriqlar yetarli darajada ishlab chiqilmagan. filologiya

yo‘nalishidagi talabalarga ingliz tilidagi mehnat mavzusiga oid maqollarni lingvistik, pragmatik, sotsiolingvistik kompetensiyalarini rivojlantirishga xizmat qiladi. Mazkur holat tadqiqot doirasida maxsus lingvodidaktik model va mashqlar tizimini ishlab chiqish zaruratini ilmiy jihatdan asoslaydi.

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OILA, MAKTAB VA JAMIYATNING O‘QUVCHILARDA MILLIY QADRIYATLARNI SHAKLLANISHIDAGI ROLI

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Annotatsiya: *Mazkur maqolada o‘quvchilarga milliy qadriyatlarni singdirishda oila, maktab va jamiyatning o‘zaro hamkorligi hamda ularning tarbiyaviy ahamiyati yoritilgan. Oila shaxs tarbiyasining boshlang‘ich maskani, maktab esa tizimli ta’lim va tarbiya beruvchi muhim institut sifatida tahlil qilingan. Shuningdek, mahalla, ommaviy axborot vositalari, madaniyat muassasalari va jamoat tashkilotlarining yosh avlodda milliy o‘zlikni anglash, vatanparvarlik, ma’naviy-axloqiy fazilatlarni shakllantirishdagi o‘rni yoritilgan.*

Kalit so‘zlar: *milliy qadriyatlar, oila, maktab, jamiyat, mahalla, tarbiya, ta’lim, ma’naviyat, vatanparvarlik, milliy o‘zlik, pedagogika, yoshlar.*

Abstract: *This article examines the role of the family, school, and society in fostering national values among students. It analyzes the educational significance of the family as the primary environment for personality development and the school as a key institution of education and upbringing. Particular attention is given to the contribution of the mahalla community, mass media, cultural institutions, and public organizations in developing national identity, patriotism, and the spiritual and moral qualities of the younger generation.*

Keywords: *national values, family, school, society, mahalla, education, upbringing, spirituality, patriotism, national identity, pedagogy, youth.*

KIRISH

Milliy qadriyatlar xalqning ko‘p asrlik tarixiy tajribasi, urf-odatlari, an’analari, madaniyati va ma’naviy merosini o‘zida mujassam etgan bo‘lib, ular shaxsning ma’naviy kamoloti va fuqarolik pozitsiyasini shakllantirishda muhim omil hisoblanadi. Yosh avlodni milliy qadriyatlar asosida tarbiyalash bugungi ta’lim tizimining ustuvor yo‘nalishlaridan biri hisoblanadi. O‘quvchilarda milliy

qadriyatlarga hurmat tuyg‘usini rivojlantirishda oila, maktab va jamiyatning uzviy hamkorligi muhim ahamiyat kasb etadi.

Oilada milliy bayramlarni nishonlash, xalq og‘zaki ijodi namunalaridan foydalanish, buyuk ajdodlar hayoti va faoliyati haqida suhbatlar o‘tkazish yoshlarning milliy o‘zligini anglashiga xizmat qiladi. Oila shaxs tarbiyasining birlamchi va eng muhim bo‘g‘inidir. Bola ilk axloqiy tushunchalarni, milliy urf-odat va an’analarni aynan oilada o‘zlashtiradi. Ota-onalarning shaxsiy namunasi, oiladagi ma’naviy muhit, o‘zaro hurmat va mehr-oqibat farzandning kelajakdagi dunyoqarashini belgilaydi.

Mahalla, madaniyat markazlari, kutubxonalar, muzeylar, teatrlar, sport va jamoat tashkilotlari yoshlarning ma’naviy kamolotiga ijobiy ta’sir ko‘rsatadi. Jamiyat ham yoshlarni milliy qadriyatlar ruhida tarbiyalashda muhim ijtimoiy muhit hisoblanadi. Ayniqsa, mahalla institutining tarbiyaviy imkoniyatlari katta bo‘lib, unda tashkil etiladigan ma’naviy-ma’rifiy tadbirlar, uchrashuvlar va xalq bayramlari yoshlarning milliy qadriyatlarga sodiqligini mustahkamlaydi.

Ta’limiy platformalar, elektron darsliklar, hujjatli filmlar, virtual ekskursiyalar va ijtimoiy tarmoqlardagi ma’rifiy loyihalar orqali o‘quvchilarga milliy tarix, madaniyat va an’analar haqida qiziqarli hamda ishonchli ma’lumotlar yetkazish mumkin.

Milliy qadriyatlarni shakllantirishda badiiy adabiyot va xalq og‘zaki ijodi alohida o‘rin tutadi. Ertaklar, dostonlar, maqollar, rivoyatlar va hikmatli so‘zlar yosh avlodni ezgulik, halollik, mehnatsevarlik, insonparvarlik va vatanparvarlik ruhida tarbiyalaydi. Buyuk mutafakkirlar va adiblarning asarlarini o‘rganish o‘quvchilarning milliy tafakkurini rivojlantirib, ularning ma’naviy dunyosini boyitadi.

Milliy qadriyatlarni o‘quvchilar ongiga singdirishda zamonaviy pedagogik texnologiyalarni qo‘llash alohida ahamiyat kasb etadi. Bugungi kunda ta’lim jarayonida interfaol metodlar, loyihaviy ta’lim, muammoli vaziyatlar, klaster, aqliy hujum, debat va keys texnologiyalaridan foydalanish

o‘quvchilarning mustaqil fikrlashini rivojlantirish bilan birga, ularda milliy qadriyatlarga ongli munosabatni shakllantiradi. Masalan, guruhlarda milliy urf-odatlar, qadimiy kasb-hunarlar yoki tarixiy shaxslar faoliyatiga bag‘ishlangan loyihalarni tayyorlash o‘quvchilarning izlanish olib borish, tahlil qilish va xulosa chiqarish ko‘nikmalarini rivojlantiradi.

Milliy qadriyatlarni singdirishda fanlararo integratsiya tamoyili ham muhim o‘rin tutadi. Tarix fanida ajdodlarimizning davlat boshqaruvi, ilm-fan va madaniyat rivojiga qo‘shgan hissasi yoritilsa, adabiyot fanida buyuk mutafakkirlarning ma’naviy merosi tahlil qilinadi. Musiqa darslarida milliy kuy va qo‘shiqlar, tasviriy san’at mashg‘ulotlarida xalq amaliy san’ati namunalari, texnologiya fanida esa milliy hunarmandchilik an’analari o‘rgatilishi o‘quvchilarda milliy madaniyatga nisbatan qiziqishni kuchaytiradi. Bunday integratsiyalashgan yondashuv o‘quvchilarning nazariy bilimlarini amaliy tajriba bilan boyitadi.

O‘quvchilarning milliy qadriyatlarni chuqurroq o‘zlashtirishida amaliy mashg‘ulotlarning ahamiyati katta. Milliy taomlar tayyorlash, xalq hunarmandchiligi namunalarini yaratish, milliy liboslar namoyishi, folklor jamoalari faoliyatida ishtirok etish, xalq o‘yinlari va sport musobaqalarida qatnashish yoshlarning milliy madaniyatni amalda his etishiga imkon yaratadi. Bunday mashg‘ulotlar ularda jamoada ishlash, o‘zaro hurmat, hamkorlik va mas’uliyat kabi fazilatlarni ham rivojlantiradi.

Maktab kutubxonalarining faoliyati ham milliy qadriyatlarni targ‘ib qilishda muhim vosita hisoblanadi. Kutubxonalarda milliy adabiyot namunalari, tarixiy manbalar, bolalar uchun mo‘ljallangan ma’rifiy kitoblar va elektron resurslar bilan boyitilgan fondning mavjudligi o‘quvchilarning kitobxonlik madaniyatini rivojlantiradi. Buyuk allomalar hayoti va ijodiga bag‘ishlangan kitob ko‘rgazmalari, kitobxonlik tanlovlari hamda adabiy uchrashuvlar yoshlarning ma’naviy dunyosini boyitadi.

Milliy qadriyatlarni yosh avlod ongiga singdirishda pedagoglarning kasbiy mahorati hal qiluvchi omillardan biridir. O‘qituvchi nafaqat bilim beruvchi, balki ma’naviy tarbiyachi hamdir. Shu sababli pedagoglar milliy qadriyatlar, xalq pedagogikasi va zamonaviy tarbiya metodlarini chuqur bilishi, ularni dars va tarbiyaviy ishlarda samarali qo‘llay olishi zarur. Pedagoglarning malakasini oshirish kurslarida milliy tarbiya masalalariga alohida e’tibor qaratilishi ushbu yo‘nalishdagi ishlar samaradorligini oshiradi.

Bugungi axborotlashgan jamiyatda raqamli ta’lim vositalaridan foydalanish imkoniyatlari kengayib bormoqda. Milliy qadriyatlarga oid elektron platformalar, mobil ilovalar, virtual muzeylar va multimedia resurslari o‘quvchilarning mustaqil ta’lim olishiga xizmat qiladi. Tarixiy obidalar bo‘ylab virtual sayohatlar, buyuk ajdodlarimiz hayotiga bag‘ishlangan videodarslar va interaktiv testlar ta’lim jarayonini yanada qiziqarli va samarali tashkil etishga yordam beradi.

Globallashuv sharoitida milliy qadriyatlarni asrab-avaylash bilan bir qatorda yoshlarni umuminsoniy qadriyatlarga hurmat ruhida tarbiyalash ham muhim vazifalardan biridir. Milliy va umuminsoniy qadriyatlarning uyg‘unligi bag‘rikenglik, tinchliksevarlik, inson huquqlarini hurmat qilish, ekologik madaniyat va fuqarolik mas’uliyati kabi fazilatlarning shakllanishiga xizmat qiladi. Shu bois ta’lim jarayonida milliy qadriyatlarni umuminsoniy tamoyillar bilan uyg‘unlashtirish zamonaviy pedagogikaning muhim yo‘nalishlaridan biri hisoblanadi.

Milliy qadriyatlarni o‘quvchilar ongiga singdirish samaradorligini oshirish uchun ta’lim muassasalari, oila va mahalla o‘rtasidagi hamkorlikni yanada kuchaytirish zarur. Ota-onalar ishtirokida davra suhbatlari, ma’naviy-ma’rifiy uchrashuvlar, oilaviy tanlovlar va milliy qadriyatlarga bag‘ishlangan loyihalar tashkil etilishi tarbiya jarayonining uzluksizligini ta’minlaydi. Bunday hamkorlik natijasida yosh avlod milliy merosni chuqur anglaydigan, o‘z tarixini

qadrlaydigan, Vatanga sadoqatli va yuksak ma’naviyatli shaxslar sifatida voyaga yetadi.

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COGNITIVE STYLISTICS AND CONCEPTUAL METAPHOR THEORY: A THEORETICAL OVERVIEW

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Abstract: *the paper traces the consolidation of Cognitive Linguistics into three interrelated subdisciplines: Cognitive Semantics, Cognitive Grammar, and Cognitive Stylistics. It outlines their theoretical foundations, clarifies the terminological debate between "cognitive stylistics" and "cognitive poetics", and situates Conceptual Metaphor Theory, Conceptual Blending Theory, and frame semantics as core instruments for the cross-linguistic study of concepts. It is shown that conceptual metaphor holds a central position within Cognitive Stylistics and serves as the methodological basis for further analysis of the concept of DEATH in the English, Uzbek, and Karakalpak linguistic cultures.*

Key words: *cognitive linguistics, cognitive semantics, cognitive grammar, cognitive stylistics, conceptual metaphor theory, conceptual integration, anthropocentric paradigm, concept.*

INTRODUCTION

The rapid development of Cognitive Linguistics in the latter decades of the twentieth century resulted in a number of distinct yet interrelated subdisciplines – particularly Cognitive Semantics, Cognitive Grammar, and Cognitive Stylistics – each significantly enhancing the field's theoretical and analytical framework.

MAIN PART

Cognitive Semantics emerged as a distinct branch of cognitive linguistics in the late 1970s and underwent extensive theoretical development during the 1980s, primarily due to the seminal contributions of George Lakoff, Mark

Johnson, Leonard Talmy, and Ronald Langacker, whose collaborative efforts solidified the discipline's foundational commitment to grounding meaning in embodied human experience. Cognitive Semantics primarily constitutes "a comprehensive theory of conceptualisation and categorisation – a framework for understanding how humans perceive and interpret their environment and how this cognitive experience is expressed in the meanings of linguistic expressions" [4; B.18.]. This enterprise is fundamentally guided by an anthropocentric paradigm, positioning the human subject – as observer, conceptualiser, and categoriser – at the core of semantic research [4; B.18.]. As defined by Evans and Green, Cognitive Semantics concerns the analysis of the relationship between experience, the conceptual system, and the semantic structure encoded in language [5; B.48.]. Talmy succinctly defines it as "research on conceptual content and its organization in language" [8; B.4.]. The primary theoretical constructs developed within this framework include conceptual metaphor, conceptual metonymy, image schemas, prototype theory, mental spaces, conceptual integration, categorisation, and frame semantics.

Cognitive Grammar emerged as a distinct linguistic framework in the late 1970s and early 1980s, primarily developed by Ronald W. Langacker, whose seminal two-volume work "Foundations of Cognitive Grammar" (1987; 1991) established its theoretical architecture. Langacker proposed Cognitive Grammar in explicit opposition to the formalist, modular conception of language advanced by generative linguistics, asserting that grammar is intrinsically meaningful and inseparable from the cognitive processes that underlie it. Cognitive Grammar advocates what Langacker calls an "encyclopedic" view of semantics, holding that linguistic meaning corresponds to conceptualisation and that semantic structures, termed "predications", are conceptual patterns activated in the mind by linguistic expressions [4; B.50.]. The framework rests on three fundamental theoretical assumptions. First, it posits that frequently used morphemes and lexical units possess multiple interconnected meanings, reflecting the prototype-

based and usage-driven nature of linguistic knowledge. Second, meaning is always defined in relation to a specific cognitive domain – a background framework of knowledge or conceptual structure invoked to interpret a linguistic expression. Third, Cognitive Grammar maintains that the meaning of a linguistic expression cannot be reduced to an objective representation of the situation it denotes, foregrounding instead the importance of the speaker's viewpoint and construal [4; B.51.]. The framework elaborates on central notions such as "figure/ground" organisation, "trajector" and "landmark", "profile" and "base", "construal", "cognitive domains", "image schemas", and "grammatical constructions as symbolic units" – all illustrating the inseparability of grammatical form and conceptual content [3; B.35.].

Cognitive Stylistics is defined as "a rapidly expanding field at the interface between linguistics, literary studies and cognitive science" which integrates "explicit, rigorous and detailed linguistic analysis of literary texts" alongside "a systematic and theoretically informed consideration of the cognitive structures and processes that underlie the production and reception of language" [6; B.9.]. In this respect, Cognitive Stylistics does not treat language as an autonomous system; rather, it investigates how linguistic choices reflect and shape the way individuals think. Simpson extends this point by observing that the field is moving "from models of text and composition towards models that make explicit the links between the human mind and the process of reading" [7; B.41.].

Cognitive Stylistics, while informed by contemporary developments in cognitive science, is grounded in an established tradition of stylistic analysis. Semino and Culpeper characterise the discipline as "both old and new": old in the sense that it attends to the relationship between linguistic choices and their effects, and new in the sense that "linguistic analysis is systematically based on theories that relate linguistic choices to cognitive structures and processes" [6; B.9.]. This characterisation is further reinforced by Dzhusupov, who argues that traditional stylistics and Cognitive Stylistics are closely related and that

Cognitive Stylistics represents a stage in the broader evolution of stylistics as a discipline. It builds upon the achievements of traditional stylistics and demonstrates that the study of language need not remain confined within the boundaries of linguistics alone, but can be conducted from a wider perspective by drawing on data from related sciences [2; B.65.]. Simpson further clarifies that stylisticians began "exploring more systematically the cognitive structures that readers employ when reading texts", and in doing so "heavily borrowed developments in cognitive linguistics and artificial intelligence", a shift that ultimately "lead to the emergence of cognitive stylistics" [7; B.41.]. Acknowledging this lineage confirms that Cognitive Stylistics combines the analytical precision of traditional stylistics with the broader explanatory scope afforded by cognitive science.

Cognitive Stylistics remains a relatively young discipline with several unresolved concerns, among them a recurring terminological debate between the labels "cognitive stylistics" and "cognitive poetics". A survey of the literature confirms that some scholars prefer "cognitive poetics" (Tsur, 1992; Stockwell, 2002; Freeman, 2002; Steen & Gavins, 2003), while others opt for "cognitive stylistics" (Semino & Culpeper, 2002; Attardo, 2002; Burke, 2004; Lancashire, 2004). Semino and Culpeper themselves treat the two terms as "largely overlapping" but adopt "cognitive stylistics" to "emphasise a concern for close attention to the language of texts" [6; B.11.]. A more substantive rationale for this preference is offered by Dzhusupov, who argues that "cognitive poetics," being rooted in literary theory, confines the scope of cognitive inquiry to literary texts alone, whereas "cognitive stylistics" encompasses a broader area of inquiry that is not inherently limited by genre or text type [2; B.66-67.]. The choice of terminology thus signals an important methodological stance regarding the scope of research, rather than a matter of mere convention.

The theoretical foundation of Cognitive Stylistics rests on its close alignment with Cognitive Linguistics. According to Ashurova, the two

disciplines share four key principles: language is understood as both a communicative and cognitive instrument; both are guided by the principles of anthropocentrism, functionalism, and interdisciplinarity; both focus on how individuals conceptualise, categorise, and interpret the world; and the analysis of linguistic phenomena must draw on both linguistic and extralinguistic knowledge [1; B.29.]. This unified theoretical orientation defines the research objectives of Cognitive Stylistics and delimits the range of problems it seeks to address. In this regard, Ashurova identifies the central research concerns of Cognitive Stylistics as comprising cognitive style, foregrounding theory, implicature, the analysis of literary concepts, cognitive modelling, and – most centrally for the present work – conceptual metaphor and conceptual integration theory [1; B.31.].

Among these domains, conceptual metaphor theory holds a particularly foundational position within Cognitive Stylistics. As Semino and Culpeper observe, "the rise of what we call cognitive stylistics… is partly due to the increasing influence of cognitive linguistics and, more specifically, of cognitive metaphor theory" [6; B.11.]. This centrality reflects the explanatory power of structure: Conceptual Metaphor Theory provides systematic tools for analysing how abstract or culturally embedded domains are organised and expressed through language. It is precisely this structural dimension that constitutes the primary analytical framework of the present study, and which will be examined in detail in the sections that follow.

CONCLUSION

The foregoing theoretical overview has traced the intellectual trajectory from the anthropocentric paradigm shift in modern linguistics – which placed the knowing subject, rather than the language system, at the centre of inquiry – through to the formation of cognitive linguistics as its most productive disciplinary expression. Cognitive linguistics, understood as the study of

language as a cognitive mechanism for organising, processing, and transmitting information, rests on three foundational operations of the human mind: cognition, conceptualisation, and categorisation. These operations are not isolated procedures but mutually conditioning processes through which experience is perceived, mentally structured, and assigned to cognitive classes, ultimately giving rise to concepts and conceptual systems that find their expression in language. The rapid development of cognitive linguistics gave rise to a set of interrelated subdisciplines – Cognitive Semantics, Cognitive Grammar, and Cognitive Stylistics – each of which, from its own analytical angle, investigates the relationship between language structure and mental representation. Within Cognitive Semantics, three theoretical frameworks have emerged as particularly productive for the analysis of conceptual organisation: Conceptual Metaphor Theory, Conceptual Blending Theory, and frame semantics. Taken together, these frameworks constitute the methodological instruments upon which the analytical work undertaken in the subsequent sections is grounded.

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ERKIN A'ZAM ASARLARIDA QAHRAMON ISMLARI VA LAQABLARINING LINGVOPOETIK XUSUSIYATLARI

Toshxujayeva Shoiraxon G'aniyevna

Qo'qon DU dotsenti

Annotatsiya. *Ushbu maqolada Erkin A'zam asarlaridagi qahramon ismlari va laqablarining lingvopoetik xususiyatlari hamda ularning badiiy-estetik, uslubiy va kommunikativ vazifalari tahlil qilinadi. Tadqiqot natijasida poetonimlarning qahramon xarakterini ochish, asarning g'oyaviy mazmunini chuqurlashtirish va yozuvchining individual uslubini namoyon etishdagi o'rni yoritib beriladi.*

Аннотация. *В статье анализируются лингвопоэтические особенности имён собственных и прозвищ персонажей в произведениях Эркина Азама, а также их художественно-эстетические, стилистические и коммуникативные функции. Результаты исследования показывают роль поэтонимов в раскрытии характера персонажей, углублении идейного содержания произведения и формировании индивидуального стиля писателя.*

Abstract. *This article examines the linguopoetic features of character names and nicknames in the works of Erkin A'zam, focusing on their artistic, stylistic, and communicative functions. The study demonstrates the role of poetonyms in revealing character traits, deepening the ideological content of literary works, and expressing the writer's individual style.*

Kalit so'zlar: *Erkin A'zam, lingvopoetika, poetonim, antroponim, laqab, badiiy matn, onomapoetika, obraz, ekspressivlik, uslub.*

Ключевые слова: *Эркин Азам, лингвопоэтика, поэтоним, антропоним, прозвище, художественный текст, ономапоэтика, образ, экспрессивность, стиль.*

Keywords: *Erkin A'zam, linguopoetics, poetonym, anthroponym, nickname, literary text, onomapoetics, character, expressiveness, style.*

KIRISH

Bugungi kunda tilshunoslikda badiiy asar tilini har tomonlama tadqiq etishga bo'lgan qiziqish tobora ortib bormoqda [5,13]. Xususan, badiiy asarning

lisoniy qatlami, uning badiiy-estetik jozibasi, tarbiyaviy ahamiyati hamda adiblarning til va so‘z imkoniyatlaridan mahorat bilan foydalanish usullarini o‘rganishga qaratilgan izlanishlar kengaymoqda. Bunday tadqiqotlar natijasida badiiy matn individual nutqiy butunlik sifatida qaralib, uning yaratilishida til vositalarining o‘rni chuqur tahlil qilinmoqda. Badiiy matnni aynan badiiy til nuqtayi nazaridan o‘rganish muallifning tilga munosabati, so‘z qo‘llash mahorati, estetik didi, o‘ziga xos uslubi va badiiy idealini aniqlash imkonini beradi. Shu tariqa lingvopoetika tilshunoslikning mustaqil va muhim yo‘nalishlaridan biri sifatida shakllanib, izchil rivojlanib bormoqda. Badiiy matnning til xususiyatlari, mazmun va shakl uyg‘unligi, til birliklarining badiiylikni yuzaga chiqarishdagi vazifasi, estetik qiymati hamda o‘quvchiga ko‘rsatadigan emotsional ta’sirini tadqiq etish esa lingvopoetikaning asosiy vazifalaridan biri hisoblanadi.

Badiiy matnda qo‘llanilgan nomlarning til birligi sifatidagi badiiy-estetik imkoniyatlarini monografik yo‘nalishda tadqiq etgan D.Andaniyazova antroponimlar, toponimlar hamda ayrim zoonimlar asar tarkibida muayyan estetik vazifani bajarishini ta’kidlaydi. Tadqiqotchining fikricha, “bunday nomlar muallif tomonidan maxsus badiiy niyat asosida qo‘llanilgani sababli ularni antropopoetonim, topopoetonim va zoopoetonim kabi terminlar bilan ifodalash maqsadga muvofiqdir” [1,3]. Shuningdek, olima ushbu tadqiqot yo‘nalishini onomapoetika (onomastik poetika) deb atashni, uning asosiy o‘rganish obyektini tashkil etuvchi badiiy nomlar uchun esa poetonimlar (poetik onimlar) terminini qo‘llashni taklif etadi. Olima badiiy matndagi antroponimlarni onomopoetikaning mustaqil o‘rganilishi zarur bo‘lgan tarkibiy qismi sifatida baholaydi [2,47]. Tadqiqotchining qayd etishicha, antroponimlarni lingvopoetik yondashuv asosida tahlil qilish muallifning badiiy maqsadini, asar qatlamlarida yashiringan ma’no va g‘oyalarni yanada teranroq anglashga xizmat qiladi.

Ma’lumki, badiiy asardagi mukammal badiiy obrazning paydo bo‘lishida asar qahramonlarining tashqi qiyofasi, xulq-atvori, nutqi bilan bir qatorda ularning ismi va ularga muallif yoki asar qahramonlari tomonidan berilgan laqablar muhim ahamiyatga ega vositalardan hisoblanadi. Shu sababdan ham jahon adabiyoti namoyandalari o‘z asarlarida qahramonlarining ismlariga alohida e’tibor berib, ularga munosib ism, laqab topish san’atkorlik belgisi sifatida ijodkordan katta mehnat, mas’uliyat va iqtidorni talab etishini alohida ta’kidlab o‘tganlar.

Bugungi kunda adabiyot maydonida jadal suratlar bilan qalam tebratayotgan, o‘zbek adiblari orasida o‘z ovozi va uslubiga ega Erkin A’zam asarlarida xalq orasida keng tarqalgan ismlar va laqablarni kommunikativ maqsadi va badiiy asar g‘oyaviy mazmuniga mos ravishda asar tarkibiga olib kirgan.

Yozuvchi badiiy asar ta’sirchanligi va obrazliligini oshirish maqsadida qahramonlar xarakteri, hatti-harakati va kasb-kori bilan bog‘liq holatda ular ismiga aloqador ko‘plab kinoyali laqablar topib qo‘llagan. Ularni quyidagi guruhlarga ajratib tahlil qilish mumkin:

1. **Qahramonlarning ma’lum bir kasb bilan shug‘ullanadigan faoliyatini ifodalovchi laqablar:** Avaz milisa, Ismoil telpakdo‘z, Habibullo magazinchi, Dagar ovchi, Dodo somsapaz, Beg‘am kabobpaz, Sayfiddin kulol, Safar nosfurush, Sattor miskar, Sobir to‘pponcha, Ahad maxsum, Rahmon Bolta, O‘rin shopir.

2. **Qahramonlarning o‘ziga xos xususiyatlarini anglatadigan laqablar:** Rayma bitliqi, Mo‘min kal, Sho‘ro bobo, Ma’mura gajak, Sayfi pason, Maymun, Lamark, Egam bechora, Egamboy, Olma kelin, Qodir kalamush, Nurmat musofir.

3. **Qahramonlarning hatti-harakati bilan bog‘liq laqablar:** Salom chopag‘on, Temir chopag‘on.

4. **Qahramonlarning xarakteri bilan bog‘liq laqablar:** Sodiq tarang, Vahshiy Orziqulov, Soli baqiroq.

5. **Rang-tus va shakl-hajm kabi semalarni ifodalovchi laqablar:** Rajab qora, Mastura daroz, O‘rmon kalta.

6. **Qahramonlarning yashash joyi (toponimika) bilan bog‘liq laqablar:** Mahmud bog‘bololik.

Yozuvchi qissada qahramonlarning laqablarini aniq izohlashga harakat qilib, ularni kiritma pozitsiyasida beradi. Masalan, *Bultur Qo‘shdaryoga paxta terimiga borganimizda shu bo‘y-basti, shu jingalaklari bilan u kun-u zzu kun paykal oralab atigi to‘rt kilogina “oq oltin” tergan, kechqurun “shtab” chog‘i jismoniy tarbiya o‘qituvchimiz Orziqulov uni xoliroq xonaga olib kirib, jingalak sochlaridan mahkam changallab, kirza etik bilan rosa qorniga tepgan – qani, miq etsa-chi, qani, bir tola sochi yulinsa-chi! Buni so‘ngra* ***Vahshiy (bolalar qo‘ygan laqab) Orziqulov****ning o‘zi taajjub aralash talay vaqt naql qilib yurgan...* (“Guli-guli”)

Xuddi shu kabi asardagi Egam bechoraning xotini – Olma kelinning laqabi adib tomonidan bunday izohlanadi: *Iya, shu uyda uning yana bir olmasi bor, yuzlari qip-qizil, sho‘xgina, istaraligina –* ***Olma kelin.*** *(Asl ismi boshqa, yuz-ko‘ziga havas qilib bu nomni unga mening enam qo‘ygan.) Tag‘in ikki olmacha – qizaloq ham shuniki.* (“Guli-guli”)

Asarda Raymaga nisbatan berilgan laqab uning qizlarga xos bo‘lmagan ko‘rinishda “qo‘sqi, nochorroq kiyimda” yurishi muallifning quyidagi ichki nutqi orqali implitsit ifodalangan: *Maymun* ***Rayma*** *(Rahima–Rayima – E.A.)* ***bitliqi*** *bilan yonma-yon o‘tirardi. Sho‘rlik qizning bitini birov ushlab ko‘rmagan, lekin boshidagi ro‘moli doim qiyshayib, qo‘sqi, nochorroq kiyimda yurganiga “bit-miti ham bo‘lsa kerak”, degan xayolga borardi odam.* (“Guli-guli”)

Adibning “Ta’ziya” hikoyasida Salim Safarovning “Salim qaror” degan laqabini muallif-hikoyachi quyidagicha izohlaydi: *... ta’ziyali uylarga otasi*

bilan kirib chiqadi. Ta'ziya munosabati bilan ***Salim Safarov*** *(****Salim Qaror*** *– partiya qarorlari va shiorlarini o'z maqolalariga iqtibos va yakunlovchi so'z sifatida ishlatadi. Bo'lsa-bo'lmasa partiya qarorlarini tiqishtiraveradi. Shuning uchun "Salim Qaror" deb laqab olgan.)*

Yozuvchi "Guli-guli" qissasida obrazlilik va ekspressivlikni kuchaytirish niyatida allegorik obraz – kalamush so'zini Qodirga nisbatan laqab ma'nosida ironik mazmunda mana bunday qo'llaydi: *(****Qodir*** *- T.Sh.)* ***Kalamush*** *– selponing omborchisi, omborida hamma narsa bor edi. "Volga"dan boshqa har balo. Kalamush ham ko'p deyishardi. Lekin eng kattasi – o'zi.* ("Guli-guli")

Ma'lumki, ayrim shaxslar nutqida rasmiy, siyqa (shablon) so'z va iboralarning noo'rin ishlatilishi, shuningdek, "bekorchi (parazit) so'zlar" deb ataluvchi (ya'ni, masalan, xo'sh kabi) lug'aviy birliklarni me'yordan ortiq qo'llash nutqning notabiiy va ishonchsiz chiqishiga olib keladi. Erkin A'zamning "Guli-guli" qissasi qahramoni O'rmonning nutqida mana shunday bekorchi, "har ikki gapining birida" takror qo'llanadigan "shaxs" so'zi uning laqabiga aylangan bo'lib, muallif buni parsellyativ qurilma shaklida izohlaydi: *Munozarachi-muzokarachilarning bari bemalol o'tirib olib falsafa so'qadi, albatta. Sira o'tirmagan, sira o'tirolmaydigan, mudom tippa-tik, ayvon bo'ylab u yoqdan bu yoqqa borib-kelib va'z o'qiydigan bitta shaxs bor. Ha, oddiygina odam emas, shaxs. O'zi har ikki gapining birida "mening shaxsimni", "mening shaxsimga nisbatan" deb pisanda qilaveradi.* ***O'rmon shaxs****.* ("Guli-guli")

Qissada Egam qahramoniga nisbatan "bechora", keyincha esa "boy" kabi laqablar bilan murojaat etiladi. Buning sababi adib tomonidan asarda quyidagicha sharhlanadi: *Egam bechora qishloqdagi eng bechora odam edi. Mahmud jo'ramizning odamlarni toifalash tartibiga ko'ra – eng oxirgi o'rindagi kimsa. Shu kimsa bir kechada kimsan –* ***Egamboy****ga aylandi. (Keyin yana bir bechora bo'lib qolgani endi boshqa masala.) Voqean, kechasi emas, kunduzi, aniqrog'i – kechqurun, horib-charchab uyga kelganida Zina kassir maoshiga*

qo‘shib majburan tutqazgan o‘ttiz tiyinlik lotereyaga “Volga” yutdi u! (“Guli-guli”)

Aytganday, qishloqqa ko‘chma zoopark kelib ketgandan keyin u rostakam maymunga aylandi – ilgari oddiygina ***Mo‘min yo Mo‘min daroz, Mo‘min naynov, enag‘ar Mo‘min,*** *yo‘q-yo‘q,* ***Mo‘min kal edi, Mo‘min kal!*** (“Guli-guli”) Erkin A’zamning “Guli-guli” qissasida yuqoridagi kabi ko‘plab laqablarga ega, muallif tomonidan alohida tasvirlangan bosh qahramonlardan biri – **Mo‘min kal**dir. “Guli-guli” deb nomlangan qissa nomi ham aynan Mo‘min kal – keyincha Maymun laqabiga ega qahramon nutqiga (*ya’ni qissaning aynan “Guli-guli” deb nomlanishi – T.Sh.*) ishora bo‘lib, asarda muallif tomonidan bu laqab quyidagicha izohlangan: *Qishloqqa zoopark kelib ketdiyu bir haqiqat ayon bo‘ldi-qoldi: Mo‘min kal deganimiz aynan maymunga o‘xshar ekan! Uzun-uzun qo‘llari tizzasiga tushib turishi ham, aft-basharasining ushoqligiyu ko‘zlarining bitdek dumaloqligi ham, baroq qoshidan bir en yuqori – peshonasining qoq o‘rtasidan boshlab o‘sgan soch pahmoq junga aylanib tamom joyini bosib ketganiga – maymunning o‘zginasI! Nega ilgari hech kim payqamagan ekan buni? Qafasdagi maymunlarni ko‘rgan borki, ‘Vuy, Mo‘min kal emasmi anovi?!’ derdi bir ovozdan. O‘sha ‘otarchi’ maymunlarga tikilaverib, ularga o‘xshab qoldimikan yo?*

Tavba, maymunga o‘xshamoq, maymun bo‘lmoq unga go‘yoki zavq ham bag‘ishlardi. Sho‘x-shalayim Mahmud ‘Qani, Mo‘minboy, bir maymun bo‘lib bering-chi, ko‘raylik!’ desa, shu zahoti jon-dili bilan baayni maymunga aylanardi-qolardi: qip-qizil tilini aylantirib lablarini yalay boshlar, dum-dumaloq ko‘zlarini har yonga tikib bema’no irshayar, qo‘llarini chalmashtrib yelkalarini qashimoqqa tushar edi.

Keyinchalik bilsak, uning muchali ham o‘ziga mos ekan: hamduna – maymun! (“Guli-guli”)

Erkin A’zam asarlari kinoyaviy uslub asosiga qurilganligi bilan alohida ajralib turadi. Yozuvchining “Guli-guli” qissasida qo‘llangan qahramonlar

ismlari ham kinoyaviy mazmunga ega. Ular qissa qahramonlarining fe’l-atvori, ijtimoiy mavqei yoki ichki mohiyatini anglatishga xizmat qiladi. Jumladan, *Mo‘min-Maymunvoy-Mo‘min kal, Tyotya Katiya, O‘rmon kalta, Amalbek, Musallam kokildor, Sho‘ro bobo, Soli baqiroq, Egamboy, Qodir kalamush, Olma kelin, Natasha Rostova, Vahshiy Orziqulov, Hasancha, Sayfiddin Kulol, Sobir to‘pponcha, Avaz milisa, Ahad maxsum, Nurillayev, Ma’mura gajak, Dodo somsapaz, Beg‘am kabobpaz, Lamark, Sattor miskar, Sayfi pason, Flyura labi qizil, Rahmon Bolta* kabi nomlar qahramonlarning qanday inson ekanligi haqida o‘quvchiga dastlabki tasavvurni beradi.

Adabiyotshunoslikda bunday nomlar “so‘zlovchi ismlar” yoki “gapiruvchi ismlar” deb yuritiladi [3,270]. Tadqiqotchi D. Andaniyozova ushbu masalani lingvistik jihatdan tahlil qilar ekan, rus olimlarining ilmiy qarashlariga ham murojaat qiladi. Xususan, “V.M. Kalinkinning ta’kidlashicha, badiiy asardagi nomlar o‘zida tarixiy, etnografik, konnotativ va boshqa turdagi ma’lumotlarni mujassamlashtirib, ularni o‘quvchiga yetkazish vazifasini bajaradi. Tilshunos Bardakova esa bolalar adabiyotidagi lingvopoetik onomastik birliklarni o‘rganish jarayonida Yu.A. Karpenkoning xizmatlarini alohida e’tirof etadi. Uning fikricha, Karpenko bolalar adabiyotida “so‘zlovchi ismlar” fenomenini tadqiq etishga asos solgan olimlardan biridir. Keyinchalik E.B. Magazanik ham rus adabiyotidagi mashhur obrazlar nomlarini tahlil qilib, ularning estetik va badiiy funksiyalarini yoritib bergan” [4,3].

XULOSA

Xulosa o‘rnida shuni aytish mumkinki, Erkin A’zam asarlarida voqelangan qahramonlarning turli xarakteri, hatti-harakati, kasb-kori, rang-tusi, xil-xususiyatlari, shakl-hajmi kabi ma’nolar bilan bog‘liq ko‘plab ismlar va laqablarning keltirilishi asarning g‘oyaviy-badiiy mazmunini yanada chuqurlashtirib, asarning milliyligi, xalqchilligini kuchaytirishda, asar voqealari va obrazlarini tipiklashtirishda asosiy til vositalaridan hisoblanadi hamda ushbu

birliklar o‘zining ekspressivligi va obrazliligi bilan muhim badiiy-estetik va funksional-uslubiy maqsadlarda qo‘llaniladi.

FOYDALANILGAN ADABIYOTLAR RO’YXATI

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“SOHIBQIRON MEROSI VA MUSIQA MADANIYATI: MILLIY YUKSALISHNING MA’NAVIY ASOSI”

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Annotatsiya: *Maqolada Amir Temur va temuriylar davrida musiqa madaniyatining rivojlanishi, saroy san’ati, maqom an’analari hamda ularning bugungi milliy yuksalish jarayonidagi o‘rni tahlil qilinadi. Sohibqiron asos solgan siyosiy barqarorlik va madaniy muhit san’at, xususan musiqa taraqqiyotiga mustahkam zamin yaratgani ilmiy asosda yoritiladi.*

Kalit so‘zlar: *Amir Temur, Temuriylar davri, musiqa madaniyati, maqom, milliy yuksalish, ma’naviyat, saroy san’ati.*

Аннотация: *В статье анализируется развитие музыкальной культуры, придворного искусства и традиций макома в период правления Амира Тимура и Тимуридов, а также их роль в процессе современного национального подъёма. Научно доказано, что политическая стабильность и культурная среде, созданная Сахибкираном, заложили прочный фундамент для развития искусства, особенно музыки.*

Ключевые слова: *Амир Тимур, эпоха Тимуридов, музыкальная культура, маком, национальный подъём, духовность, придворное искусство.*

Abstract: *The article analyzes the development of musical culture, court art, maqom traditions during the reign of Amir Temur and Temurids, and their role in today’s national rise. In is scientifically demonstrated that the political stability and cultural environment established by Sahibkiran created a solid foundation for the development of art, especially music.*

Keywords: *Amir Temur, Timurid era, musical culture, maqom, national rise, spirituality, court art*

KIRISH

O‘zbekiston tarixida temuriylar davri yuksak madaniy va ma’naviy taraqqiyot bosqichi sifatida alohida o‘rin egallaydi. Amir Temur tomonidan barpo etilgan markazlashgan davlat nafaqat siyosiy va harbiy qudrati, balki ilm-fan va san’at rivoji bilan ham ajralib turadi. Bu davrda musiqa san’ati saroy va xalq ijodiyoti doirasida ravnaq topib, ma’naviy hayotning ajralmas qismiga aylandi.

Milliy yuksalish jarayonida tarixiy merosni chuqur o‘rganish, uni zamonaviy taraqqiyot tamoyillari bilan uyg‘unlashtirish va amaliy hayotga tatbiq etish muhim ilmiy hamda ma’naviy vazifa hisoblanadi. O‘zbekiston tarixida temuriylar davri nafaqat siyosiy qudrat, balki yuksak ma’naviy va madaniy taraqqiyot bosqichi sifatida ham alohida o‘rin egallaydi. Bu davrda davlat boshqaruvi, ilm-fan, me’morchilik, adabiyot va musiqa o‘zaro uyg‘unlikda rivojlanib, yagona ma’rifiy muhitni shakllantirgan.

Amir Temur tomonidan asos solingan markazlashgan davlat Sharqda kuchli siyosiy tizimni barpo etish bilan bir qatorda, ilm-fan va san’at ravnaqi uchun qulay shart-sharoit yaratdi. Sohibqiron siyosatida madaniyat va san’at jamiyatni birlashtiruvchi, ma’naviy barkamollikni ta’minlovchi muhim omil sifatida qaraldi. Natijada temuriylar davrida shakllangan ijodiy muhit san’atning barcha turlarida, xususan musiqa sohasida yuksalish jarayonini boshlab berdi.

Musiqa san’ati bu davrda nafaqat estetik zavq manbai, balki ma’naviy-axloqiy tarbiyaning samarali vositasi sifatida namoyon bo‘ldi. Saroy marosimlari, tantanalar, ilmiy-adabiy majlislar va xalq sayillarida musiqa muhim o‘rin tutgan. Bu esa musiqa madaniyatining ijtimoiy hayot bilan uzviy bog‘liq holda rivojlanganini ko‘rsatadi.

Temuriylar davrida poytaxtga aylangan Samarqand Sharqning yirik ilmiy va madaniy markaziga aylandi. Bu yerda shakllangan yuksak ma’naviy muhit san’atkorlar, hofizlar va sozandalar ijodiga keng imkoniyatlar yaratdi. Keyinchalik aynan shu muhit negizida mumtoz musiqa an’analari, jumladan Shashmaqom tizimining shakllanishiga asos bo‘lgan jarayonlar yuzaga keldi.

Shu bois Sohibqiron merosini o‘rganishda musiqa madaniyati masalasiga alohida e’tibor qaratish dolzarb ilmiy vazifa hisoblanadi. Zero, milliy yuksalishning ma’naviy asosi avvalo tarixiy xotira, madaniy meros va san’at an’analarining davomiyligida namoyon bo‘ladi.

Temuriylar davrida musiqa san’atining rivoji

Temuriylar davrida poytaxtga aylangan Samarqand Sharqning yirik madaniyat markaziga aylandi. Bu yerda me’morchilik, adabiyot, tasviriy san’at bilan bir qatorda musiqa ham yuksaldi. Saroy marosimlari, diplomatik qabullar va tantanali tadbirlarda musiqaning o‘rni beqiyos bo‘lgan.

Temuriylar davrida shakllangan va rivojlangan mumtoz musiqa an’analari keyinchalik “Shashmaqom” kabi yuksak san’at namunasining yuzaga kelishiga zamin yaratdi. Shashmaqom — Markaziy Osiyo xalqlari mumtoz musiqasining noyob namunasi bo‘lib, unda asrlar davomida shakllangan nazariy va amaliy tajriba mujassamdir.

Bu davrda musiqa ilmiy asosda ham rivojlandi. Musiqa nazariyasi Sharq mutafakkirlari tomonidan falsafa va matematika bilan uzviy bog‘liq holda o‘rganildi. Temuriylar saroyida musiqashunos va sozandalar faoliyat yuritgan, ijodkorlar qo‘llab-quvvatlangan.

Ma’naviy muhit va san’at taraqqiyoti

Amir Temur davrida yaratilgan barqaror siyosiy muhit ijodkorlar uchun keng imkoniyatlar ochdi. San’at ahliga e’tibor berish, ularni rag‘batlantirish an’anasi temuriylar sulolasi davrida davom etdi. Xususan, Mirzo Ulug‘bek hukmronligi davrida ilm-fan bilan bir qatorda san’at rivojiga ham katta ahamiyat berildi.

Temuriylar davri adabiy muhiti ham musiqa bilan chambarchas bog‘liq bo‘lgan. Alisher Navoiy g‘azallari va dostonlari keyinchalik mumtoz maqom yo‘llariga solinib, musiqiy ijodning yuksak namunalariga aylangan. Bu esa adabiyot va musiqa uyg‘unligining yorqin ifodasidir.

Samarqand – Sharqning madaniy markazi

Temuriylar davrida Samarqand nafaqat siyosiy poytaxt, balki butun Sharqning yirik ilmiy va madaniy markaziga aylandi. Amir Temur tomonidan amalga oshirilgan bunyodkorlik ishlari natijasida shaharda muhtasham me’moriy inshootlar, madrasalar, kutubxonalar, bog‘lar va saroy majlislari barpo etildi. Bu jarayon madaniy hayotning barcha sohalari, jumladan musiqa san’ati rivojiga ham kuchli turtki berdi.

Samarqandda shakllangan ijodiy muhit san’atkorlar, hofizlar va sozandalar faoliyatiga keng imkoniyatlar yaratdi. Saroy majlislari va tantanali marosimlar musiqa san’atisiz tasavvur etilmagan. Musiqa davlat qudrati va saltanat salobatini ifodalovchi vosita sifatida qadrlangan. Diplomatik qabullar, harbiy yurishlardan so‘nggi tantanalar, bayramlar va xalq sayillarida musiqa ijrosi muhim o‘rin tutgan.

Temuriylar davrida Samarqandga turli hududlardan olimlar, hunarmandlar va san’atkorlar taklif etilgan. Bu esa turli madaniy an’analar sintezini yuzaga keltirib, musiqa san’atining boyishiga sabab bo‘lgan. Sharqning turli mintaqalaridan kelgan ijrochilar o‘z maktab va uslublarini olib kelib, mahalliy an’analar bilan uyg‘unlashtirganlar. Natijada ko‘p qatlamli va murakkab musiqiy tafakkur shakllangan.

Shahar ilmiy muhitining yuksalishi ham musiqa taraqqiyotiga bevosita ta’sir ko‘rsatdi. Xususan, Mirzo Ulug‘bek davrida ilm-fan ravnaqi yuqori bosqichga ko‘tarildi. Ilmiy tafakkur rivoji musiqaning nazariy asoslarini takomillashtirishga xizmat qildi. Musiqa tovush tizimi, lad va ritm masalalari ilmiy qarashlar bilan boyidi.

Samarqandda shakllangan yuksak ma’naviy muhit adabiyot va musiqa uyg‘unligiga ham zamin yaratdi. Keyinchalik Alisher Navoiy ijodining musiqiy talqinlarda keng qo‘llanilishi ana shu davr madaniy asoslariga borib taqaladi.

Shunday qilib, temuriylar davrida Samarqandning madaniy markaz sifatida shakllanishi musiqa san’atining yuksalishida hal qiluvchi omil bo‘ldi.

Bu muhit milliy musiqa merosining keyingi taraqqiyot bosqichlari uchun mustahkam poydevor vazifasini o‘tadi.

Sohibqiron merosi va bugungi musiqa taraqqiyoti

Mustaqillik yillarida Amir Temur merosini qayta o‘rganish va targ‘ib etish jarayoni kuchaydi. Uning nomi bilan atalgan xalqaro festivallar, ilmiy anjumanlar va madaniy tadbirlar milliy san’at rivojiga xizmat qilmoqda.

Bugungi kunda milliy musiqa san’ati — xususan maqom ijrochiligi — yosh avlodni vatanparvarlik, milliy o‘zlikni anglash va estetik did ruhida tarbiyalashda muhim omil bo‘lib xizmat qilmoqda. Temuriylar davrida asos solingan ma’naviy qadriyatlar hozirgi milliy yuksalish siyosatining madaniy negizini tashkil etadi.

Saroy san’ati va ijrochilik an’analari

Temuriylar davrida saroy madaniy hayotning markazi bo‘lib, san’atning turli yo‘nalishlari qatori musiqa ham davlat e’tiborida bo‘lgan. Amir Temur siyosatida san’at va madaniyat saltanat nufuzini mustahkamlovchi muhim omil sifatida qaralgan. Shu bois saroyda ijodkorlar, xususan hofizlar, sozandalar va bastakorlar alohida hurmat va e’tiborga sazovor bo‘lgan.

Saroy marosimlari — tantanali qabullar, harbiy g‘alabalar sharafiga uyushtirilgan bayramlar, diplomatik uchrashuvlar va diniy marosimlar — musiqa san’atisiz o‘tmagan. Musiqa bu tadbirlarda davlat qudrati, tartib-intizom va ma’naviy salobatni ifodalovchi vosita vazifasini bajargan. Ayniqsa, nog‘ora va karnay-surnay kabi cholg‘ular tantanavor ruhni kuchaytirgan bo‘lsa, lirika yo‘nalishidagi kuy-qo‘shiqlar majlislarning ruhiy-estetik muhitini boyitgan.

Temuriylar saroyida professional ijrochilik an’analari shakllana boshlagan. Ijrochilar ma’lum tayyorgarlik va ustoz-shogird an’anasi asosida kamol topgan. Bu jarayon keyinchalik o‘zbek mumtoz musiqa maktablarining shakllanishiga zamin yaratdi. Saroy muhitida ijro etilgan asarlar yuqori badiiy saviya, murakkab lad tuzilishi va mukammal ritmik tizimi bilan ajralib turgan.

Saroy san’ati xalq musiqa an’analari bilan uzviy bog‘liq holda rivojlangan. Xalq orasida mashhur bo‘lgan kuy va qo‘shiqlar saroy talqinida yanada sayqallanib, badiiy jihatdan mukammallashgan. Bu o‘zaro ta’sir jarayoni professional musiqa ijrochiligi bilan xalq og‘zaki ijodi o‘rtasida ijodiy aloqani mustahkamlagan.

Temuriylar davrida musiqa faqat ko‘ngilochar vosita sifatida emas, balki ma’naviy tarbiya va axloqiy kamolot omili sifatida qaralgan. Musiqa orqali inson qalbini poklash, ruhiy muvozanatni saqlash va estetik didni shakllantirish g‘oyalari ilgari surilgan. Bu jihat Sharq falsafiy qarashlari bilan hamohang ravishda namoyon bo‘ladi.

Shuningdek, saroy majlislarida adabiyot va musiqa uyg‘unligi muhim ahamiyat kasb etgan. Keyinchalik Alisher Navoiy g‘azallari va boshqa mumtoz she’riy namunalarning kuyga solinishi ana shu tarixiy an’analar davomiyligini ko‘rsatadi. Bunday uyg‘unlik musiqa san’atining mazmunan boyishi va estetik jihatdan mukammallashuviga xizmat qilgan.

Umuman olganda, temuriylar davridagi saroy san’ati va ijrochilik an’analari milliy musiqa madaniyatining professional asoslarini shakllantirdi. Ushbu an’analar keyingi asrlarda maqom ijrochiligi, hofizlik maktablari va bastakorlik san’ati rivojiga mustahkam zamin yaratdi.

Mumtoz musiqa va maqom an’analari

Temuriylar davri musiqa madaniyati Sharq mumtoz san’atining shakllanish va takomillashuv bosqichlaridan biri sifatida alohida ahamiyat kasb etadi. Bu davrda musiqa nafaqat amaliy ijrochilik san’ati, balki chuqur nazariy asosga ega badiiy tizim sifatida rivojlandi. Aynan shu tarixiy-madaniy muhit keyinchalik maqom san’atining mukammal ko‘rinishda shakllanishiga zamin yaratdi.

Mumtoz musiqa Sharq xalqlarining ko‘p asrlik estetik tafakkuri mahsuli bo‘lib, unda ruhiy poklanish, ma’naviy kamolot va axloqiy g‘oyalar mujassamdir. Temuriylar davrida saroy homiyligi ostida shakllangan yuqori

badiiy saviyadagi ijrochilik an’analari mumtoz musiqa rivojining muhim bosqichini tashkil etdi. Kuy va qo‘shiqlarning murakkab lad tuzilishi, ritmik tizimi va poetik matn bilan uyg‘unligi bu davr musiqasining asosiy xususiyatlaridan bo‘ldi.

Maqom san’ati ana shu jarayonning mantiqiy davomi sifatida yuzaga keldi. Xususan, Shashmaqom tizimi Markaziy Osiyo mumtoz musiqasining eng mukammal namunalaridan biri hisoblanadi. U ko‘p qismli tuzilishga, murakkab lad asosiga va falsafiy-estetik mazmunga ega. Maqom asarlarida inson qalbining nozik kechinmalari, ishqiy va ilohiy mavzular, sabr-toqat va komillik g‘oyalari musiqiy ifodasini topadi.

Temuriylar davridagi adabiy muhit maqom an’analarining mazmunan boyishiga katta ta’sir ko‘rsatdi. Mumtoz she’riyat namunalari, ayniqsa Alisher Navoiy g‘azallari keyinchalik maqom yo‘llariga solinib, hofizlik san’atining ajralmas qismiga aylandi. Bu esa adabiyot va musiqa o‘rtasidagi uzviy bog‘liqlikni mustahkamladi.

Maqom san’ati nafaqat estetik zavq bag‘ishlovchi, balki tarbiyaviy ahamiyatga ega tizim sifatida ham qadrlanadi. Unda insonni ruhiy poklanishga, sabr-qanoatga, ma’naviy komillikka chorlovchi ohang va matn uyg‘unligi mujassam. Shu jihatdan maqom san’ati milliy yuksalishning ma’naviy asoslaridan biri sifatida namoyon bo‘ladi.

Temuriylar davrida shakllangan professional ijrochilik va nazariy tafakkur maqom tizimining keyingi asrlarda mukammallashuviga xizmat qildi. Ustoz-shogird an’analari asosida avloddan avlodga o‘tib kelgan bu meros bugungi kunda ham milliy musiqa madaniyatining yuksak namunasi sifatida qadrlanmoqda.

Shunday qilib, mumtoz musiqa va maqom an’analari temuriylar davrida yaratilgan yuksak ma’naviy-madaniy muhit mahsuli bo‘lib, ular milliy yuksalishning ruhiy va estetik poydevorini tashkil etadi.

Adabiyot va musiqa uyg‘unligi

Temuriylar davrida adabiyot va musiqa o‘zaro uyg‘unlikda rivojlangan. Bu uyg‘unlik nafaqat san’atning badiiy boyligi, balki uning ma’naviy va tarbiyaviy ahamiyatini oshirishga xizmat qilgan. Xususan, Alisher Navoiy ijodi mumtoz musiqa rivojida muhim rol o‘ynadi. Uning g‘azallari, qasidalari va dostonlari keyinchalik maqom ijrochiligi uchun matn va ruhiy mazmun manbai sifatida qo‘llanilgan.

Adabiyot va musiqa uyg‘unligi ijro etiladigan asarlarning badiiy mukammalligini oshirdi. She’riy matnlarning ritmik va lad bilan uyg‘unligi, so‘zning ohang bilan birlashishi, qo‘shiq va kuylarning ta’sirchanligini kuchaytirdi. Shu tariqa, musiqiy ijro va she’riyat bir-birini boyitib, yuqori san’at namunalarini yaratdi.

Bundan tashqari, adabiyot va musiqa uyg‘unligi ma’naviy tarbiya vositasi sifatida ham ahamiyat kasb etdi. Xalqning estetik didini shakllantirish, inson qalbini poklash va ma’naviy kamolotga chorlovchi g‘oyalar asarlar orqali yetkazildi. Temuriylar davrida ijodiy muhit shunday shakllanki, adabiyot va musiqa bir-birini to‘ldirib, jamiyatda san’atning uzviy uyg‘unligini ta’minladi.

Shunday qilib, adabiyot va musiqa uyg‘unligi temuriylar davrida mumtoz san’atning rivojida hal qiluvchi omil bo‘lgan va ularning merosi bugungi milliy musiqa madaniyatining asosiy tarkibiy qismiga aylangan.

Ilm-fan taraqqiyoti va musiqa nazariyasi

Temuriylar davrida ilm-fan va musiqa rivoji o‘zaro uzviy bog‘liq bo‘lgan. Mirzo Ulug‘bek davrida ilm-fan yuksak darajaga ko‘tarilib, astronomiya, matematika va falsafa sohalarida katta yutuqlar erishildi. Bu yutuqlar musiqaning nazariy asoslarini mustahkamlashga ham xizmat qilgan. Masalan, tovush tizimi, lad va ritmik tartiblarni ilmiy asosda o‘rganish imkoniyati paydo bo‘ldi.

Musiqa nazariyasi ilmiy tafakkur bilan uyg‘unlashib, murakkab musiqiy tizimlar va maqomlarning mukammal tuzilishini shakllantirdi. Temuriylar davrida bastakorlar va hofizlar faqat ijrochi sifatida emas, balki musiqiy

qonuniyatlarni chuqur tushunadigan mutaxassislar sifatida tayyorlangan. Bu jarayon keyinchalik maqom san’ati va mumtoz musiqa an’analarining nazariy poydevorini yaratdi.

Shuningdek, ilmiy-musiqiy tafakkur san’atning ma’naviy va estetik jihatlarini boyitdi. Musiqa ijrosida ritmik va lad uyg‘unligi, tovush ohangining harmoniyasi ilmiy asosga tayanib, ijrochilik san’atini yanada mukammal qildi. Musiqa nafaqat eshituvchilarni zavqlantiruvchi, balki ularni ruhiy va ma’naviy rivojlantiruvchi vosita sifatida qadrlangan.

Umuman olganda, temuriylar davrida ilm-fan taraqqiyoti musiqa san’ati va nazariyasi rivojiga kuchli turtki bo‘lib xizmat qilgan. Bu davr musiqashunoslikning keyingi asrlar davomida shakllanishi va mukammallashuviga mustahkam ilmiy poydevor yaratdi.

Sohibqiron merosining zamonaviy musiqa taraqqiyotidagi o‘rni

Mustaqillik yillarida Amir Temur merosini o‘rganish va targ‘ib qilish davlat siyosati darajasiga ko‘tarildi. Tarixiy merosni qadrlash, uning ma’naviy va madaniy jihatlarini yosh avlodga yetkazish milliy yuksalishning muhim omiliga aylandi. Sohibqiron merosi nafaqat siyosiy va harbiy tajriba, balki madaniyat va san’atning rivojlanishi uchun ham muhim asos sifatida qaraladi.

Bugungi kunda maqom san’ati, an’anaviy ijrochilik maktablari, xalq musiqasi festivallari va konsertlar yosh avlodni estetik va ma’naviy jihatdan tarbiyalashda muhim vosita bo‘lib xizmat qilmoqda. Sohibqiron davridagi musiqa an’analari va saroy ijrochiligi tajribalari zamonaviy musiqa ijrochiligi va ta’limi uchun muhim metodik asosni tashkil qiladi.

Shuningdek, Sohibqiron merosi yosh musiqashunos va bastakorlar uchun ilhom manbai hisoblanadi. Mumtoz va maqom an’analari, saroy musiqasi va adabiyot uyg‘unligi bugungi milliy musiqa madaniyati rivojida uzluksiz poydevor vazifasini bajaradi. Bu meros milliy ruhni mustahkamlash, vatanparvarlik va madaniy o‘zlikni anglashda muhim ahamiyat kasb etadi.

Natijada, Sohibqiron merosi nafaqat tarixiy fakt sifatida, balki zamonaviy musiqa madaniyati va milliy yuksalishning ma’naviy asoslaridan biri sifatida tirik qolmoqda. Musiqa va san’at orqali tarixiy meros bugungi avlodning madaniy identifikatsiyasi va estetik didini shakllantirishda faol rol o‘ynaydi.

Temuriylar davri musiqa madaniyati O‘zbekiston tarixida yuksak ma’naviy va estetik bosqichni ifodalaydi. Amir Temur tomonidan yaratilgan siyosiy barqarorlik va ma’naviy muhit san’at, xususan musiqa rivojiga keng imkoniyatlar yaratdi. Saroy san’ati, hofizlik maktablari, bastakorlik va mumtoz musiqa an’analari milliy musiqa madaniyatining asosini tashkil qilgan.

Mumtoz musiqa va maqom an’analari bugungi milliy yuksalish jarayonida ham o‘z ahamiyatini saqlab qolmoqda. Ular nafaqat estetik zavq manbai, balki tarbiyaviy va ma’naviy o‘sish vositasi sifatida milliy madaniyatning muhim tarkibiy qismini tashkil qiladi.

Sohibqiron merosi — bu milliy yuksalishning ma’naviy poydevori, tarixiy tajriba va madaniyatning uzluksizligini ta’minlovchi boy merosdir. Bugungi kunda mazkur meros yosh avlodni milliy g‘urur, vatanparvarlik va san’atga mehr bilan tarbiyalashda muhim vosita sifatida xizmat qilmoqda.

Shunday qilib, temuriylar davri musiqa madaniyati va Sohibqiron merosi milliy yuksalishning nafaqat tarixiy, balki ma’naviy va estetik asoslarini tashkil etadi.

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STYLISTIC DEVICES FOR REPRESENTING THE CONCEPT OF PERSONALITY IN CHARLOTTE BRONTË'S NOVEL *JANE EYRE*

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Abstract: *This article examines the stylistic devices used to represent the concept of personality in Charlotte Brontë's* Jane Eyre. *It analyzes how metaphor, symbolism, irony, imagery, repetition, and expressive syntax contribute to the portrayal of Jane's moral, emotional, and intellectual development. The study highlights the interaction between linguistic choices and characterization, demonstrating that stylistic techniques shape the reader's understanding of identity, independence, and self-realization. The findings reveal that Brontë's stylistic mastery plays a crucial role in constructing the protagonist's personality and conveying the novel's central themes.*

Keywords: *Stylistics, personality, characterization, metaphor, symbolism,* Jane Eyre, *Charlotte Brontë, identity.*

INTRODUCTION

The study of literary stylistics has become one of the most productive approaches to understanding how language contributes to the construction of meaning in literary texts. Rather than treating language as a neutral medium, stylistics investigates the relationship between linguistic form and literary function, demonstrating how authors employ specific lexical, syntactic, semantic, and rhetorical devices to shape readers' perceptions of characters, events, and themes. In nineteenth-century English literature, stylistic analysis is particularly significant because Victorian novelists frequently used expressive language to portray the psychological complexity of individuals and the social realities of their time. Among these writers, Charlotte Brontë occupies a

distinguished position due to her innovative narrative techniques and profound psychological characterization.

Charlotte Brontë's Jane Eyre, first published in 1847, remains one of the most influential novels in English literature. The novel combines elements of realism, Gothic fiction, romance, and the Bildungsroman tradition to present the spiritual, emotional, and intellectual development of its protagonist, Jane Eyre. Unlike many female characters in Victorian fiction, Jane is portrayed as an independent, morally determined, and intellectually mature woman who continuously seeks equality, dignity, and personal freedom. Her journey from an oppressed orphan to a self-confident individual reflects not only personal growth but also broader cultural and philosophical questions concerning identity, gender, morality, and social justice.

One of the principal reasons for the novel's enduring popularity lies in Brontë's exceptional command of language. The author's stylistic choices extend beyond aesthetic ornamentation; they function as essential mechanisms for revealing the inner world of the protagonist and communicating the novel's ideological concerns. Through metaphorical expressions, symbolic images, vivid descriptions of nature, irony, repetition, rhetorical questions, and emotionally charged narrative discourse, Brontë constructs a multidimensional representation of personality. These stylistic devices enable readers to experience Jane's emotional conflicts, moral dilemmas, and psychological transformation while simultaneously reflecting the restrictive social environment of Victorian England.

The concept of personality has attracted considerable attention across disciplines such as psychology, linguistics, philosophy, and literary criticism. Within literary studies, personality is generally understood as a dynamic combination of psychological characteristics, moral values, behavioral tendencies, emotional responses, and intellectual capacities that define an individual's identity. Literary characters are not merely described through direct

narration; instead, their personalities emerge through dialogue, narrative voice, imagery, symbolic structures, and stylistic patterns. Consequently, stylistic analysis provides an effective framework for exploring how linguistic choices contribute to characterization and the representation of personal identity [1-3].

Recent developments in stylistic criticism emphasize that literary meaning is generated through the interaction of multiple linguistic levels, including phonology, morphology, syntax, semantics, and discourse. Modern scholars argue that stylistic devices should be interpreted not as isolated figures of speech but as interconnected textual strategies that influence readers' cognitive and emotional responses. From this perspective, Brontë's narrative demonstrates a sophisticated integration of stylistic techniques that collectively shape the reader's understanding of Jane Eyre as a resilient, compassionate, and intellectually independent individual. The novel's first-person narration further strengthens this effect by allowing readers direct access to Jane's thoughts, emotions, and moral reasoning, thereby creating an intimate psychological portrait.

Although numerous studies have examined Jane Eyre from feminist, psychological, historical, and socio-cultural perspectives, comparatively fewer investigations have focused specifically on the relationship between stylistic devices and the construction of the concept of personality. Existing research often discusses characterization or symbolism independently without providing a comprehensive analysis of how various stylistic features interact to produce a coherent representation of identity. This gap highlights the necessity of a systematic stylistic investigation that combines linguistic analysis with literary interpretation.

The present study therefore aims to examine the principal stylistic devices employed in Jane Eyre and to evaluate their role in representing the concept of personality. Particular attention is devoted to metaphor, symbolism, imagery, irony, repetition, expressive syntax, and narrative perspective as key linguistic

instruments that reveal Jane's psychological development and moral evolution. By integrating stylistic theory with close textual analysis, the research seeks to demonstrate that Brontë's artistic language is fundamental to the creation of one of the most memorable protagonists in English literature. The findings are expected to contribute to contemporary stylistic criticism by providing a deeper understanding of the interaction between language, characterization, and personality representation in Victorian fiction [4,5].

MAIN PART

Charlotte Brontë's Jane Eyre presents one of the most psychologically sophisticated female protagonists in Victorian literature. The representation of Jane's personality is achieved not only through the events of the narrative but also through the deliberate use of stylistic devices that reveal her emotions, values, intellectual maturity, and moral principles. Brontë combines figurative language, expressive syntax, symbolism, imagery, irony, repetition, and narrative perspective to create a multidimensional portrait of a woman who seeks independence, dignity, and self-respect despite social inequality and personal suffering.

One of the most significant stylistic devices employed in the novel is metaphor. Metaphorical expressions serve as linguistic instruments that externalize Jane's inner experiences and emotional conflicts. Throughout the novel, emotional states are frequently represented through images of fire, storms, darkness, and light. Fire symbolizes passion, determination, and spiritual vitality, while coldness and darkness often reflect loneliness, oppression, and emotional isolation. These metaphorical oppositions illustrate Jane's psychological transformation from a vulnerable orphan into an independent and morally confident woman. Rather than functioning merely as decorative language, metaphors establish conceptual relationships between the protagonist's internal world and the surrounding environment.

Another prominent stylistic feature is symbolism, which enriches the thematic structure of the novel. Natural elements repeatedly symbolize different stages of Jane's personal development. The red-room, where Jane experiences punishment during her childhood, symbolizes fear, injustice, and emotional imprisonment. In contrast, open landscapes, gardens, and the natural environment frequently represent freedom, self-discovery, and spiritual renewal. Similarly, Thornfield Hall functions as a complex symbol of mystery, emotional attachment, and hidden truths, whereas Moor House represents intellectual balance and personal independence. Through these symbolic spaces, Brontë illustrates that personality develops through continuous confrontation with external and internal challenges.

Imagery plays an equally important role in representing Jane's emotional and psychological condition. Visual descriptions of landscapes, changing weather, and architectural settings correspond closely to the protagonist's feelings. During periods of emotional distress, Brontë frequently describes gloomy skies, heavy rain, strong winds, or dark interiors. Conversely, scenes associated with hope, reconciliation, or self-realization contain bright natural imagery and harmonious landscapes. This close relationship between external nature and internal consciousness demonstrates the Romantic influence on Brontë's narrative style while simultaneously strengthening the psychological realism of the novel.

The novel's first-person narrative style significantly contributes to personality representation. Jane narrates her own experiences with remarkable honesty, allowing readers direct access to her thoughts, emotions, reflections, and moral judgments. This narrative perspective creates psychological intimacy between the protagonist and the reader, encouraging empathy and deeper understanding of her personal growth. Because events are filtered through Jane's consciousness, readers observe not only what happens but also how she interprets and emotionally responds to every experience. Such subjective

narration transforms characterization into a dynamic psychological process rather than a static description [6].

Brontë also employs repetition as an effective stylistic strategy to emphasize Jane's determination and moral consistency. Repeated references to concepts such as freedom, equality, conscience, truth, and self-respect reinforce the ideological foundations of Jane's personality. Lexical repetition strengthens thematic cohesion while highlighting the protagonist's unwavering commitment to her ethical beliefs. These recurring expressions remind readers that personal integrity remains the guiding principle throughout Jane's life despite numerous hardships.

Another important stylistic device is irony, particularly situational irony. Many characters initially underestimate Jane because of her social status, appearance, or financial condition. However, the development of the narrative repeatedly demonstrates that true worth depends on moral character rather than social privilege. The ironic contrast between outward circumstances and inner strength exposes the hypocrisy of Victorian social conventions. Through irony, Brontë criticizes rigid class distinctions and patriarchal expectations while simultaneously affirming Jane's intellectual and ethical superiority.

Furthermore, expressive syntax contributes significantly to the emotional intensity of the novel. Brontë frequently uses rhetorical questions, exclamatory sentences, parallel structures, and short emphatic statements during moments of psychological conflict. These syntactic variations reproduce the rhythm of Jane's emotional experiences and make her internal struggles more vivid and convincing. The alternation between long reflective sentences and brief emotional utterances reflects the complexity of human thought and feeling, thereby reinforcing the authenticity of the protagonist's voice.

The interaction of these stylistic devices demonstrates that personality in Jane Eyre is represented as a dynamic and evolving construct rather than a fixed personal characteristic. Jane's identity develops through continuous moral

choices, emotional experiences, intellectual reflection, and resistance to social injustice. Brontë's stylistic mastery transforms linguistic forms into powerful mechanisms of characterization, enabling readers to perceive personality as an intricate combination of emotional resilience, ethical responsibility, rational judgment, and personal independence. Consequently, the novel illustrates that stylistic devices are fundamental to the artistic representation of human identity and remain central to understanding both the protagonist's psychological evolution and the broader humanistic values embedded in Victorian literature [7].

Stylistic devices representing the concept of personality in Charlotte Brontë's Jane Eyre

Table 1

Stylistic Device	Function in the Novel	Contribution to the Concept of Personality
Metaphor	Expresses emotions through symbolic comparisons	Reveals Jane's psychological growth, resilience, and emotional depth
Symbolism	Represents abstract ideas through objects, places, and natural elements	Highlights freedom, morality, identity, and spiritual development
Imagery	Creates vivid visual and sensory descriptions	Reflects the protagonist's emotional and mental states
Irony	Contrasts appearance with reality	Emphasizes moral superiority over social status and wealth
Repetition	Reinforces key concepts and beliefs	Strengthens Jane's determination, self-respect, and ethical principles
Expressive Syntax	Uses rhetorical questions, exclamations, and parallel structures	Intensifies emotional expression and internal psychological conflict
First-person Narration	Presents events from Jane's personal perspective	Allows direct access to the protagonist's thoughts, feelings, and personal development

Table 1 demonstrates that Charlotte Brontë systematically employs a variety of stylistic devices to construct the concept of personality in *Jane Eyre*.

Each stylistic feature performs a specific linguistic and literary function while simultaneously contributing to the psychological portrayal of the protagonist. Rather than operating independently, these devices interact to produce a coherent representation of Jane's identity and character development.

Metaphor and symbolism appear to be the most influential devices because they connect Jane's internal experiences with external reality. Symbolic settings such as the Red Room, Thornfield Hall, and the natural landscape illustrate different stages of her emotional and moral evolution. Likewise, metaphorical references to fire, darkness, storms, and light transform abstract emotions into concrete images that readers can easily interpret.

Imagery and expressive syntax further strengthen this representation by making Jane's emotional experiences vivid and convincing. Detailed descriptions of landscapes correspond closely with her psychological condition, while rhetorical questions and exclamatory sentences reproduce the intensity of her inner conflicts. These stylistic choices increase the realism of the narrative and establish a close emotional connection between the protagonist and the reader.

Repetition functions as a discourse strategy that emphasizes central concepts such as freedom, equality, conscience, and self-respect. The repeated appearance of these ideas reinforces the stability of Jane's moral principles despite continuous social and personal challenges. Similarly, irony exposes the contradiction between Victorian social expectations and genuine human value, illustrating that personality is determined by integrity and intellectual independence rather than social class or material wealth.

Finally, the first-person narrative perspective integrates all of these stylistic devices into a unified discourse. Since the story is narrated directly by Jane herself, readers gain immediate access to her thoughts, emotions, and moral reasoning. This narrative strategy transforms characterization into a gradual psychological process and allows Brontë to present personality as a dynamic

combination of emotional resilience, ethical responsibility, intellectual maturity, and personal autonomy. Consequently, the findings summarized in Table 1 confirm that stylistic devices constitute the principal linguistic mechanisms through which the concept of personality is represented and developed throughout the novel.

CONCLUSION

The present study has demonstrated that the representation of the concept of personality in Charlotte Brontë's *Jane Eyre* is fundamentally achieved through the author's deliberate and systematic use of stylistic devices. The analysis confirms that linguistic features such as metaphor, symbolism, imagery, irony, repetition, expressive syntax, and first-person narration are not merely aesthetic elements but essential mechanisms for constructing the psychological, moral, and intellectual identity of the protagonist. These stylistic strategies enable readers to perceive Jane Eyre as a dynamic and evolving character whose personality develops through continuous interaction with social, emotional, and ethical challenges.

The findings reveal that metaphor and symbolism occupy a central position in portraying Jane's inner world. Symbolic settings and recurring natural images effectively reflect different stages of her psychological transformation, while metaphorical expressions externalize complex emotional experiences that cannot be communicated through literal language alone. Likewise, imagery establishes a close correspondence between external landscapes and internal emotional states, reinforcing both the psychological realism and artistic coherence of the novel.

Furthermore, the study confirms that expressive syntactic structures, lexical repetition, and ironic contrasts significantly strengthen characterization by emphasizing Jane's determination, moral integrity, and intellectual independence. The first-person narrative perspective serves as the unifying stylistic framework that allows readers direct access to the protagonist's

thoughts, reflections, and emotional responses. As a result, personality is represented not as a fixed psychological attribute but as a continuously developing construct shaped by experience, self-reflection, and moral decision-making.

From a stylistic perspective, *Jane Eyre* illustrates how language functions as a powerful instrument for representing human identity. Brontë's linguistic choices transform individual experiences into universal reflections on freedom, equality, dignity, and self-realization. Consequently, the novel remains an outstanding example of Victorian literary artistry in which stylistic devices perform both aesthetic and cognitive functions, guiding readers toward a deeper understanding of personality and human consciousness.

The research also contributes to contemporary stylistic criticism by integrating linguistic analysis with literary interpretation. It demonstrates that the investigation of stylistic devices provides valuable insights into characterization and expands the understanding of how literary language shapes conceptual meanings. Future studies may extend this line of inquiry by comparing the stylistic representation of personality in *Jane Eyre* with other Victorian novels or by applying contemporary approaches such as cognitive stylistics, corpus stylistics, or discourse analysis to further explore the interaction between language, narrative structure, and identity construction.

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NEUROMOTOR PERFORMANCE RANKING AND LOWER-LIMB FUNCTIONAL ASYMMETRY IN ELITE FEMALE BOXERS: A QUICK BOARD ASSESSMENT

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Annotatsiya. *O'zbekiston ayollar boks terma jamoasi a'zolarining neyromotor tayyorgarligi, reaksiya qobiliyati va pastki ekstremitalar funksional assimetriyasi Quick Board tizimi yordamida baholandi (n=12). Umumiy ko'rsatkichlar 1207–3174 ball oralig'ida bo'ldi; Foot Fire natijalari 73–96 takrorni, chap va o'ng oyoq reaksiya vaqtlari mos ravishda 0,701–1,190 s va 0,688–1,257 s ni tashkil etdi. Ayrim sportchilarda yuqori funksional assimetriya aniqlandi. Quick Board tizimi neyromotor holatni monitoring qilish va individual mashg'ulot dasturlarini ishlab chiqishda samarali vosita ekanligi ko'rsatildi.*

Kalit so'zlar: *boks, ayol bokschilar, neyromotor tayyorgarlik, Quick Board, reaksiya vaqti, funksional assimetriya, chaqqonlik.*

Аннотация. *Оценивались нейромоторная подготовленность, реакционные способности и функциональная асимметрия нижних конечностей спортсменок сборной Узбекистана по боксу (n=12) с помощью системы Quick Board. Общий показатель варьировал от 1207 до 3174 баллов; результаты теста Foot Fire составили 73–96 повторений, время реакции левой и правой ноги — 0,701–1,190 с и 0,688–1,257 с соответственно. У ряда спортсменок выявлена выраженная функциональная асимметрия. Quick Board является эффективным инструментом мониторинга и разработки индивидуальных тренировочных программ.*

Ключевые слова: *бокс, женщины-боксёры, нейромоторная подготовленность, Quick Board, время реакции, функциональная асимметрия, ловкость.*

Abstract. *This study evaluated neuromotor performance, reaction ability, and lower-limb functional asymmetry in elite female boxers of the Uzbekistan Women's National Team (n=12) using the Quick Board system. Overall scores ranged from 1207 to 3174 points; Foot Fire performance ranged from 73–96 repetitions, and left/right reaction times ranged from 0.701–1.190 s and 0.688–1.257 s, respectively. Several athletes showed pronounced*

functional asymmetry. Findings support Quick Board as an effective tool for monitoring neuromotor status and guiding individualized training.

Keywords: *boxing, female boxers, neuromotor performance, Quick Board, reaction time, functional asymmetry, agility.*

INTRODUCTION

Boxing performance depends on neuromotor ability, reaction speed, and lower-limb functional balance, since athletes must perceive stimuli and execute motor responses within fractions of a second (Sheppard & Young, 2006; Paul et al., 2016). Digital assessment systems such as Quick Board provide objective measures of foot speed, agility, reaction time, and bilateral symmetry (Nimphius et al., 2018; Lockie et al., 2012). Interlimb asymmetries have been linked to reduced movement efficiency and elevated injury risk (Bishop et al., 2021; Fort-Vanmeerhaeghe & Bishop, 2020), and lower-limb power and speed are established predictors of athletic performance (Loturco et al., 2018; Young et al., 2002). Despite the rapid growth of women's boxing, neuromotor and asymmetry profiling of elite female boxers using Quick Board technology remains scarce.

Purpose: to evaluate neuromotor performance, reaction ability, and lower-limb functional asymmetry in elite female boxers using the Quick Board system and to establish an objective ranking of functional readiness.

Objectives: (1) assess neuromotor performance via Quick Board; (2) evaluate Foot Fire performance and left/right reaction times; (3) determine bilateral symmetry/asymmetry; (4) identify inter-individual differences and rank athletes; (5) provide practical recommendations for individualized training.

MATERIALS AND METHODS

Participants. Twelve elite female boxers of the Uzbekistan Women's National Boxing Team took part in the assessment [author to confirm: age range, mean training experience, weight categories, and ethical approval/informed consent statement].

Instrumentation and procedure. Neuromotor performance was assessed with the Quick Board system [author to confirm manufacturer/model], which records an overall composite score together with (a) the Foot Fire test — number of foot-contact repetitions completed within a fixed time interval [author to confirm test duration, e.g., 10 s], and (b) a bilateral reaction-time test, in which left- and right-leg response times (s) to a visual/light stimulus were recorded [author to confirm stimulus type and number of trials]. A bilateral symmetry index (%) was calculated for each limb from the reaction-time data, with 100% indicating perfect symmetry.

Statistical analysis. Individual scores are reported directly (min–max range) to enable athlete-level profiling, consistent with the applied, individualized-monitoring focus of the assessment [author to confirm whether group descriptive statistics (mean ± SD) and/or software, e.g., SPSS, were additionally used].

RESULTS

Overall Quick Board scores ranged from 1207 to 3174 points, indicating marked inter-individual variability in functional readiness (Table 1). The highest scores were recorded by O.I. (3174), M.X. (2868), and Z.Y. (2682), who combined strong Foot Fire performance with balanced bilateral reaction times; the lowest scores were recorded by A.Yo. (1207), Sh.U. (1500), and D.A. (1673).

Table 1.

Quick Board monitoring results of the Uzbekistan Women's National Boxing Team

Athlete	Score	Foot Fire (reps)	Left RT (s)	Right RT (s)	Left Sym. (%)	Right Sym. (%)
O.I.	3174	93	0.886	0.763	100.0	98.5
M.X.	2868	85	0.745	0.868	100.0	94.4

Athlete	Score	Foot Fire (reps)	Left RT (s)	Right RT (s)	Left Sym. (%)	Right Sym. (%)
Z.Y.	2682	88	0.916	0.941	100.0	99.8
R.B.	2159	78	1.091	0.993	100.0	96.4
S.X.	2062	77	0.866	0.711	100.0	96.6
T.J.	1866	73	1.190	0.791	100.0	98.0
S.Sh.	1795	80	0.842	0.716	77.4	100.0
R.K.	1676	84	0.814	0.688	75.0	100.0
Z.Ya.	1676	79	0.931	0.889	100.0	87.3
D.A.	1673	81	1.048	1.157	91.1	100.0
Sh.U.	1500	81	0.972	1.257	70.2	100.0
A.Yo.	1207	96	0.701	0.786	98.2	100.0

Foot Fire performance ranged from 73 to 96 repetitions. Notably, A.Yo. recorded the highest Foot Fire value (96) despite the lowest overall score, indicating that foot-movement frequency alone does not determine overall neuromotor readiness; T.J. recorded the lowest value (73). Reaction times ranged from 0.701–1.190 s (left leg) and 0.688–1.257 s (right leg); the fastest responses were shown by A.Yo. (left, 0.701 s) and R.K. (right, 0.688 s), while T.J. and Sh.U. were slowest on each side, respectively.

Bilateral symmetry analysis revealed pronounced asymmetry in several athletes, most notably Sh.U. (70.2%), R.K. (75.0%), and S.Sh. (77.4%) on the left side. Athletes with the highest overall scores (O.I., M.X., Z.Y.) also showed the most favorable combination of reaction speed and bilateral symmetry (≥94%).

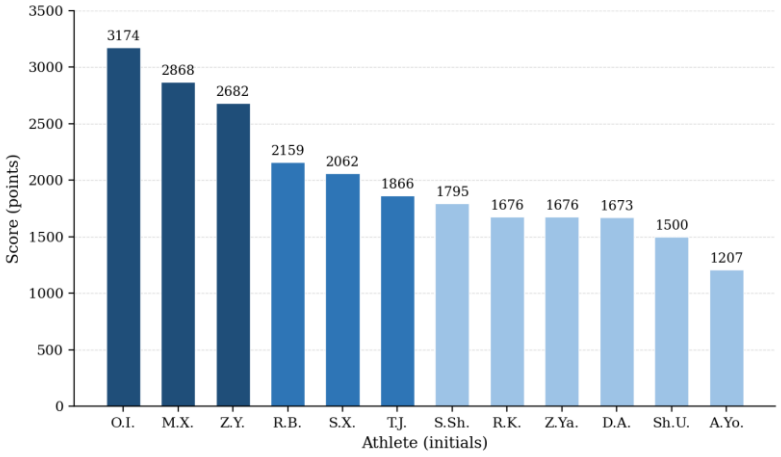

Figure 1. Inter-individual differences in overall neuromotor performance among elite female boxers

DISCUSSION

The findings confirm that Quick Board assessment differentiates elite female boxers by neuromotor profile beyond simple movement frequency, consistent with reports that agility and reaction ability jointly determine sport performance (Sheppard & Young, 2006; Paul et al., 2016). The asymmetry levels observed in several athletes (>10–15%) align with Bishop et al. (2021) and Fort-Vanmeerhaeghe & Bishop (2020), who associated pronounced interlimb asymmetry with reduced movement efficiency and elevated injury risk. As lower-limb mechanics underpin punching efficiency, targeted corrective training for athletes with marked asymmetry (Sh.U., R.K., S.Sh.) is warranted, alongside continued multidimensional monitoring integrating agility, reaction ability, and bilateral symmetry rather than any single metric in isolation.

CONCLUSION

Quick Board assessment revealed substantial inter-individual variability in neuromotor performance (1207–3174 points) among elite female boxers, and demonstrated that overall readiness depends on a combination of foot speed, reaction ability, and bilateral symmetry rather than movement frequency alone. Several athletes exhibited pronounced lower-limb asymmetry warranting individualized corrective intervention. The system is recommended as a practical

tool for ongoing neuromotor monitoring and training prescription in elite boxing; future work should include larger samples, longitudinal monitoring, and biomechanical analysis.

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PHYSIOLOGICAL AND CONDITIONING DETERMINANTS OF PERFORMANCE IN ELITE HEAVYWEIGHT BOXERS (+90 KG): A LITERATURE-BASED ANALYSIS

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***Abstract**: This thesis examines the physiological and conditioning determinants that underlie competitive performance in elite heavyweight boxers (+90 kg), a weight category whose energetic and recovery demands remain underrepresented in the sport science literature relative to lighter divisions. Contemporary studies on cardiorespiratory load, aerobic-anaerobic interaction, work-to-rest ratios, and post-exercise recovery in amateur and professional boxing were reviewed and synthesized. The analysis indicates that heavyweight boxers must sustain near-maximal oxygen uptake and heart-rate responses across successive rounds while repeatedly producing high-force punching actions, a combination that places simultaneous demand on aerobic capacity, anaerobic power, and fatigue-resistance mechanisms. Based on the reviewed evidence, a conditioning framework is proposed that integrates interval-based aerobic development, anaerobic-lactic training, and structured recovery protocols specific to the physical profile of heavyweight athletes. The findings support the need for weight-category-specific conditioning models rather than generalized boxing training prescriptions.*

***Keywords:** heavyweight boxing, conditioning, aerobic-anaerobic capacity, cardiorespiratory demand, recovery, fatigue resistance.*

INTRODUCTION

Boxing performance at the elite level is governed not only by technical-tactical skill but by the athlete's capacity to sustain repeated high-intensity efforts across three-minute rounds separated by brief recovery periods. In the heavyweight division (+90 kg), this physiological burden is compounded by greater body mass, higher energy cost of movement, and the mechanical demands of generating and absorbing large punching forces. National programs

in Uzbekistan, including Presidential Resolution No. PR-5099 (2021) on the development of boxing and subsequent government resolutions on Olympic preparation for Paris 2024 and Los Angeles 2028, explicitly call for the modernization of scientific support systems in boxing, underscoring the relevance of evidence-based conditioning research for this population.

Despite growing interest in boxing physiology, the majority of investigations have examined mixed-weight or lighter-weight amateur cohorts, leaving the specific cardiorespiratory and metabolic profile of heavyweight boxers comparatively unexamined. Given that competitive success in this division depends on the ability to repeat forceful actions while managing accumulated fatigue, clarifying the physiological and conditioning requirements of heavyweight boxers is both scientifically relevant and practically important for coaches designing weight-category-specific training programs.

Aim of the study: to analyze contemporary scientific evidence on the physiological and conditioning determinants of performance in elite heavyweight boxers (+90 kg) and to outline a conditioning framework suited to this weight category.

METHODS

A narrative literature analysis was conducted using peer-reviewed sources retrieved from Scopus, PubMed, and Google Scholar, published predominantly between 2013 and 2025. Search terms included combinations of “boxing,” “heavyweight,” “aerobic-anaerobic,” “conditioning,” “VO_2max,” “heart rate,” and “recovery.” Sources addressing the physiological load of simulated or competitive bouts, work-to-rest structuring, and recovery interventions in boxing and comparable combat sports were prioritized. Findings were grouped thematically into cardiorespiratory demand, anaerobic contribution, and recovery strategies, and were then interpreted in relation to the specific physical profile of heavyweight athletes.

RESULTS

El-Ashker et al. (2018) demonstrated that during a simulated 3 × 3-minute amateur boxing contest, oxygen uptake exceeded 90% of VO_2max and heart rate remained above 90% of HRmax throughout all rounds, confirming that boxing imposes a physiological load close to maximal capacity even within a relatively short contest duration. Davis, Wittekind, and Beneke (2018) similarly characterized amateur boxing as an activity combining high-intensity intermittent actions with substantial aerobic contribution, noting that punch output and work-rate fluctuate considerably across rounds as fatigue accumulates.

Ruddock et al. (2016) emphasized that boxing preparation requires the simultaneous development of aerobic conditioning, anaerobic capacity, and sport-specific skill within compressed training periods, and recommended that conditioning work be periodized alongside technical-tactical and strength training rather than treated as an isolated component. For heavyweight athletes specifically, the greater absolute energy cost of moving a larger body mass suggests that conditioning volumes and work-to-rest ratios established for lighter divisions may require adjustment to avoid premature fatigue without compromising force-production capacity in later rounds.

Table 1 summarizes the principal physiological and conditioning findings relevant to heavyweight boxing preparation, together with their practical implications for training design in the +90 kg category.

Author(s)	Research focus	Main finding	Implication for +90 kg boxers
El-Ashker et al. (2018)	Cardiorespiratory load of simulated bouts	VO_2 and HR exceeded 90% of maximal values across rounds	High-intensity aerobic-anaerobic conditioning is essential

Davis, Wittekind & Beneke (2018)	Activity profile of amateur boxing	Intermittent high-intensity actions with substantial aerobic contribution	Interval-based conditioning should mirror bout intermittency
Ruddock et al. (2016)	Strength and conditioning integration	Conditioning, strength, and skill must be developed concurrently	Periodized planning is needed given compressed preparation time

DISCUSSION AND CONCLUSION

The reviewed evidence indicates that elite heavyweight boxing performance depends on the capacity to sustain near-maximal cardiorespiratory output while intermittently producing high-force actions, a profile that combines substantial aerobic and anaerobic demands. Because heavyweight athletes carry greater body mass, the metabolic cost of movement and recovery between exchanges is likely higher than in lighter divisions, suggesting that generic conditioning templates may be insufficient for this population.

A conditioning framework for heavyweight boxers should therefore combine round-specific interval training that replicates competitive work-to-rest ratios, targeted anaerobic-lactic development to support repeated forceful exchanges, and structured recovery protocols to manage accumulated fatigue across training cycles and multi-bout tournaments. Future research should directly compare physiological responses of heavyweight and lighter-weight boxers under standardized competitive simulations to establish weight-category-specific conditioning benchmarks. Such work would provide a stronger evidence base for optimizing the preparation of Uzbek heavyweight boxers for major international competitions, including the Olympic Games.

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BILATERAL SYMMETRY AND REACTIVE AGILITY PERFORMANCE IN AN ELITE BOXER: A CASE STUDY USING A LIGHT-BASED REACTIVE TRAINING SYSTEM

Xasanboy Dusmatov

Abstract: *Background: Reactive agility, bilateral limb symmetry, and reaction accuracy are performance-limiting and injury-relevant qualities in boxing, a sport characterized by an asymmetric orthodox or southpaw stance. Light-based reactive training systems allow rapid, field-based quantification of contact time, reaction time, and accuracy for each limb, together with composite agility scores across standardized reactive footwork drills.*

Case Presentation: *A single competitive boxer with no active injury completed a reactive agility and limb-symmetry test battery. Contact time, reaction time, accuracy, and a composite symmetry index were recorded bilaterally, alongside four reactive footwork exercises (Stagger Step 3134, Stagger Step 3235, Double Leg React, and Foot Fire 10 Seconds), yielding a composite agility rating of 2347.*

Methods: *Descriptive case-study design; between-limb differences were expressed as a percentage asymmetry, and agility drill outcomes were compared against the athlete's own historical average and best performances.*

Results: *Reaction time was near-symmetric between limbs (0.7% difference), whereas contact time (16.2%) and accuracy (16.6%) showed asymmetries exceeding commonly cited clinical thresholds, favouring the right side. All four agility drills matched or equalled the athlete's previous average and best completion percentages, despite variable error counts (0-17 errors), with Stagger Step 3235 producing the highest error count.*

Conclusion: *Despite symmetric central reaction speed, this boxer displayed clinically relevant peripheral asymmetries in contact time and accuracy that were not evident from the composite agility score alone. Reactive testing that decomposes performance by limb may reveal asymmetries with implications for training prescription and injury-risk monitoring that are masked by aggregate scores.*

Keywords: boxing; reactive agility; limb symmetry index; reaction time; combat sports; injury risk

INTRODUCTION

Boxing performance depends on an athlete's capacity to detect a stimulus, select an appropriate motor response, and execute that response with speed and accuracy under time pressure — a composite quality generally termed reactive agility [1]. Because boxers adopt a habitually asymmetric stance (orthodox or southpaw), the lead and rear limbs are exposed to different loading patterns, proprioceptive demands, and technical roles across a competitive career, which may promote the development of inter-limb asymmetries in strength, reactivity, and movement accuracy [2,3].

Inter-limb asymmetry has attracted increasing attention in strength and conditioning and sports medicine because asymmetries beyond approximately 10-15% have been associated in some cohorts with reduced physical performance and elevated injury risk, although the relationship is task- and sport-dependent and not universally observed [2,4]. In combat sports specifically, asymmetric loading is intrinsic to technique (e.g., the lead jab versus the rear cross in boxing, or lead-leg versus rear-leg kicks in karate and kickboxing), making the quantification of bilateral differences potentially useful both for performance profiling and for longitudinal injury-risk screening [3,5].

Light-based reactive training systems, which require an athlete to respond to randomised visual stimuli by striking or stepping on illuminated targets, provide a practical field method for quantifying contact time, reaction time, and response accuracy separately for each limb, in addition to composite scores for standardised agility drills. However, published applications of these systems in combat sport athletes remain scarce, and most reports present only aggregate performance scores rather than limb-specific breakdowns. The purpose of this case study was to describe the bilateral reactive agility and symmetry profile of a competitive boxer using such a system, and to consider the practical implications of any observed asymmetries for training and monitoring.

METHODS

Case Description

The participant was a competitive male boxer (identifier: Xasanbay Dosmatov) with no active injury at the time of testing. The athlete was newly enrolled in the monitoring system, and the session reported here (17 June 2026) constituted his baseline reactive agility and symmetry assessment. Testing was conducted while the athlete was in an active pre-competition weight-cutting phase, involving combined caloric and fluid restriction to reach competition weight.

Testing Procedure

Testing was conducted using a light-based reactive training system comprising wireless illuminated sensor pods arranged to elicit stimulus-driven upper- and lower-limb responses. Following a standardised warm-up and task familiarisation, the athlete completed: (i) a symmetry assessment protocol quantifying contact time, reaction time, and response accuracy independently for the left and right sides; and (ii) four reactive footwork drills — Stagger Step 3134 (10 s, fixed sequence 3-1-3-4), Stagger Step 3235 (10 s, fixed sequence 3-2-3-5), Double Leg React (10 s), and Foot Fire 10 Seconds (left-right step count) — performed with zero programmed delay and no flash cueing.

Data Analysis

For each bilateral metric, a between-limb asymmetry percentage was calculated as the absolute difference between left and right values divided by the higher (better-performing) value, multiplied by 100, consistent with conventional limb symmetry index reporting [2]. Agility drill outcomes (result and error count) were compared descriptively against the athlete's own previous average and previous best performances, as generated automatically by the testing system. As a single-case, single-session design, no inferential statistics were applied; data are presented descriptively.

RESULTS

Bilateral Symmetry Profile

Reaction time was closely matched between limbs (left 0.814 s, right 0.820 s; asymmetry 0.7%), indicating near-symmetric central processing and initiation speed. In contrast, contact time was 0.142 s on the left versus 0.119 s on the right (asymmetry 16.2%, favouring the right side), and accuracy was 70.7% on the left versus 84.8% on the right (asymmetry 16.6%, favouring the right side). The system-derived composite symmetry score was 96.9% for the left side against a 100.0% reference for the right side. Full results are presented in Table 1.

Metric	Left	Right	Average	Asymmetry (%)
Contact time (s)	0.142	0.119	0.131	16.2
Reaction time (s)	0.814	0.820	0.817	0.7
Accuracy (%)	70.7	84.8	77.8	16.6
Composite symmetry index (%)	96.9	100.0	-	3.1

Reactive Agility Drills

The athlete achieved a composite agility rating of 2347. Across the four drills, completion results matched 100% of both the previous average and previous best benchmarks in every case (Stagger Step 3134: 31 repetitions; Stagger Step 3235: 32 repetitions; Double Leg React: 12 repetitions; Foot Fire 10 Seconds: 84 steps). Error counts, however, varied considerably between drills: 10 errors on Stagger Step 3134, 17 errors on Stagger Step 3235, 4 errors on Double Leg React, and 0 errors on Foot Fire 10 Seconds. Full results are presented in Table 2.

Exercise	Result	Errors	Previous average completion (%)	Previous best completion (%)
Stagger Step 3134 (10 s, sequence 3-1-3-4)	31	10	100	100
Stagger Step 3235 (10 s, sequence 3-2-3-5)	32	17	100	100
Double Leg React (10 s)	12	4	100	100
Foot Fire 10 Seconds (left-right count)	84	0	100	100

DISCUSSION

This case study describes the bilateral reactive agility and symmetry profile of a competitive boxer using a light-based reactive testing system. The principal finding was a dissociation between central and peripheral measures of reactivity: reaction time, which primarily reflects stimulus detection and central decision-making speed, was virtually symmetric between limbs, whereas contact time and accuracy, which more directly reflect limb-specific motor execution, showed asymmetries of approximately 16%, exceeding thresholds commonly used to flag clinically relevant asymmetry in the strength and conditioning literature [2,4].

This pattern is plausible in the context of boxing's asymmetric stance. Repeated preferential use of one limb for lead-hand jabbing or lead-leg

positioning, relative to the power-oriented but less frequently probing rear side, could differentially train reactive accuracy and contact efficiency without necessarily altering basic reaction speed, which is thought to be governed more centrally and to transfer more readily across limbs [1,3]. Similar stance-related asymmetries have been reported for kicking actions in karate and taekwondo athletes and for punching kinetics in boxers, generally favouring the technically dominant or rear striking limb [3,5].

A further observation was that the composite agility rating and the 100% previous-average and previous-best completion values gave no indication of the underlying accuracy asymmetry; only the limb-disaggregated data revealed the deficit. This suggests that composite or session-level agility scores, while useful for tracking overall readiness or day-to-day performance, may mask meaningful bilateral deficits relevant to injury-risk screening and technical development. The markedly higher error count on Stagger Step 3235 relative to the other three drills further suggests that directional-change complexity, rather than general reactive capacity, may be a specific limiting factor for this athlete, warranting targeted footwork-pattern training.

An important contextual factor is that testing occurred during an active pre-competition weight-cutting phase. Rapid weight loss through caloric and fluid restriction has been associated with impaired neuromuscular function, reduced fine motor control, and compromised cognitive-motor performance, even when gross reaction speed is relatively preserved [9]. This raises the possibility that the observed accuracy and contact-time asymmetry, rather than reflecting a stable, stance-related trait, was partly state-dependent, transiently amplified by dehydration- or glycogen-restriction-related fatigue affecting the non-dominant limb more than the dominant limb. This distinction has direct practical relevance: if the asymmetry is primarily state-dependent, it would be expected to narrow once the athlete is fully rehydrated and refuelled post-weigh-in, whereas a trait-level asymmetry would be expected to persist. Repeat testing

outside the weight-cutting window is therefore necessary before attributing the deficit to fixed technical or structural factors.

From a practical standpoint, coaches and practitioners working with this athlete could consider incorporating unilateral, left-side-biased reactive drills to narrow the observed accuracy and contact-time asymmetry, while continuing to monitor whether the composite symmetry index changes over subsequent testing sessions. Because reaction time was already symmetric, generic reaction-speed training is unlikely to address the deficit; accuracy- and precision-oriented left-limb drills are more likely to be relevant.

Limitations

This report describes a single athlete at a single time point, precluding causal or longitudinal conclusions and limiting generalisability. Test-retest reliability of the specific device and metrics used was not established in this session, and no kinematic or video corroboration of the asymmetry was obtained. The 10-15% threshold used to contextualise asymmetry magnitude was derived from strength- and jump-based literature and may not translate directly to reactive light-based accuracy metrics. Most importantly, testing during an active weight-cutting phase means that hydration status, energy availability, and fatigue were not controlled, and hydration or dietary intake in the hours before testing was not recorded; these factors represent a substantial confound that cannot be separated from stance-related or technical explanations in this single-session design. Repeated testing across the training cycle — including at least one euhydrated, weight-stable time point — together with kinematic analysis of the boxer's punching and footwork mechanics, would be necessary to determine whether the observed asymmetry is state-dependent or a stable trait.

CONCLUSION

In this competitive boxer, reaction time was symmetric between limbs, but contact time and reactive accuracy showed asymmetries of approximately 16% favouring the right side, findings that were not apparent from composite agility

or symmetry scores alone. Limb-disaggregated reactive testing may offer additional, performance-relevant information for combat sport athletes beyond aggregate scores, supporting its inclusion alongside standard biomechanical and physical testing in ongoing athlete monitoring.

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STRENGTH, POWER AND BIOMECHANICAL DETERMINANTS OF PUNCH FORCE IN ELITE HEAVYWEIGHT BOXERS (+90 KG)

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***Abstract**: This thesis analyzes the strength, power, and biomechanical factors that determine punch force production in elite heavyweight boxers (+90 kg). Contemporary literature on lower-body maximal strength, explosive power development, kinetic-chain sequencing, and effective mass transfer during punching was reviewed. The evidence indicates that punch impact force is not primarily a function of body mass but of the athlete's ability to generate force in the lower limbs, sequence segmental acceleration efficiently through the trunk and upper limb, and transfer effective mass into the target at the moment of contact. Elite boxers consistently demonstrate greater punch velocity, impulse, and rate of force development than lower-level counterparts, and power-oriented resistance training has been shown to produce measurable gains in explosive output. Based on these findings, training priorities for heavyweight boxers are proposed, centered on lower-body strength and power development, technical-biomechanical drilling of the kinetic chain, and sport-specific neuromuscular activation strategies.*

***Keywords:** punch force, kinetic chain, effective mass, explosive power, lower-body strength, heavyweight boxing.*

INTRODUCTION

Punching effectiveness is among the most decisive determinants of competitive success in boxing, and its importance is amplified in the heavyweight division (+90 kg), where a single high-impact strike can end a contest. Government programs in Uzbekistan aimed at improving international competitiveness in boxing, including measures adopted for Olympic preparation cycles, identify the modernization of scientific and methodological support as a strategic priority, which extends to strength, power, and biomechanical training methodology.

While punch force is often intuitively associated with body mass, recent biomechanical research suggests that force production depends more strongly on how efficiently an athlete generates and transfers force through the kinetic chain than on mass alone. Clarifying the specific strength, power, and biomechanical determinants of punching performance in heavyweight boxers is therefore essential for designing training programs that target the actual physical qualities underlying high-impact striking.

Aim of the study: to analyze contemporary evidence on the strength, power, and biomechanical determinants of punch force in elite heavyweight boxers (+90 kg) and to derive training priorities for this weight category.

METHODS

A narrative review of peer-reviewed literature (2013–2025) was conducted using Scopus, PubMed, and Google Scholar. Search terms combined "boxing," "punch force," "kinetic chain," "effective mass," "explosive power," and "lower-body strength." Studies examining punch biomechanics, resistance and power training interventions, and neuromuscular activation strategies in boxing and related combat sports were selected. Findings were organized into three themes: lower-body strength and power, kinetic-chain and force-transfer mechanics, and neuromuscular activation, then interpreted with respect to heavyweight-specific training implications.

RESULTS

Beattie and Ruddock (2022) reported that punch impact force differentiates boxers by performance level and weight category, and that athletes capable of generating high-impact punches possess substantially greater lower-body maximal and explosive strength than those producing lower punch forces, identifying lower-limb force capacity as a critical determinant of striking performance. Consistent with this, Loturco et al. (2018) found that a seven-week optimum-power-load program in Brazilian Olympic boxers increased bench press power by approximately 8% and jump squat power by 7%, demonstrating

that power-oriented resistance training produces measurable neuromuscular gains applicable to punching performance.

From a kinetic-chain perspective, Liu et al. (2022) compared elite and junior boxers and found that elite athletes achieved significantly greater peak punch velocity, contact velocity, peak punch force, and impulse, attributing these differences to more efficient sequential acceleration of body segments and momentum transfer through the kinetic chain. Complementing this, Kacprzak et al. (2025) showed that punching force depends heavily on the efficiency of effective mass transfer rather than on body mass alone, with straight punches—particularly the rear straight—producing the highest effective mass values among common punch types. Jin et al. (2025) further demonstrated that boxing-specific dumbbell throw exercises produced acute improvements in rear-hand punch velocity, force, and power, indicating that targeted neuromuscular activation can enhance striking output in the short term.

Table 1 summarizes the principal strength, power, and biomechanical findings relevant to punch force production, together with their implications for heavyweight boxer training.

Author(s)	Research focus	Main finding	Implication for +90 kg boxers
Beattie & Ruddock (2022)	Strength–punch force relationship	Lower-body maximal/explosive strength strongly predicts punch force	Prioritize lower-limb strength and power development
Loturco et al. (2018)	Optimum power load training	Bench press power ↑8%, jump squat power ↑7% after 7 weeks	Power-oriented resistance training is

			effective and time-efficient
Liu et al. (2022)	Kinetic-chain biomechanics of the lead straight punch	Elite boxers show greater punch velocity, force, and impulse than juniors	Technical drilling of segmental sequencing is essential
Kacprzak et al. (2025)	Effective mass and force transfer	Force-transfer efficiency matters more than body mass	Biomechanical optimization should accompany strength training
Jin et al. (2025)	Post-activation performance enhancement	Dumbbell throw drills acutely improved punch velocity and power	Useful as a pre-competition or pre-sparring activation strategy

DISCUSSION AND CONCLUSION

Collectively, the reviewed evidence indicates that punch force production in heavyweight boxers is a multifactorial outcome of lower-body strength and power, efficient kinetic-chain sequencing, and effective mass transfer at the moment of impact, rather than a simple function of body size. This reframes training priorities: rather than assuming that greater body mass automatically confers striking advantage, heavyweight boxers should be trained to maximize the rate and efficiency with which force is generated in the lower limbs and transmitted through the trunk and arm into the target.

Practical training priorities emerging from this analysis include structured lower-body maximal-strength work (e.g., squat and deadlift variations), power-oriented training using optimum-load methods and plyometrics, technical-biomechanical drilling aimed at improving segmental sequencing and effective mass transfer, and periodic use of neuromuscular activation exercises before

high-intensity sparring or competition. Future studies should quantify these relationships directly within heavyweight boxing populations, as most existing kinetic-chain and effective-mass research has been conducted on mixed-weight or lighter-weight samples. Establishing weight-category-specific normative data would strengthen the evidence base for training prescriptions aimed at improving the international competitiveness of Uzbek heavyweight boxers.

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EVALUATION OF NEUROMOTOR PERFORMANCE AND FUNCTIONAL SYMMETRY IN ELITE FEMALE BOXERS USING THE QUICK BOARD SYSTEM

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Abstract: *This study evaluated neuromotor performance in elite female boxers using the Quick Board system. Nine members of the Uzbekistan Women's National Boxing Team participated in the assessment. Total Score, reaction time, movement efficiency, Foot Fire performance, and functional symmetry were analyzed. The results revealed considerable individual differences in neuromotor readiness. Athletes with higher performance scores demonstrated faster reaction times, greater movement efficiency, and better bilateral symmetry, whereas several athletes exhibited functional asymmetries. The findings indicate that the Quick Board system is an effective tool for monitoring neuromotor performance, identifying functional deficits, and supporting individualized training programs in elite female boxing.*

Keywords: *elite female boxers, Quick Board, neuromotor performance, reaction time, functional symmetry.*

Annotatsiya: *Mazkur tadqiqotda Quick Board tizimi yordamida yuqori malakali ayol bokschilarning neyromotor tayyorgarligi baholandi. Tadqiqotda O‘zbekiston ayollar boks terma jamoasining 9 nafar sportchisi ishtirok etdi. Umumiy natija, reaksiya vaqti, Foot Fire testi, harakat samaradorligi va funksional simmetriya ko‘rsatkichlari tahlil qilindi. Natijalar sportchilar o‘rtasida sezilarli individual farqlar mavjudligini ko‘rsatdi. Quick Board tizimi neyromotor holatni monitoring qilish, funksional kamchiliklarni aniqlash va individual mashg‘ulotlarni rejalashtirishda samarali vosita ekanligi aniqlandi.*

Kalit so‘zlar: *ayollar boksi, Quick Board, neyromotor tayyorgarlik, reaksiya vaqti, funksional simmetriya.*

Аннотация: *В исследовании оценивалась нейромоторная подготовленность высококвалифицированных женщин-боксеров с использованием системы Quick Board. В обследовании приняли участие 9 спортсменок национальной сборной Узбекистана. Анализировались общий показатель результативности, время реакции, тест Foot Fire,*

двигательная эффективность и функциональная симметрия. Полученные результаты выявили значительные индивидуальные различия в нейромоторной подготовленности. Система Quick Board показала эффективность для мониторинга функционального состояния, выявления нейромоторных дефицитов и разработки индивидуализированных программ подготовки.

Ключевые слова: *женский бокс, Quick Board, нейромоторная подготовленность, время реакции, функциональная симметрия.*

INTRODUCTION

Boxing performance depends on the integration of technical, tactical, physical, and neuromotor abilities. Among these, neuromotor readiness plays a critical role by enabling athletes to respond rapidly and accurately to changing competitive situations. Reaction time, movement efficiency, and lower-limb coordination are essential for effective footwork, defensive actions, and counterattacks. Recent studies have shown that superior neuromotor performance contributes to agility, movement quality, and overall competitive success in combat sports (Chaabene et al., 2018; Loturco et al., 2019).

Modern assessment technologies provide objective measures of neuromotor function. The Quick Board system evaluates reaction time, movement efficiency, coordination, and functional symmetry, making it a practical tool for monitoring athlete readiness and identifying functional deficits. Previous research has also demonstrated that lower-limb asymmetry may reduce movement efficiency, impair technical performance, and increase injury risk (Bishop et al., 2021). Despite these findings, limited information is available on the neuromotor characteristics of elite female boxers assessed using the Quick Board system.

Therefore, this study aimed to evaluate neuromotor performance, reaction time, movement efficiency, and lower-limb functional symmetry in elite female boxers using the Quick Board assessment system. It was hypothesized that athletes with higher overall performance scores would demonstrate faster reaction times, greater movement efficiency, and better bilateral symmetry.

2. Materials and Methods

Nine elite female boxers from the Uzbekistan Women's National Boxing Team participated in this cross-sectional study. All athletes were actively preparing for national and international competitions and provided informed consent prior to testing in accordance with the Declaration of Helsinki.

Neuromotor performance was assessed using the Quick Board™ system (Quick Board LLC, USA). The evaluated variables included Total Performance Score, Foot Fire performance, left and right lower-limb reaction time, movement efficiency, and functional symmetry. Before testing, athletes completed a standardized warm-up consisting of low-intensity running, dynamic stretching, and sport-specific exercises.

During the assessment, participants responded to randomly illuminated targets using rapid multidirectional foot movements. The system automatically recorded reaction time, movement efficiency, and symmetry indices. Functional symmetry values below 85% were considered indicative of clinically relevant asymmetry (Bishop et al., 2021).

Descriptive statistics were calculated and presented as mean ± standard deviation (SD), minimum and maximum values, and 95% confidence intervals (95% CI). Data normality was assessed using the Shapiro–Wilk test. Inter-limb effect sizes were determined using Hedges' g and interpreted as trivial (<0.20), small (0.20–0.49), moderate (0.50–0.79), and large (≥0.80).

3. Results and Discussion

The descriptive statistics revealed substantial inter-individual variability in overall neuromotor performance among elite female boxers. Total Quick Board scores ranged from 1207 to 3868 points, with a mean value of 2376.6 ± 930.8 points. Foot Fire performance averaged 92.7 ± 9.5 repetitions, indicating a relatively high level of lower-limb movement frequency (Table 1).

Table 1.

Descriptive Statistics, 95% Confidence Intervals, and Effect Sizes of Neuromotor Performance Variables in Elite Female Boxers (n = 9)

Variable	Mean ± SD	95% CI	Min	Max	Hedges' g	Magnitude
Total Score (points)	2376.6 ± 930.8	1660.9–3092.3	1207	3868	–	–
Foot Fire (reps)	92.7 ± 9.5	85.4–100.0	81	109	–	–
Left RT (s)	0.819 ± 0.148	0.705–0.933	0.668	1.048	0.04†	Trivial
Right RT (s)	0.811 ± 0.245	0.623–0.999	0.610	1.257	–	–
Left Efficiency (score)	16.2 ± 6.1	11.5–20.9	9	25	-0.65†	Moderate
Right Efficiency (score)	19.8 ± 4.3	16.5–23.1	17	29	–	–
Left Symmetry (%)	85.6 ± 11.4	76.8–94.4	68.5	100.0	-1.53†	Large
Right Symmetry (%)	99.0 ± 2.9	96.8–101.2	91.2	100.0	–	–

Note. Data are expressed as mean ± SD, 95% CI, minimum, and maximum values. Hedges' g was used to quantify inter-limb effect sizes. RT = reaction time; CI = confidence interval; SD = standard deviation.

The relatively wide confidence intervals observed for Total Score and Left Symmetry indicate considerable variability among athletes, whereas Right Symmetry demonstrated the narrowest confidence interval, reflecting a more homogeneous performance profile across participants. Such findings support the use of individualized neuromotor monitoring for optimizing training interventions and identifying functional deficits in elite female boxing athletes.

Figure 1 presents the overall neuromotor performance scores of elite female boxers obtained using the Quick Board assessment system. Considerable

inter-individual variability was observed among the athletes, with total scores ranging from 1207 to 3868 points. The mean group score was 2376.6 ± 930.8 points, indicating substantial differences in neuromotor readiness despite all athletes competing at a similar elite level.

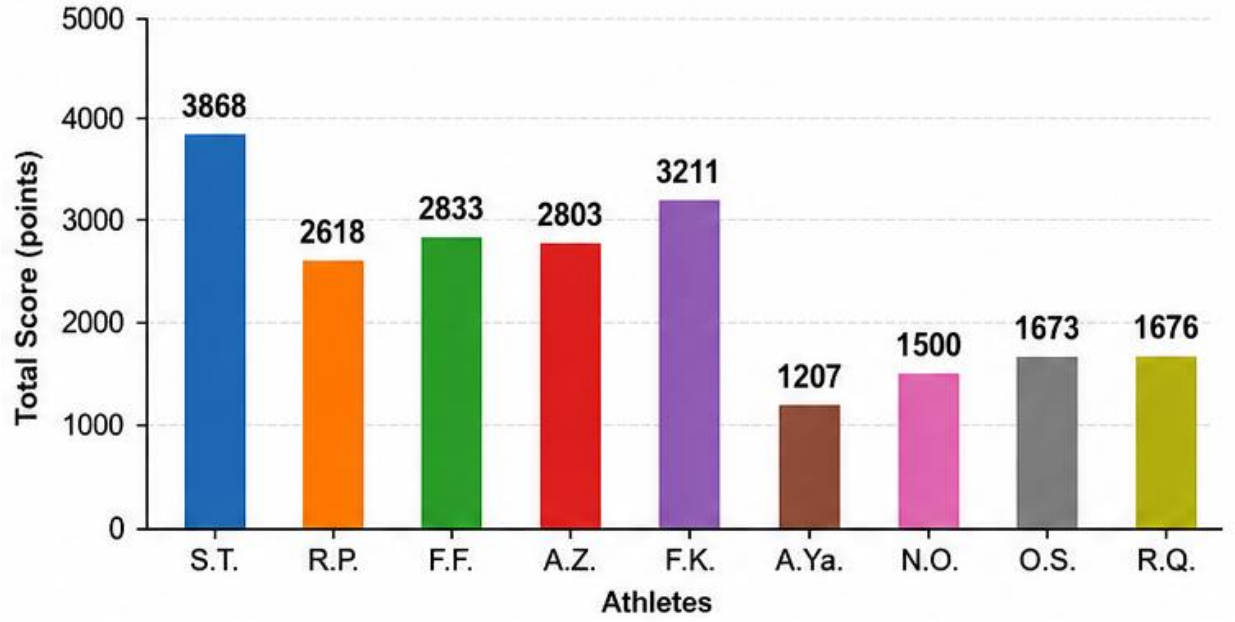

Figure 1.

Overall Neuromotor Performance Scores of Elite Female Boxers Assessed by the Quick Board System.

The obtained results indicate that athletes with higher Quick Board scores demonstrated superior sensorimotor readiness characterized by faster reactions, more efficient lower-limb movements, and improved movement coordination. Conversely, athletes with lower scores exhibited reduced neuromotor efficiency and a lower capacity to perform rapid multidirectional actions.

From a biomechanical perspective, the total Quick Board score represents an integrated indicator of neuromuscular function, combining reaction speed, movement efficiency, coordination accuracy, and bilateral movement control. Therefore, higher scores may reflect a greater ability to execute boxing-specific actions such as footwork adjustments, defensive maneuvers, counterattacks, and rapid changes of direction.

The substantial variability observed among the athletes suggests that neuromotor readiness remains highly individualized even within elite female boxing. Similar observations have been reported by Bishop et al. (2018) and Loturco et al. (2019), who demonstrated that neuromuscular performance characteristics may differentiate athletes competing at comparable competitive levels. Furthermore, superior neuromotor performance has been associated with improved agility, movement efficiency, and sport-specific technical execution (Chaabene et al., 2018).

CONCLUSION

This study demonstrated that the Quick Board system effectively evaluates neuromotor performance in elite female boxers. Considerable inter-individual differences were observed in reaction time, movement efficiency, and functional symmetry despite similar competitive levels. Athletes with higher performance scores generally exhibited faster reactions, greater movement efficiency, and better bilateral symmetry, whereas several athletes showed clinically relevant functional asymmetries. These findings support the use of Quick Board as a practical tool for monitoring neuromotor readiness, identifying functional deficits, and guiding individualized training programs to enhance performance and reduce injury risk in elite female boxing.

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LINGUOCULTURAL ANALYSIS OF THE CONCEPT "BEAUTY" IN ENGLISH LANGUAGE CULTURE

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Abstract *.The concept of beauty has always occupied an important place in human culture, philosophy, and language. Every nation forms its own understanding of beauty according to its history, traditions, values, and worldview. Language reflects these cultural perceptions and preserves them in words, idioms, metaphors, proverbs, and literary works. Therefore, the linguocultural study of the concept "beauty" makes it possible to understand the relationship between language, culture, and cognition. This article investigates the linguistic representation of beauty in English language culture. The research analyzes lexical units, phraseological expressions, proverbs, and literary examples that reveal the semantic and cultural characteristics of beauty. Cognitive and linguocultural approaches are applied to explain how the English-speaking community conceptualizes beauty. The study demonstrates that beauty in English culture is associated not only with physical attractiveness but also with kindness, morality, intelligence, harmony, and individuality. The findings contribute to cognitive linguistics, linguoculturology, and intercultural communication.*

Keywords*: beauty, concept, linguoculturology, English language, culture, cognitive linguistics, semantics, conceptual analysis.*

INTRODUCTION

Language and culture are inseparable components of human society. Language does not simply function as a means of communication; it also stores cultural knowledge and reflects people's perception of the world. Linguoculturology studies this close interaction between language and culture by examining how cultural values are expressed through linguistic forms.

One of the most significant cultural concepts is beauty. Throughout history philosophers, writers, artists, and linguists have attempted to define beauty from different perspectives. Ancient Greek philosophers considered beauty a symbol of harmony and perfection, whereas modern scholars emphasize that beauty is culturally determined and may differ from one society to another.

In English language culture, beauty has developed into a multidimensional concept. It includes physical appearance, moral behavior, inner qualities, artistic creativity, and appreciation of nature. English literature, folklore, and everyday communication demonstrate that beauty is evaluated according to both aesthetic and ethical principles.

The purpose of this study is to analyze the linguocultural characteristics of the concept "beauty" in English language culture and identify the linguistic means through which this concept is represented.

LITERATURE REVIEW

The theoretical foundation of linguocultural studies was established by many prominent scholars. V. A. Maslova states that cultural concepts are reflected in linguistic consciousness and represent the national worldview. [50]According to Anna Wierzbicka, language preserves culturally specific meanings that cannot always be translated directly into another language.[51] George Lakoff and Mark Johnson explain that conceptual metaphors shape people's understanding of abstract notions, including beauty.[52]

Beauty has also been discussed extensively in philosophy. Plato viewed beauty as an eternal ideal, while Aristotle connected beauty with harmony and proportion. Later, Immanuel Kant argued that judgments of beauty are subjective but based on universal human cognitive abilities.

[50] Maslova V. A. Linguoculturology. Moscow: Akademiya, 2001.
[51] WierzbickaA.UnderstandingCulturesthroughTheirKeyWords.OxfordUniversityPress,1997.
[52] Lakoff G., Johnson M. Metaphors We Live By. University of Chicago Press, 2003.

English literary works present different interpretations of beauty. William Shakespeare often contrasts external beauty with inner virtue. Oscar Wilde criticizes excessive admiration of physical appearance in The Picture of Dorian Gray, emphasizing the importance of moral beauty. Jane Austen presents beauty together with intelligence, modesty, and personal character.

Modern linguists argue that beauty is a conceptual category whose meaning changes according to historical, social, and cultural factors. Consequently, the linguocultural approach enables researchers to investigate beauty as both a linguistic and cultural phenomenon.

RESEARCH METHODS

The study employs qualitative research methods.

The descriptive method is used to explain the semantic features of lexical units related to beauty.

Semantic analysis identifies the meanings of words such as beauty, beautiful, handsome, lovely, attractive, elegant, graceful, and charming.

Conceptual analysis examines how beauty is represented in English linguistic consciousness.

Phraseological analysis investigates idioms and fixed expressions.

Comparative analysis compares linguistic evidence with cultural values reflected in English society.

Examples are collected from English dictionaries, literary works, proverbs, and academic publications.

ANALYSIS AND DISCUSSION

The lexical field of beauty in English is broad and diverse. The noun beauty generally refers to qualities that provide pleasure through appearance or character. However, English contains many synonyms with slightly different meanings.

For example, beautiful usually describes general attractiveness, while pretty often refers to delicate or youthful beauty. Handsome is commonly

associated with men but may also describe objects characterized by elegance. Gorgeous expresses admiration for exceptional beauty, whereas lovely often reflects emotional appreciation.

Phraseological expressions demonstrate cultural attitudes toward beauty. Expressions such as Beauty is in the eye of the beholder indicate that beauty depends on individual perception. Another proverb, Beauty is only skin deep, emphasizes that physical appearance is less important than personality and moral values.

English literature provides numerous examples of the interaction between external and internal beauty. Shakespeare frequently suggests that physical beauty disappears with time, whereas virtue remains permanent. Oscar Wilde presents external beauty as temporary and warns against excessive dependence on appearance. Jane Austen portrays intelligent and morally strong female characters whose inner qualities become more valuable than physical attractiveness.

Metaphorical expressions also reveal conceptual understanding. Beauty is often associated with light, flowers, nature, and precious objects. Expressions such as a rose among thorns, radiant beauty, and a beautiful soul illustrate the symbolic connection between aesthetics and morality.

Modern English-speaking society has expanded the meaning of beauty through media and globalization. Diversity, confidence, natural appearance, and individuality are increasingly recognized as components of beauty. This shift demonstrates that cultural concepts continuously evolve according to social change.

The linguocultural analysis shows that beauty in English culture consists of several interconnected dimensions:

Physical beauty; Inner beauty; Moral beauty; Intellectual beauty; Artistic beauty; Natural beauty.

These dimensions collectively form the conceptual structure of beauty in English linguistic consciousness.

CONCLUSION

The concept of beauty occupies an important position in English language culture. Linguistic evidence demonstrates that beauty extends beyond physical appearance and includes moral, intellectual, emotional, and spiritual characteristics. Proverbs, idioms, metaphors, literary texts, and lexical units reflect the cultural understanding of beauty and reveal the close relationship between language and culture.

The research confirms that the English conceptualization of beauty is dynamic and culturally conditioned. Linguocultural analysis contributes to a deeper understanding of conceptual systems and promotes effective intercultural communication. Future studies may compare the concept of beauty in English and Uzbek linguistic cultures to identify universal and culture-specific features.

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TRADITIONS AND SKILLS OF EASTERN CLASSICAL LITERATURE IN THE WORK OF ZARIF QORI TOSHKANDIY

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Abstract. *This article examines the life-affirming principles of Eastern literature and their manifestation in the works of Zarif Qori Toshkandiy. Particular attention is paid to the poet's creative interpretation of Alisher Navoi's literary heritage and his ability to preserve and develop the traditions of classical literature in accordance with the spirit of his time and artistic thought. Using comparative and analytical methods, the study explores the reflection of Navoi's poetic ideas, artistic imagery, moral and educational concepts, and aesthetic principles in Toshkandiy's works. The findings reveal the harmony of tradition and innovation, literary continuity, and the enduring humanistic values embodied in Eastern literary heritage.*

Keywords: *Zarif Qori Toshkandiy, Alisher Navoi, Eastern literature, literary tradition, creative continuity, poetics, aesthetic principles, classical literature.*

Аннотация. *В данной статье анализируются жизнеутверждающие принципы восточной литературы и особенности их отражения в творчестве Зарифа Кори Тошкандий. Особое внимание уделяется творческому отношению поэта к литературному наследию Алишера Навои, а также продолжению традиций классической литературы в соответствии с духом эпохи и художественным мышлением. На основе сравнительно-аналитического метода исследуется воплощение в произведениях Тошкандий поэтических идей, художественных образов, нравственно-просветительских взглядов и эстетических принципов, характерных для поэтики Навои. В результате раскрываются преемственность литературных традиций, единство традиции и новаторства, а также гуманистическая сущность восточной литературы.*

Ключевые слова: Зариф Кори Тошкандий, Алишер Навои, восточная литература, литературная традиция, творческая преемственность, поэтика, эстетические принципы, классическая литература.

The issue of literary influence is one of the current topics in world literary studies. The Turkic peoples have fed each other in literary and cultural terms and have been creatively influenced by each other. In particular, Uzbek-Uyghur literature, as in all literatures of the world, has been creatively developing each other's unique traditions for centuries. In a number of large cities of East Turkestan, such as Gulja, Kashgar, Yorkent, Khotan and Urumqi, the classical traditions of Uyghur literature were formed in the midst of literary traditions adopted from the experience of other peoples, and they also serve as a great school for poets who came after them. The work of the great Uzbek poet Alisher Navoi, one of the classical poets in Uzbek literature, who was closely in tune not only with Uyghur literature, but also with its language and culture, was an artistic monument that made a great contribution to further strengthening the literary ties between these two peoples. Uyghur poets were active in following Alisher Navoi in their creative work. Along with such figures as Khirqatiy, Abdurahim Nizariy, Garibiy, Zaliliy, Muhammad Sodiq Kashgariy, Bilol Nozim, there are also a number of artists whose names are not yet familiar to Uzbek literary studies, including Uyghur-Uzbek poets who lived and worked at the beginning of the 20th century. The disclosure of these issues would also shed light on the issue of influence on the poetry of other Uzbek poets, along with Navoiy's work. It is also significant in that it can provide important information about the forms and methods, patterns, literary styles, and typological characteristics of Uyghur and Uzbek literary relations.

The article, approaching the latest criteria of literary studies, covers the information based on the principles of historicity, comparative-logical analysis, and objectivity, and examines the attitude of Uyghur poets to the work of Alisher Navoi and the issues of literary succession.

In general, in Uyghur literary studies, Uyghur literary studies have conducted scientific research on the work of Alisher Navoi in our country, on the study of the work of Alisher Navoi, and on the activities of Uyghur poets, writers, and literary scholars who worked under the influence of the poet.

In literary studies, researchers such as Arshiddinov U. Mamatoxunov, S. Erkinov, R. Qodiriy, Sh. Umar, V. Gopur, A. Khusayn, T. Aliyev, S. Mallaudov, I. Imirov, Q. Hasanov, H. Soliyeva have made a worthy contribution to the issues of Uyghur literature. [1,2,3,4,5,6,7,8] In this regard, it is worth highlighting the scientific works of M. Hamroyev, Yu. Muhlisov, R. Qodiriy, D. Ru'ziyeva and D. Rayhonov, Z. Kasimova, who studied the issues of Navoi's traditions in Uyghur literature.[9,10,11,12]Tadqiqotchi Z.Qasimova “Uyg‘ur adabiyoti tarixida Alisher Navoiy ijodining o‘rganilishi” maqolasida uyg‘ur adabiyotining tarixiy taraqqiyoti, o‘zbek–uyg‘ur adabiy aloqalarida Alisher Navoiyni tutgan o‘rni, Alisher Navoiyning uyg‘ur adabiyotiga ta’siri kabi masalalari ilmiy tahlil qilingan. Bu masalani o‘rganish orqali navoiyshunoslikning yangi qirralari va dolzarb masalalariga oydinlik kiritilishini to`g`ri ta`kidlaydi.[Z,Kasimova,13:16]

Literary critic Kh.Solihova's scientific research is mainly devoted to the study of Navoi's traditions in Uyghur literature, the continuation of the Khamsa tradition, and the work of Uyghur Khamsanavis. [Kh.Solihova, 15:1995]

In Urumqi, the work and literary heritage of Uzbek writers are being studied to one degree or another at the Scientific Research Institute of the Academy of Social Sciences of the Xinjiang Autonomous Region. Scholars such as Qodir Akbar [Qodir Akbar, 16:1989] and Hurmatjon Fikrat [17;1995,2005] are actively involved in this work.

In this article, we aim to analyze the extent to which Uyghur-Uzbek poets who lived and worked at the beginning of the 20th century were interested in Navoi's work and were inspired by the poet's artistic style of writing poems and the skill of creating poetic images.

Navoi's work, which has amazed the entire Turkic world with its deep humanistic ideas and unparalleled artistry, has also had a positive impact on Uyghur poets. There are poets who wrote in the Turkic language who enjoyed and were influenced by this great admiration. It is enough to get acquainted with the personalities and works of these poets and take a comparative look at the harmony of the common ideological and artistic aspects of Navoi's work. In particular, the inter-temporal basis is distinguished by the fact that in ghazals, the same meter, the same rhyme, and the same artistic burden are creatively continued, with new allegories, artistic elements, and an attempt to continue the deep philosophical content. For example, let us pay attention to one of the verses of Zarif qori Tashkenti,

Gul yuzungsiz bog` aro bulbul kabi zor o`lmisham,
Hajri xori sanchilib bag`rim ado xor o`lmisham.
Lutf aylab bir kelib qoshimg`a ahvolimni ko`r,
Kimsa yanglig` man saning hajringda abgor o`lmisham[53]./
I would die like a nightingale in a garden without a flower,
I would die in shame, pierced by the sound of the bell.
Please come and see my condition,
I am someone new, I would die in your bell

Literary scholar K. Mullakho`jayeva noted that one of the factors ensuring the perfection of Alisher Navoi's ghazals is the perception of essence and phenomenon and their relationship based on faith and a certain philosophical doctrine.

Also, through the appeal to the Quranic stories related to the names of Khizr, Noah, Jesus, Sulayman, Yusuf, and Qarun, we encounter a beautiful

[53] G`azallar “Shinjong o`zbek adiblari” kitobidan olindi.Sahifasi qavs ichida ko`rsatiladi. Muallif bu antologiyaga 1911-yil “Bayozi Muhallo” nomli toshbosmaga kiritilgan matnlarga tayangan. Bu haqda qarang: Shinjong o‘zbek adiblari. Nashrga tayyorlovchi: Qodir Akbar. Shinjong xalq nashriyoti.1989 y., 114 – 140 betlarشىنجاڭ ئۇزبېكستان يازغۇچىلىرى. نەشر قىلىشقا تەييارلانغان: قادىر ئەكبەر. شىنجاڭ خەلق نەشرىياتى1989

example of the art of talmeh in Navoi's ghazals, while Zarif Qori Tashkenti effectively used this method in his poetry.

The spiritual closeness and creative traditionalism in the work of Zarif Qori Tashkenti and Navoi are also visible in the condemnation of human nature, in particular, inhumane traits inherent in bad behavior. Zarif Qori Tashkenti sought to be in harmony with folk literature and traditions in his works. In his poems, he skillfully embodied the life of his time, describing the customs, social order, labor and lifestyle of the people. At the same time, his poems illuminated the hopes, sufferings and worldviews of the people. For example, in his ghazal, written in harmony with the ghazal "Telba konglum yorasi hadsiz tani uryon aro", which was included in Navoi's "Navodur un nihoya" collection, there is such a verse:

Ul pari ishqin buzuq ko`nglum aro ettim nihon,

O`ylakim pinhon etarlar ganjni vayron aro.(112-bet)

According to folk tales, great treasures were found in caves and ruins (chugs). The greatest treasure for a lover is the love of a beloved, which he hides in a corrupt heart, in a simple but memorable way.

Tashkentiy is one of the poets who has taken his place in the lyrical school of classical Uzbek poetry, and his ghazals are examples of a harmonious combination of formal elegance, substantive depth and stylistic sophistication. Although the poet masterfully mastered the traditional rules of the ghazal genre, he brought to them his own refined spirit, breadth of imagery and a succession of layers of meaning. For Tashkentiy, a ghazal is not just an expression of a feeling, but a complex poetic phenomenon born from the harmony of spiritual observation, refined observation and artistic thinking. From the point of view of form, Tashkenti creates based on the requirements of the classical ghazal: he uses the smooth flow of the aruz, perfectly harmonizes the rhyme-radif system, and achieves that the independence of the verses, along with their service to the general poetic flow, serve. However, the poet does not aim to strictly maintain

the form, but, on the contrary, creates subtle melodies, internal rhythms and musical connections between words within it. The verses often begin in a calm, gentle tone, and in the next verse, a strong emphasis on the root of meaning determines the formal elevation characteristic of Tashkenti.

Although Tashkenti's ghazals include traditional themes such as love, loyalty, exile, trust, and the transience of life, the poet interprets them not in a simple lyrical tone, but in a deep observation, imbued with spiritual purification and spiritual awakening. Tashkenti presents love not only as a feeling between two hearts, but also as an inner space of self-knowledge, spiritual growth, and spiritual transformation. Therefore, love in his ghazals is a multi-layered content that can be joy, anxiety, intimacy, and exile at the same time. The poet's skill is that he reveals meaning through the inner warmth of images rather than through their external beauty. For example, classical images such as a flower, moon, candle, and sky become symbols in Tashkent that express not ordinary aesthetics, but the spiritual state of the human soul. A flower is interpreted not as a symbol of beauty, but as the transience of beauty, the moon is interpreted not as light, but as the need for light, and a candle is interpreted not as just light, but as the power of a person to radiate light to others, even if it burns him. From the above analysis, the following conclusions can be drawn:

1. The work of the great poet Alisher Navoi, along with all Turkic peoples, has provided endless inspiration and lessons to Uyghur poets and writers.

2. In the recent past - the beginning of the 20th century, the tradition of creating ghazals in Navoi-like melodies and styles, and continuing the series of images, continued in the work of poets living in Xinjiang.

3. In terms of form, the rules of aruz, rhyme scheme and requirements for it have not changed, they have been distinguished by their own characteristics in simple, light, playful meters, the selective use of purely Turkic words for rhyme, and the use of radif, continuing in the national spirit.

4. By studying how literary contacts between Uyghur-Uzbek poets took place, it is important both in discovering new aspects of Navoi studies and in revealing new unsolved issues about the work of Uyghur poets.

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STRENGTHENING NATIONAL VALUES AND PATRIOTISM IN UZBEKISTAN'S CONTINUOUS EDUCATION SYSTEM: AN ANALYSIS OF THE 2026 STATE PROGRAM

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Abstract: *This study examines the newly adopted State Program of the Republic of Uzbekistan aimed at improving the effectiveness of educating young people in the spirit of national values and patriotism within the continuous education system. Using qualitative document analysis, the research investigates the objectives, implementation mechanisms, and expected outcomes of the governmental policy approved by the Cabinet of Ministers in January 2026. The findings indicate that the Program establishes a vertically integrated model of national education spanning preschool, general secondary, vocational, and higher education institutions. The introduction of the "National Education Model," the weekly "Future Hour" lessons, and coordinated cooperation among educational institutions, families, communities, and government agencies are identified as the Program's core innovations. The study concludes that the Program provides a comprehensive framework for strengthening civic responsibility, national identity, and ideological resilience among young people while contributing to the modernization of Uzbekistan's educational policy.*

Keywords: *national education, patriotism, national values, continuous education, educational policy, Uzbekistan, civic education.*

INTRODUCTION

The development of patriotic consciousness and commitment to national values has become a strategic priority in many countries seeking to strengthen social cohesion and sustainable development. In Uzbekistan, educational reforms under the concept of "New Uzbekistan – Towards the Third

Renaissance" emphasize the formation of intellectually capable, socially responsible, and nationally conscious citizens.

On January 28, 2026, the Cabinet of Ministers adopted Resolution No. 34 approving the **Program for Enhancing the Effectiveness of Educating Youth in the Spirit of National Values and Patriotism within the Continuous Education System**. The Program introduces a unified national educational framework designed to integrate patriotic education across all educational stages, from preschool to higher education.

Despite increasing governmental attention to value-based education, limited academic research has examined the structure, implementation mechanisms, and expected educational outcomes of this newly adopted policy.

Research Objectives

The study aims to:

- analyze the objectives and priorities of the State Program;
- examine its implementation mechanisms;
- identify expected educational outcomes;
- evaluate its contribution to strengthening national identity and civic competence.

MATERIALS AND METHODS

Research Design

This research employs a **qualitative descriptive design** based on document analysis.

Data Source

The primary source of data is the official Resolution No. 34 of the Cabinet of Ministers of the Republic of Uzbekistan adopted on January 28, 2026, together with the attached State Program.

Data Collection

The official policy document was systematically reviewed to identify:

- policy objectives;

- educational strategies;
- implementation mechanisms;
- institutional responsibilities;
- monitoring procedures;
- expected educational outcomes.

Data Analysis

The collected information was analyzed using **qualitative content analysis**.

The analysis followed four stages:

1. coding policy objectives;
2. categorizing implementation mechanisms;
3. identifying educational innovations;
4. interpreting expected impacts on educational quality.

RESULTS

Introduction of the National Education Model

One of the Program's major innovations is the development of the **National Education Model**.

The model serves as the conceptual framework for:

- value-based education;
- citizenship education;
- moral development;
- ideological resilience;
- national identity formation.

The model is expected to standardize educational content throughout the country.

Weekly "Future Hour" Lessons

The Program mandates that every Monday educational institutions conduct a special lesson called **"Future Hour"**.

These lessons include:

- civic education;
- patriotism;
- national values;
- historical heritage;
- contemporary social issues.

Digital educational materials, videos, and teaching scenarios will be developed through the national online platform.

Three-Stage Educational Framework

The Program establishes three developmental stages.

Stage I (Preschool)

Focus areas include:

- self-awareness;
- emotional regulation;
- national identity;
- social interaction.

Educational activities include multimedia materials, fairy tales, folklore, and parental engagement projects.

Stage II (General Secondary Education)

Key competencies include:

- independent thinking;
- tolerance;
- responsibility;
- studying historical heritage;
- ideological immunity.

Teachers receive specialized training on the National Education Model.

Stage III (Vocational and Higher Education)

Educational priorities include:

- civic leadership;
- military preparedness;

- healthy lifestyle;
- professional ethics;
- contribution to national development.

Projects such as **Healthy Generation – Future of the Nation** and methodological publications are planned.

Institutional Cooperation

The Program strengthens collaboration among:

- educational institutions;
- families;
- local communities;
- ministries;
- cultural organizations;
- writers;
- artists;
- civil society institutions.

This cooperation aims to establish a holistic educational environment.

Monitoring System

The Program introduces systematic monitoring through:

- annual implementation reports;
- educational indicators;
- competency assessment;
- governmental supervision.

The Ministry of Preschool and School Education and the Ministry of Higher Education coordinate monitoring activities.

DISCUSSION

The findings demonstrate that Uzbekistan's new educational policy reflects contemporary international trends emphasizing competency-based education, citizenship education, and value-oriented learning.

Unlike traditional patriotic education programs focused mainly on historical knowledge, the new Program adopts a multidimensional approach integrating:

- civic engagement;
- ethical behavior;
- national identity;
- social responsibility;
- healthy lifestyles;
- digital educational resources.

The vertical integration from preschool to higher education represents one of the Program's strongest features. International educational research suggests that long-term continuity significantly improves the internalization of civic values and moral competencies.

Furthermore, the introduction of digital learning resources and teacher professional development aligns with global educational modernization strategies.

However, the Program's effectiveness will largely depend on several factors:

- teacher preparedness;
- quality of educational content;
- institutional cooperation;
- continuous monitoring;
- measurable learning outcomes.

Future empirical studies should investigate the Program's practical implementation and its impact on students' civic competencies.

CONCLUSION

The State Program approved by the Cabinet of Ministers of Uzbekistan establishes a comprehensive national framework for patriotic and value-based education across the continuous education system.

The Program integrates educational policy, teacher training, digital technologies, civic education, and institutional cooperation into a unified national strategy.

Its successful implementation has the potential to strengthen national identity, civic responsibility, ideological resilience, and social cohesion among future generations.

Future research should focus on evaluating the Program's implementation at institutional levels and measuring its long-term educational outcomes using quantitative and mixed-method research designs.

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UZBEKISTAN - ONE HOMELAND: MODERN FACTORS OF STRENGTHENING NATIONAL UNITY AND PATRIOTISM

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Annotation: *This article scientifically analyzes the role of the idea of "Uzbekistan - one homeland" in the development of society, strengthening national unity, forming patriotic feelings in the minds of young people, and developing civic responsibility. During the research, the social, spiritual, and educational aspects of patriotism were covered on the basis of scientific literature, regulatory legal documents, and modern scientific approaches. The importance of the reforms being carried out in Uzbekistan in strengthening national unity was also revealed. The results of the study serve to develop practical recommendations for educating the younger generation in the spirit of loyalty to the Motherland, developing civil society, and further strengthening interethnic harmony.*

Keywords: *Homeland, national unity, patriotism, civil society, spirituality, youth policy, interethnic harmony, development, national values.*

Abstract: *This article examines the role of the idea "Uzbekistan – One Homeland" in strengthening national unity, patriotism, and civic responsibility. The study analyzes modern scientific approaches, legal documents, and educational concepts related to patriotism and social cohesion. The findings demonstrate that strengthening national identity and fostering patriotic values among young people are key factors in ensuring sustainable development and social stability. Practical recommendations are proposed for improving patriotic education and enhancing national solidarity in Uzbekistan.*

Keywords: *Homeland, patriotism, national unity, civic society, youth, spirituality, tolerance, sustainable development.*

1.INTRODUCTION

The development of every nation is, first of all, closely related to its love for the Motherland, national unity and civic responsibility. The idea of "Uzbekistan is a single Motherland" is an important spiritual factor uniting all citizens living in the country towards a single goal. This idea represents the common interests of all citizens, regardless of nationality, language and religion, and serves to ensure the stability of society. Amir Temur's wisdom "Strength is in justice" retains its significance today as one of the important principles of state governance, ensuring justice and unity in society. In a society where justice is a priority, citizens' loyalty to the Motherland and mutual trust are strengthened.

Alisher Navoi glorified the ideas of humanity, tolerance and serving the interests of the people as high values in his works. His spiritual heritage remains an important source of encouraging young people to love and do good for the Motherland.

Islam Karimov's idea that "The Motherland is as sacred as a place of worship" has become an important idea in the hearts of our people, expressing love and devotion to the Motherland.

As Shavkat Mirziyoyev noted, "The creation of a new Uzbekistan is primarily associated with educated, patriotic and enterprising youth." This approach is an important factor in comprehensively supporting young people, developing their intellectual potential and strengthening national unity.

Therefore, studying the idea of "Uzbekistan - a single Motherland" on a scientific basis, in-depth elucidation of its content and essence, and analyzing its place in the development of modern society are one of the current scientific issues of today.

2. Research methods (Methods)

A comprehensive scientific approach was used in this study. The main purpose of the study is to scientifically analyze the role of the idea of "Uzbekistan - a single homeland" in strengthening national unity and its

importance in developing patriotic feelings in the minds of young people. The following scientific methods were used during the study:

Analysis and synthesis method - to study and summarize scientific literature, regulatory legal documents and scientific articles on national unity, patriotism and civil society.

Comparative analysis method - to compare the spiritual and educational reforms being implemented in Uzbekistan with the experiences of patriotic education in other countries.

Systematic approach - to identify the interrelationships between national unity, spirituality, education and civic responsibility.

Logical and statistical generalization - to summarize the information provided in scientific sources and draw conclusions.

The theoretical basis of the article was the Constitution of the Republic of Uzbekistan, regulatory legal acts on patriotism and spirituality, scientific works of local and foreign scientists, as well as the views of Amir Temur, Alisher Navoi, Islam Karimov and Shavkat Mirziyoyev on the national idea, patriotism and statehood.

The idea of "Uzbekistan - a single homeland" was systematically analyzed not only as a spiritual value, but also as a social factor ensuring the sustainable development of society. Practical proposals were also developed to strengthen patriotism among young people.

3. Results

The results of the study showed that the idea of "Uzbekistan - a single homeland" is an important spiritual factor uniting all citizens living in the country around a common goal and noble values. The practical significance of this idea is clearly manifested in the following areas:

1. Strengthening national unity

National unity is one of the main factors of stability and development of society. The coexistence of representatives of different nationalities and ethnic

groups on the basis of mutual respect, tolerance and solidarity ensures social stability. The reforms being implemented in Uzbekistan serve to strengthen these principles.

2. Development of a sense of patriotism

The formation of love for the Motherland, national pride and civic responsibility in young people is effectively implemented through the education system, family and neighborhood cooperation. Such education increases the activity of young people in public life and encourages them to contribute to the prosperity of the country.

3. Development of spiritual values

The scientific and spiritual heritage of our great ancestors such as Alisher Navoi and Amir Temur is an important source for educating the younger generation in the spirit of goodness, justice, and selflessness. Commitment to national values strengthens civic unity.

4. Development of civil society

Analysis shows that as citizens' active participation in the life of the state and society increases, social responsibility also increases. Public control, volunteer efforts, and civic initiatives further strengthen national unity.

Table 1. Main directions of the idea of "Uzbekistan - a single homeland"

Direction Main result

National unity Stability and harmony of society

Patriotism Loyalty to the Motherland increases in young people

Spirituality National values develop

Education Civic responsibility is formed

Development Sustainable socio-economic development is ensured

The results show that the idea of "Uzbekistan - a single homeland" is not only a spiritual concept, but also one of the important strategic factors of the development of the state and society. Consistent promotion of this idea through

education, family, neighborhood and mass media will serve to further strengthen patriotism and civic responsibility in the younger generation.

4. Discussion

The idea of "Uzbekistan - a single homeland" is not only a spiritual slogan, but also a strategic factor uniting society and ensuring the development of the state. In today's conditions of globalization, a sharp increase in information flows and the strengthening of various ideological influences, strengthening the understanding of national identity of young people, forming loyalty to the Motherland and civic responsibility in them is becoming an urgent task. The strength of national unity is directly related to the social stability of society, economic development and state security. Therefore, strengthening cooperation between educational institutions, family, neighborhood, mass media and public organizations is of great importance.

Amir Temur's wisdom "Strength is in justice" remains one of the important principles of state governance and social development today. Justice, the rule of law and equal rights of citizens are the main factors strengthening national unity.

The ideas of humanity, tolerance and goodness put forward in the works of Alisher Navoi still serve as an important theoretical basis for the spiritually well-rounded upbringing of young people today.

As Shavkat Mirziyoyev noted, "We will build a new Uzbekistan together with educated, enterprising and patriotic youth." This approach indicates the need to further improve youth policy, the quality of education and spiritual upbringing.

5. CONCLUSION

In conclusion, the idea of "Uzbekistan is a single homeland" is an important spiritual basis for the development of the country, ensuring interethnic harmony and civic unity. The results of the study showed that by deeply instilling this idea in the minds of young people, their love for the Motherland, responsibility and active civic position can be further developed.

To strengthen national unity, it is necessary to consistently develop cooperation between state bodies, the education system, family, neighborhood and civil society institutions. The harmony of the spiritual heritage of our great ancestors and modern reforms serves as an important factor in the development of a new Uzbekistan.

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THE ROLE OF SOCIAL ENVIRONMENT AND ETHNOCULTURAL FACTORS IN THE DEVELOPMENT OF FANATICISM

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Annotation: *This article examines the role of the social environment and ethnocultural factors in the development and prevention of fanaticism among adolescent girls. It analyzes the influence of family socialization, parenting styles, emotional security, school climate, peer relationships, and Uzbek ethnocultural values on psychological resilience. The discussion is based on Bronfenbrenner's Ecological Systems Theory, Baumrind's parenting style model, Rokeach's theory of dogmatism, Adler's compensation theory, Kruglanski's Need for Significance Theory, and Social Identity Theory. The study concludes that strengthening critical thinking, psychological resilience, and cooperation among families, schools, and communities is essential for preventing radicalization and promoting social stability.*

Keywords: *fanaticism, radicalization, adolescent girls, family socialization, ethnocultural factors, psychological resilience, parenting styles, social identity, education.*

INTRADUCTION

The significance of family socialization lies in its decisive role in preparing individuals for independent adulthood, including future family life, while fostering the personal qualities and competencies necessary for successful social functioning. Through the family environment, individuals develop intellectually, emotionally, morally, and physically, enabling them to become well-rounded, responsible, and psychologically resilient members of society. A healthy family atmosphere not only equips children with the skills required for social interaction, cooperation, and professional development but also instills respect for ethical norms and prepares them psychologically for participation in broader social life. Thus, the family should be understood not merely as an

economic or social unit but as the primary setting in which an individual's psychological resilience and value system are formed. Individuals raised in families where existential security, emotional warmth, and psychological support are insufficient often develop a persistent perception of the external world as threatening and unpredictable. Such chronic insecurity may motivate them to seek protection, certainty, and a sense of belonging within rigid ideological or radical groups. From this perspective, family cohesion, emotional attachment, and psychological safety constitute one of the most effective social protective factors against the emergence of fanaticism and radicalization.

From an ethnocultural perspective, several interrelated factors contribute to strengthening resistance to fanaticism. First, gender-related psychological characteristics play an important role. Within Uzbek society, women traditionally serve as key agents of social stability by preserving family values, maintaining cultural traditions, and ensuring continuity of social norms across generations. Their greater tendency toward tolerance, empathy, and conflict resolution functions as a natural socio-psychological barrier against aggressive forms of ideological fanaticism.

Second, ethnocultural stability represents an important protective mechanism. Despite experiencing historical, political, and ideological transformations—including wars, the Soviet period, post-independence reforms, and the contemporary processes of globalization—the Uzbek people have largely maintained continuity through their historical and cultural heritage. This continuity has supported psychological adaptation, social cohesion, and spiritual resilience despite external challenges.

Third, the ethical and moral foundations embedded within Uzbek ethnoculture—including modesty (*hayo*), social sensitivity (*andisha*), emotional restraint, patience, and contentment—serve as culturally embedded protective factors. These values promote tolerance, self-regulation, and social harmony

while reducing vulnerability to ideological extremism, religious fundamentalism, and other forms of destructive fanaticism.

According to Urie Bronfenbrenner's Ecological Systems Theory, the microsystem represents the immediate social environment that exerts the strongest influence on an individual's psychological development. For adolescent girls, this microsystem primarily consists of the family, the school environment, and peer groups.[54] The initial psychological foundations of fanaticism often emerge within this immediate social context through unresolved family conflicts, emotional deprivation, interpersonal insecurity, and conformity pressures. As the environment that directly shapes personality development, the microsystem serves as the primary context in which the psychological mechanisms underlying fanatic attitudes and behaviors may gradually develop. The microsystem, as the immediate social context responsible for shaping an individual's psychological development, serves as the primary environment in which the predispositions toward fanaticism may emerge and gradually consolidate. Within this framework, the family's influence can be understood through three principal mechanisms.

First, parenting style constitutes a critical determinant of adolescents' cognitive and ideological development. According to Diana Baumrind's typology of parenting styles, authoritarian parents emphasize unquestioning obedience while discouraging autonomy and independent reasoning.[55] Such rigid and inflexible family environments restrict opportunities for critical reflection and cognitive flexibility. Consistent with Milton Rokeach's theory of the closed mind, prolonged exposure to authoritarian parenting may foster cognitive rigidity, dogmatic thinking, and an intolerance of ambiguity.[56]

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[55] Holden & Harrist. Authoritarian parents are characterized by high control, insistence on obedience, and limited encouragement of autonomy. 2024, p. 51.

[56] Brandt, M. J., Reyna, C., Chambers, J. R., Crawford, J. T., & Wetherell, G. (Eds.). (2022). Divided: Open-Mindedness and Dogmatism in a Polarized World. Oxford University Press. –P 18

Consequently, adolescents become more likely to interpret complex social realities through dichotomous categories such as ‘right versus wrong’ or ‘good versus evil,’ rather than through balanced evaluation and compromise.

Second, emotional deprivation represents another important family-related risk factor. Adolescent girls who experience insufficient parental affection, emotional validation, and psychological security often develop feelings of emotional emptiness and social isolation. From a psychological perspective, this unmet need for attachment and belonging may increase susceptibility to highly cohesive ideological or religious groups that promise certainty, unconditional acceptance, and a sense of absolute truth. Such groups may therefore satisfy emotional needs that remain unmet within the family environment, thereby increasing vulnerability to fanatical forms of group identification.

Third, sociocultural expectations regarding gender may further reinforce conformity. In many traditional Eastern societies, girls are generally expected to demonstrate greater obedience, modesty, and adherence to collective norms than boys. While these expectations contribute to social cohesion, they may also increase adolescents' tendency toward conformity, making them more responsive to peer influence and group norms. Under particular social conditions, heightened conformity may reduce independent judgment and facilitate stronger identification with highly cohesive ideological groups.

Academic frustration and psychological compensation constitute additional mechanisms that may contribute to the development of fanatical attitudes. Adolescent girls who experience persistent academic difficulties or are negatively labeled by teachers often demonstrate diminished self-esteem and weakened perceptions of personal competence. According to Alfred Adler’s theory of compensation, individuals frequently attempt to overcome feelings of inferiority by seeking success and recognition in alternative domains. Likewise, Arie Kruglanski's Need for Significance Theory suggests that individuals who

perceive themselves as socially devalued become increasingly motivated to restore their personal significance. Consequently, adolescents who fail to achieve recognition within the educational environment may seek validation through ideological, religious, or subcultural groups, where unwavering commitment to group values is rewarded with identity, purpose, and social recognition.

Pedagogical rigidity and the absence of empathy within the school environment may further intensify this process. When educational institutions rely predominantly on formal discipline while failing to address adolescents' developmental and emotional needs, students may become psychologically detached from school. As schools lose their function as meaningful sources of identity, belonging, and value formation, this vacuum may be filled by alternative social networks operating beyond educational supervision, some of which may promote rigid ideological beliefs and contribute to the radicalization process.

According to Henri Tajfel and John Turner’s Social Identity Theory, adolescents construct their personal identity largely through membership in valued social groups. During adolescence, conformity to peer-group norms is particularly pronounced, as acceptance by significant others becomes central to psychological well-being and self-definition. When a reference group is organized around a specific ideology, style of dress, religious orientation, or shared interest, adolescent girls may internalize these collective values to an extreme degree in order to avoid social exclusion or ostracism. Consequently, loyalty to the in-group may evolve into rigid ideological commitment, while individuals or groups perceived as belonging to the out-group are increasingly viewed as outsiders, competitors, or even threats. Such polarization creates favorable psychological conditions for the emergence of fanatical attitudes and intergroup hostility.

CONCLUSION

In conclusion, the educational process constitutes one of the most important protective mechanisms for fostering ideological resilience and preventing radicalization among adolescent girls. Within the context of the contemporary information society, mitigating the psychological and social risks associated with rapid technological change requires an educational system that extends beyond the transmission of knowledge to promote critical thinking, moral development, personal autonomy, and psychological resilience. Such an approach enables young people to evaluate competing ideological narratives independently rather than accepting them uncritically. Addressing the distinctive psychological and developmental needs of adolescent girls through coordinated educational, familial, and community-based interventions can significantly strengthen their resistance to extremist and fanatical influences. Integrating these preventive strategies into educational policy and practice not only enhances individual well-being but also contributes to long-term social cohesion and stability. Ultimately, cultivating intellectually independent, emotionally resilient, and socially responsible young people represents one of the most effective approaches to reducing vulnerability to radicalization and safeguarding society against the destructive consequences of fanaticism and ideological extremism.

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РАҚАМЛИ ТРАНСФОРМАЦИЯ ВА ГЕНДЕР АСИММЕТРИЯ

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22.00.02 — “Ижтимоий тузилиш, ижтимоий институтлар ва турмуш тарзи”

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Аннотация. *Мазкур тезисда меҳнат бозорида гендер тенгсизлиги, рақамли иқтисодиётда хотин-қизлар иштироки ва STEM соҳаларидаги гендер асимметрия масалаларига оид расмий статистик маълумотлар таҳлил қилинди. Шунингдек, халқаро амалиётда қўлланилаётган гендер сезгир сиёсатлар ва рақамли инклюзия моделлари қиёсий таҳлил қилинди.*

Калит сўзлар: *рақамли технологиялар, иқтисодий ривожланиш, меҳнат бозори, стартап, инновацион лойиҳа, гендер асимметрия.*

Аннотация. *В диссертации анализируются официальные статистические данные о гендерном неравенстве на рынке труда, участии женщин в цифровой экономике и гендерной асимметрии в STEM-областях. Также проводится сравнительный анализ гендерно-чувствительной политики и моделей цифровой инклюзии, используемых в международной практике.*

Ключевые слова: *цифровые технологии, экономическое развитие, рынок труда, стартап, инновационный проект, гендерная асимметрия.*

Abstract. *The dissertation analyzes official statistical data on gender inequality in the labor market, women's participation in the digital economy, and gender asymmetry in STEM fields. It also conducts a comparative analysis of gender-sensitive policies and models of digital inclusion used in international practice.*

Keywords: *digital technologies, economic development, labor market, startup, innovative project, gender asymmetry.*

КИРИШ

XXI асрда рақамли технологиялар иқтисодий ривожланишнинг асосий драйверига айланди. Шунингдек, рақамли трансформация иш

жараёнларини, касбий тузилмани ва меҳнат бозори муносабатларини тубдан ўзгартирмоқда. Бу жараёнда гендер масаласи — яъни эркаклар ва хотин-қизлар учун тенг имкониятларни таъминлаш меҳнат бозоридаги ижтимоий тенгликнинг марказий йўналишларидан бирига айланмоқда.

Социологик нуқтаи назардан қаралганда, рақамли иқтисодиёт фақат иқтисодий ўсиш эмас, балки ижтимоий имкониятларнинг қайта тақсимланиш жараёни ҳамдир. Агар рақамли технологиялар имкониятлар яратса, улардан фойдаланиш имкони бўлмаган гуруҳлар айниқса, хотин-қизлар янги иқтисодий имкониятлардан четда қолиш хавфига дуч келади.

Дарҳақиқат, 2023 йилда БМТ Тараққиёт дастури (UNDP) томонидан ўтказилган “Gender Digital Divide Assessment” тадқиқоти натижалари Ўзбекистонда рақамли тенглик масаласининг долзарблигини яққол намоён этди[57]. Тадқиқотга кўра, хотин-қизлар ва эркаклар ўртасида рақамли кўникмалар бўйича тахминий 24 фоизлик фарқ мавжуд. Бу эса рақамли трансформация жараёнларида гендер асимметрия ҳануз сезиларли даражада эканлигини англатади.

Бундай тафовут мамлакатда рақамли иқтисодиётни ривожлантириш, инновацион фаолликни ошириш ва меҳнат бозорида тенг имкониятларни таъминлашга тўсқинлик қилиши мумкин. Айниқса, STEM ва IT соҳаларида аёллар улушининг пастлиги рақамли скилллар етишмаслиги билан узвий боғлиқ. Шу боис, рақамли кўникмалардаги гендер тафовутни камайтириш — Ўзбекистонда инклюзив иқтисодий ўсиш ва рақамли иқтисодиётни барқарор ривожлантириш учун муҳим шарт ҳисобланади.

Ушбу тезисда социологик таҳлил ва қиёсий ёндашув усуллари қўлланилди. Маълумотлар базаси сифатида Халқаро меҳнат ташкилоти (ILO), Жаҳон банки (World Bank) ҳамда Ўзбекистон Республикаси

[57] United Nations Development Programme. (2023). *Digital transformation and gender equality in Central Asia*. New York: UNDP. https://www.undp.org/uzbekistan/publications/gender-digital-divide-assessment-uzbekistan?utm_source=chatgpt.com

Статистика агентлиги ҳисоботлари асос бўлди. Тадқиқот жараёнида меҳнат бозорида гендер тенгсизлиги, рақамли иқтисодиётда хотин-қизлар иштироки ва STEM соҳаларидаги гендер асимметрия масалаларига оид расмий статистик маълумотлар таҳлил қилинди. Шунингдек, халқаро амалиётда қўлланилаётган гендер сезгир сиёсатлар ва рақамли инклюзия моделлари қиёсий таҳлил қилинди.

Таҳлил ва танижалар. Меҳнат бозоридаги тенглик масалалари бўйича сўнгги маълумотларда қайд этилишича, Ўзбекистонда хотин-қизларнинг меҳнат бозорида иштирок даражаси 2024 йил ҳолатига кўра 47%, эркакларники 69% ни ташкил этади.[58] Бу кўрсаткичлар жинсий тенглик нуқтаи назаридан меҳнат бозорида сезиларли гендер тафовут мавжудлигини кўрсатади. Хотин-қизларнинг иқтисодий фаоллиги даражаси эркакларникидан тахминан 22 фоизга паст экани мамлакатдаги иқтисодий ресурслардан фойдаланишда тенг имкониятларнинг чекланганлигини ифодалайди.

Социологик нуқтаи назардан, мазкур фарқ меҳнат бозоридаги институционал, маданий ва ижтимоий меъёрлар таъсири билан изоҳланиши мумкин. Жумладан, гендер ролларининг анъанавий тақсимоти, уй меҳнати ва бола парваришининг асосан хотин-қизлар зиммасига юкланиши, шунингдек, касбий сегрегациянинг сақланиб қолиши хотин-қизларнинг тўлиқ иқтисодий иштирокини чеклайди.

Иқтисодий ривожланишнинг рақамли босқичга ўтиш даврида мазкур тенгсизликни бартараф этиш нафақат ижтимоий адолат нуқтаи назаридан, балки мамлакатнинг умумий инновацион салоҳияти ва рақобатбардошлигини ошириш учун ҳам муҳим ҳисобланади. Хотин-қизларнинг рақамли иқтисодиётда фаол иштирок этиши меҳнат ресурсларидан самарали фойдаланишни таъминлаб, янги стартаплар, IT

[58] The World Bank. (2024). *Uzbekistan Gender Assessment Report 2024*. Washington, DC: The World Bank. https://www.worldbank.org/en/country/uzbekistan/publication/country-gender-assessment-2024

соҳаси ва хизматлар бозорида гендер мувозанатини шакллантиришга хизмат қилади.

Яна бир статистик маълумотда STEM ва IT соҳаларида хотин-қизлар улуши тахминан 28% атрофида[59]. (2) Бу кўрсаткич Иқтисодий ҳамкорлик ва тараққиёт ташкилоти (OECD) мамлакатлари ўртачасидан 15-20 фоиз паст дегани ва гендер мувозанатининг етарлича таъминланмаганидан далолат беради. Қолаверса, мазкур ҳолат таълим тизими ва меҳнат бозори ўртасидаги узвий боғлиқликни, шунингдек, жинсий ролларга оид ижтимоий стереотипларнинг кучли таъсирини кўрсатади. Хотин-қизларнинг техник ва инновацион соҳалардаги иштирокининг камлигини, аввало, болалик ва ёшлик давриданоқ гендерга асосланган касбий йўналтириш амалиёти, таълимдаги “анъанавий” рол моделлари ҳамда ижтимоий кутилмалар билан изоҳлаш мумкин.

Бу тенденция меҳнат бозоридаги рақамли трансформация жараёнларига ҳам таъсир кўрсатади, чунки STEM ва IT соҳаларидаги гендер тафовут рақамли иқтисодиётнинг инклюзив ривожланишини чеклаб қўяди. Хотин-қизларни ушбу соҳаларга кенг жалб этиш эса фақат иқтисодий ўсиш эмас, балки инновация, ижодкорлик ва инсон капитали салоҳиятининг ўсишига ҳам хизмат қилади. Шу боис, таълим дастурларида қизларни STEM соҳаларига йўналтирувчи мотивацион механизмлар, менторлик тизимлари ва гендер сезгир сиёсатларни кучайтириш муҳим аҳамият касб этади.

Шунингдек, Халқаро меҳнат ташкилоти (ILO)нинг “Gender Pay Gap Uzbekistan, 2023” ҳисоботи маълумотларига кўра, рақамли касбларда ҳам эркаклар иш ҳақи хотин-қизларникидан ўртача 20-25 фоизга юқори[60]. Бу

[59] Organisation for Economic Co-operation and Development. (2023). *Bridging the digital gender divide: Include, upskill, innovate*. Paris: OECD Publishing. https://eulacfoundation.org/system/files/digital_library/2023-07/bridging-the-digital-gender-divide.pdf

[60] International Labour Organization. (2023). *Gender pay gap: Uzbekistan country brief*. Geneva: ILO. https://www.ilo.org/publications/gender-pay-gap-uzbekistan-recent-trends-and-policy-implications

ҳолат меҳнат бозоридаги гендер тенгсизлигининг янги технологик соҳаларда ҳам сақланиб қолаётганини кўрсатади. Ушбу тафовут институционал ва маданий омиллар йиғиндиси билан изоҳланади. Биринчидан, хотин-қизлар кўпинча кам маош тўланадиган ёки қисман иш вақтини талаб қилувчи вазифаларга йўналтирилади; иккинчидан, иш ҳақини белгилашда “эркаклар асосий боқувчи” деган анъанавий стереотиплар ҳам таъсир кўрсатади. Шунингдек, раҳбарлик лавозимларида хотин-қизлар улушининг пастлиги ҳам умумий маош даражасига таъсир этувчи муҳим омил ҳисобланади.

Бундан ташқари, рақамли иқтисодиётда маошдаги гендер тафовут мавжудлиги иқтисодий самарадорлик ва инновацион ривожланиш учун йўқотиш ҳисобланади. Хотин-қизлар меҳнатининг адолатли баҳоланиши ва иш ҳақини белгилашда гендер тенглик тамойилларини татбиқ этиш рақамли соҳада инклюзивликни таъминлаш, инсон капитали салоҳиятини тўлиқ рўёбга чиқариш учун зарур шартдир.

Сўнгги йилларда фриланс ва масофадан ишлаш соҳаларининг кенгайиши меҳнат бозорида хотин-қизлар учун янги имкониятлар яратмоқда. Бу тенденция, айниқса, иш жойига боғлиқликни камайтириши ва уй шароитида ишлаш имконини бериши сабабли, анъанавий чекловларга дуч келаётган хотин-қизлар учун иқтисодий фаолликнинг янги форматини таклиф этмоқда.

Бироқ, социологик таҳлил шуни кўрсатадики, рақамли иқтисодиётнинг инклюзив ривожланиши учун зарур бўлган интернет инфратузилмаси, рақамли кўникмалар ва таълим ресурсларидан тенг фойдаланиш имкониятлари борасида ҳануз гендер асимметрия мавжуд. Хотин-қизларнинг катта қисми рақамли саводхонлик даражасининг пастлиги, техник ускуналардан фойдаланишнинг чекланганлиги ва рақамли таълим платформаларида фаол иштирок этмаслиги сабабли рақамли меҳнат бозорида тўлиқ иштирок эта олмаяпти. Бу ҳолат рақамли

жамиятдаги “янги турдаги гендер рақамли бўлиниш”ни шакллантирмоқда. Шунинг учун давлат ва нодавлат тузилмалар даражасида рақамли таълим дастурларини гендер тенгликни қўллаб-қувватловчи йўналишда йўлга қўйиш, хотин-қизлар учун STEM ва IT йўналишларида онлайн ўқув платформаларидан кенгроқ фойдаланиш имкониятларини яратиш муҳим ижтимоий ва иқтисодий аҳамиятга эга.

Халқаро Меҳнат Ташкилоти (ILO) “Decent Work for Women in Digital Economy” дастури доирасида рақамли секторда хотин-қизларнинг иштирокини кенгайтириш учун флексибил иш жадваллари, масофавий иш шароити ва тенг маош тамойилларини илгари сурмоқда. Шунингдек, рақамли платформаларда (Uber, Upwork, Fiverr ва ҳ.к.) гендер тенглиги стандартларини жорий этишни тавсия қилади[61].

Жаҳон банки ва Бирлашган Миллатлар ташкилоти тараққиёт дастури (UNDP) тавсияларига кўра[62], рақамли кўникмалар бўйича таълимни хотин-қизлар учун махсус квоталар асосида ташкил этиш (Digital Skills for Women Initiatives), IT ва стартап экотизимида хотин-қизлар етакчилигини рағбатлантирувчи грантлар, акселератор дастурларини кенгайтириш ҳамда рақамли инфраструктура (интернет, қурилмалар, дастурий таъминот) имкониятларига эга бўлишда ҳудудий тенгликни таъминлашни илгари сурмоқда.

IT Park Uzbekistan амалиётига назар соладиган бўлсак, “Women in Tech” дастури доирасида хотин-қизлар учун IT курслари, менторлик ва стартап грантлари ташкил этилмоқда. 2024 йилда мазкур дастур орқали 500 дан зиёд қизлар рақамли касблар бўйича малака сертификатларини олган[63].

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[61] International Labour Organization. *Gender Pay Gap in Uzbekistan: Trends and Implications*, 2023. https://www.ilo.org/sites/default/files/2025-03/Gender%20Pay%20Gap%20in%20Uz-ENG-2802.pdf

[62] UNDP. *Digital Inclusion and Gender Equality in Central Asia*, 2024. https://www.undp.org/eurasia/publications/gender-equality-strategy-Eurasia-2024-2025

[63] IT Park Uzbekistan веб ресурси: *Pitch & Rise: Women on the startup stage*. https://it-park.uz/en/itpark/news/pitch-rise-women-on-the-startup-stage-investing-in-the-economy-of-the-future?utm_source=chatgpt.com

Бу амалиётлар рақамли иқтисодиётда хотин-қизларнинг фаол иштирокини таъминлаш учун институционал асос яратаётганини кўрсатади.

Юқоридагилардан келиб чиқиб, рақамли меҳнат бозоридаги тенгсизликларни социологик нуқтаи назардан қуйидаги ҳолатларда кўриш мумкин:

ижтимоий-маданий тўсиқлар – анъанавий гендер роллари хотин-қизларни STEM ва рақамли касбларга йўналишидан тўсади;

таълим ва рақамли саводхонлик – қизлар IT йўналишларини танлашда камроқ фаол, чунки уларга мос мотивацион муҳит ва мураббийлик тизими етишмайди;

иш жойидаги стереотиплар – хотин-қизлар техник мутахассис сифатида камроқ ишга қабул қилинади ёки лавозим ўсишида чекловларга дуч келади;

меҳнат бозори сегрегацияси – рақамли иқтисодиётда “soft skills” соҳалари (дизайн, SMM, HR) хотин-қизлар билан боғланса, “hard skills” (дастурлаш, сунъий интеллект, киберхавфсизлик) соҳалари эркаклар устунлигида қолмоқда.

Бу ҳолат шуни кўрсатадики, рақамли соҳадаги тенгликни таъминлаш нафақат технологик, балки ижтимоий-сиёсий устувор вазифага ҳам айланиши лозим. Шунинг учун таълим, қайта тайёрлаш ва рақамли саводхонлик дастурларини гендер сезгир (яъни, хотин-қизлар ва эркаклар эҳтиёжларини инобатга олган) йўналишда амалга ошириш муҳим аҳамият касб этади.

ХУЛОСА ВА ТАКЛИФЛАР

Рақамли технологиялар меҳнат бозорида гендер тенглигини кучайтириши мумкин, аммо бу жараённи фақат иқтисодий эмас, ижтимоий ислоҳотлар билан уйғунлаштириш зарур. Гендер тенглиги фақат ҳуқуқий ёки сиёсий эмас, балки институционал ва маданий ўзгаришларни талаб этади. Зеро, хотин-қизларнинг рақамли иқтисодиётдаги иштироки

ижтимоий капиталнинг ўсиши, инновация ва рақобатбардошликни ошириш омилидир. Шу боис, хотин-қизларнинг рақамли иқтисодиётдаги иштирокини кучайтириш бўйича қуйидаги таклифлар илгари сурилади:

Давлат сиёсати даражасида:

- “Digital Gender Equality Roadmap” қабул қилиш (ILO ва UNDP тавсияларига асосан)[64];

- рақамли касблар бўйича қизлар учун грант ва квота тизимини кенгайтириш;

- рақамли саводхонлик бўйича миллий кампаниялар ташкил этиш.

Таълим тизимида:

- мактаб ва олий таълим муассасаларида STEM ва IT фанларини қизлар учун мотивацион йўналишда ифода этиш;

- “mentorship” ва “role model” дастурлари орқали қизларни илғор аёл мутахассислар билан боғлаш.

Хусусий сектор ва IT паркларда:

- ишга қабул қилиш жараёнларида баҳолаш ёки танлов жараёнларида жинс омиллари таъсирини ҳисобга олмайдиган, ҳар икки жинс учун тенг қўлланиладиган мезонлар тизимини жорий этиш;

- хотин-қизлар учун менторлик, масофавий иш ва флексибил иш шароитларини яратиш;

- IT стартапларда гендер баланси кўрсаткичларини (ахборот технологиялари соҳасидаги янги ташкил этилган компаниялар (стартаплар)да хотин-қизлар ва эркаклар иштирокининг нисбатини кўрсатувчи статистик ва сифат мезон) жорий этиш.

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КОРРУПЦИЯ – ЖАМИЯТ ТАРАҚҚИЁТИГА ТЎСИҚ БЎЛУВЧИ ИЖТИМОИЙ ИЛЛАТ: КОРРУПЦИЯГА ҚАРШИ КУРАШИШНИНГ ҲУҚУҚИЙ ВА МАЪНАВИЙ АСОСЛАРИ

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Аннотация: *Мазкур мақолада коррупциянинг жамият тараққиётига салбий таъсири, унинг ҳуқуқий, ижтимоий ва маънавий жиҳатлари илмий таҳлил қилинган. Шунингдек, коррупциянинг келиб чиқиш омиллари, унинг давлат бошқаруви, иқтисодиёт ва ёшлар тарбиясига таъсири ёритилган. Ёшлар ўртасида ўтказилган ижтимоий сўров натижалари асосида коррупцияга муносабат ҳамда унинг олдини олиш бўйича таклифлар ишлаб чиқилган. Тадқиқот натижалари коррупцияга қарши курашишда ҳуқуқий механизмлар билан бир қаторда маънавий тарбия, миллий қадриятлар ва жамоатчилик назоратини кучайтириш муҳим аҳамиятга эга эканлигини кўрсатади.*

Аннотация:*В данной статье проведён научный анализ негативного влияния коррупции на развитие общества, рассмотрены её правовые, социальные и нравственные аспекты. Исследованы причины возникновения коррупции, её влияние на государственное управление, экономику и воспитание молодёжи. На основе результатов социологического опроса среди молодёжи разработаны предложения по предупреждению коррупции. Полученные результаты свидетельствуют о том, что эффективная борьба с коррупцией требует не только совершенствования правовых механизмов, но и укрепления духовно-нравственного воспитания, национальных ценностей и общественного контроля.*

Abstract: *This article provides a scientific analysis of the negative impact of corruption on social development and examines its legal, social, and moral dimensions. The study explores the causes of corruption and its influence on public administration, the economy, and youth education. Based on the results of a sociological survey conducted among*

young people, recommendations for preventing corruption are proposed. The findings indicate that an effective anti-corruption policy requires not only strong legal mechanisms but also moral education, national values, and active public oversight.

Калит сўзлар: *Коррупция, пора, ҳалоллик, ҳуқуқий онг, ҳуқуқий маданият, жамоатчилик назорати, шаффофлик, ёшлар, маънавий тарбия, давлат бошқаруви.*

Ключевые слова*: Коррупция, взяточничество, честность, правовое сознание, правовая культура, общественный контроль, прозрачность, молодёжь, духовно-нравственное воспитание, государственное управление.*

Keywords *: Corruption, bribery, integrity, legal awareness, legal culture, public oversight, transparency, youth, moral education, public administration.*

КИРИШ

Коррупция инсоният тараққиёти давомида жамият ривожланишига жиддий тўсиқ бўлиб келган энг хавфли ижтимоий иллатлардан бири ҳисобланади. У давлат бошқарувининг самарадорлигини пасайтиради, иқтисодий ўсишни секинлаштиради, қонун устуворлигига путур етказади ҳамда аҳолининг давлат институтларига бўлган ишончини сусайтиради. Шу боис коррупцияга қарши курашиш нафақат ҳуқуқий, балки ижтимоий, иқтисодий ва маънавий аҳамиятга эга бўлган долзарб вазифадир. Халқимиз азалдан ҳалоллик, инсоф ва адолатни энг олий қадрият сифатида эъзозлаб келган. «Пора ортидан қувсанг, бўлур юзинг қора», «Ҳалол меҳнат – барака манбаи» каби халқ мақоллари ҳам коррупциянинг миллий қадриятларимизга мутлақо зид эканлигини кўрсатади. Бугунги кунда коррупция нафақат иқтисодий зарар келтирувчи ҳуқуқбузарлик, балки мамлакат тараққиётини секинлаштирувчи, ижтимоий адолатни издан чиқарувчи ва фуқароларнинг келажакка бўлган ишончини заифлаштирувчи омил сифатида баҳоланмоқда.

Жаҳон тажрибаси шуни кўрсатадики, тараққий этган давлатлар коррупцияга қарши курашишнинг самарали ҳуқуқий механизмларини яратиш, давлат бошқарувида очиқлик ва шаффофликни таъминлаш, рақамли технологияларни кенг жорий этиш ҳамда аҳолининг ҳуқуқий

маданиятини юксалтириш орқали сезиларли натижаларга эришган. Бироқ коррупцияга қарши курашиш фақат жазони кучайтириш билан чекланмайди. Бу жараён, аввало, жамиятда ҳалоллик, масъулият, ватанпарварлик ва қонунга ҳурмат каби қадриятларни шакллантиришни талаб этади.

Ўзбекистонда ҳам коррупцияга қарши курашиш давлат сиёсатининг устувор йўналишларидан бири сифатида белгиланган. Кейинги йилларда бу соҳада ҳуқуқий базани такомиллаштириш, давлат хизматлари тизимини рақамлаштириш, жамоатчилик назоратини кучайтириш ва давлат органлари фаолиятининг очиқлигини таъминлаш бўйича кенг кўламли ислоҳотлар амалга оширилмоқда. Бироқ мазкур иллатга қарши курашишда ҳар бир фуқаронинг ҳуқуқий онги, маънавий тарбияси ва фуқаролик масъулияти ҳал қилувчи аҳамият касб этади.

Мазкур тадқиқотнинг мақсади коррупциянинг жамият тараққиётига таъсирини ижтимоий-фалсафий ва ҳуқуқий жиҳатдан таҳлил қилиш, ёшларнинг коррупцияга муносабатини ўрганиш ҳамда унинг олдини олишга қаратилган самарали таклиф ва тавсияларни ишлаб чиқишдан иборат.

АДАБИЁТЛАР ТАҲЛИЛИ ВА МЕТОДОЛОГИЯ

Мазкур тадқиқотда коррупциянинг жамият тараққиётига таъсири, унинг келиб чиқиш омиллари ҳамда мазкур ижтимоий иллатга қарши курашишнинг ҳуқуқий ва маънавий асослари комплекс ёндашув асосида ўрганилди. Тадқиқот жараёнида назарий ва амалий материаллар ўзаро уйғунлаштирилиб, илмий хулосалар чиқаришда замонавий тадқиқот усулларидан фойдаланилди.

Тадқиқотнинг назарий-методологик асосини коррупцияга қарши курашиш соҳасида қабул қилинган миллий қонунчилик ҳужжатлари, халқаро ҳуқуқий нормалар, илмий монографиялар, мақолалар, соҳага оид

статистик маълумотлар ҳамда маҳаллий ва хорижий олимларнинг илмий қарашлари ташкил этди.

Тадқиқот давомида қуйидаги илмий методлар қўлланилди:

– Таҳлил ва синтез усули – коррупция тушунчасининг мазмун-моҳиятини, унинг ҳуқуқий, иқтисодий, ижтимоий ва маънавий жиҳатларини комплекс таҳлил қилишда қўлланилди.

– Қиёсий таҳлил усули – коррупцияга қарши курашиш бўйича хорижий давлатлар тажрибаси ҳамда Ўзбекистонда амалга оширилаётган ислоҳотларни ўзаро таққослаш орқали уларнинг самарадорлиги баҳоланди.

– Тарихий ёндашув – коррупциянинг жамият тараққиётига таъсири турли даврлар мисолида таҳлил қилиниб, унинг шаклланиш омиллари ёритилди.

– Социологик тадқиқот усули – 17–30 ёшдаги ёшлар ўртасида ўтказилган сўровнома натижалари таҳлил қилиниб, уларнинг коррупцияга муносабати, ушбу иллатнинг сабаблари ва уни бартараф этиш юзасидан фикрлари умумлаштирилди.

Сўровнома натижалари коррупцияга қарши курашишда аҳолининг ҳуқуқий онги, жамоатчилик назорати ва давлат органлари фаолиятининг очиқлиги муҳим аҳамиятга эга эканлигини кўрсатди. Шу билан бирга, ёшларнинг коррупцияга нисбатан муросасиз муносабатини шакллантиришда маънавий тарбия ва миллий қадриятларнинг ўрни алоҳида эканлиги аниқланди.

Тадқиқотнинг ишончлилигини таъминлаш мақсадида назарий маълумотлар амалий кузатишлар ва сўровнома натижалари билан ўзаро солиштирилди. Олинган маълумотлар тизимлаштирилиб, улар асосида коррупциянинг олдини олишга қаратилган илмий асосланган хулоса ва амалий тавсиялар ишлаб чиқилди.

НАТИЖА ВА МУҲОКАМА

Тадқиқот доирасида 17–30 ёшли ёшлар ўртасида коррупцияга муносабат, унинг келиб чиқиш омиллари ҳамда ушбу иллатнинг олдини олиш чоралари юзасидан ижтимоий сўровнома ўтказилди. Сўровнома натижалари ёшларнинг коррупцияга муносабати, давлат органларига бўлган ишончи ҳамда коррупцияга қарши курашиш бўйича таклифларини аниқлаш имконини берди.

Сўров иштирокчиларига «Коррупцияни камайтириш учун биринчи навбатда нима қилиш керак?» деган савол берилганда, иштирокчиларнинг 18 фоизи давлат хизматчилари ва бошқа соҳа вакилларининг меҳнатига муносиб ҳақ тўлаш коррупциянинг камайишига хизмат қилади, деб ҳисоблаган. Бу эса иқтисодий омиллар коррупциянинг юзага келишига маълум даражада таъсир қилишини кўрсатади.

Респондентларнинг 14 фоизи коррупцияга қарши курашишда давлат бошқаруви тизимини такомиллаштириш ҳамда ҳуқуқбузарликлар учун жазони кучайтириш зарурлигини таъкидлаган. Уларнинг фикрича, жазонинг муқаррарлиги ва қонун устуворлигининг таъминланиши коррупция ҳолатларини камайтиришга хизмат қилади.

Сўров қатнашчиларининг 12 фоизи давлат бюджети маблағларининг сарфланишида очиқлик ва шаффофликни таъминлаш коррупциянинг олдини олишда энг муҳим омиллардан бири эканлигини билдирган. Бу натижа давлат молиявий бошқарувида жамоатчилик назоратини кучайтириш зарурлигини кўрсатади.

«Коррупция ҳолатига гувоҳ бўлсангиз, қаерга мурожаат қиласиз?» деган саволга иштирокчиларнинг 28 фоизи Коррупцияга қарши курашиш агентлигига мурожаат қилишини билдирган. 18 фоизи прокуратура ва ички ишлар органларига хабар беришини айтган бўлса, 12 фоизи блогерлар ёки жамоатчилик вакиллари орқали муаммони ёритишни маъқул кўрган. Шу билан бирга, 11 фоиз иштирокчи ҳеч қаерга мурожаат қилмаслигини билдирган. Бу ҳолат айрим фуқароларда давлат органларига мурожаат

қилиш бўйича ишонч ёки ҳуқуқий фаоллик ҳали етарли даражада шаклланмаганлигини кўрсатади.

«Охирги икки йил давомида қайси соҳада коррупция ҳолатларига дуч келгансиз?» деган саволга берилган жавоблар таҳлили коррупция хавфи юқори бўлган соҳаларни аниқлаш имконини берди. Жумладан, иштирокчиларнинг 21 фоизи таълим соҳасини, 14 фоизи соғлиқни сақлаш тизимини, 12 фоизи бандлик соҳасини, 10 фоизи эса прокуратура ва ички ишлар органларини кўрсатган. Шу билан бирга, 18 фоиз иштирокчи сўнгги икки йил ичида коррупция ҳолатларига дуч келмаганини таъкидлаган.

Сўровномада коррупция учун ким кўпроқ айбдор, деган савол ҳам ўртага ташланди. Ушбу саволга респондентларнинг 70 фоизи ҳам пора берувчи, ҳам пора олувчи бирдек жавобгар эканлигини таъкидлади. Бу эса ёшлар коррупцияни икки томонлама ҳуқуқбузарлик сифатида баҳолаётганини ва мазкур иллатга нисбатан муросасиз муносабат шаклланаётганини кўрсатади.

Олинган натижалар коррупцияга қарши курашишда ҳуқуқий чоралар билан бир қаторда жамиятда ҳалоллик муҳитини шакллантириш, давлат хизматлари шаффофлигини ошириш, рақамли технологияларни кенг жорий этиш, аҳолининг ҳуқуқий маданиятини юксалтириш ҳамда ёшларда коррупцияга қарши мафкуравий иммунитетни ривожлантириш муҳим аҳамиятга эга эканлигини кўрсатди.

Умуман олганда, тадқиқот натижалари коррупцияга қарши самарали курашиш фақат жазо чораларини кучайтириш билан эмас, балки профилактик чора-тадбирлар, маънавий тарбия, очиқ давлат бошқаруви ва жамоатчилик иштирокини кучайтириш орқали юқори самара беришини тасдиқлади.

Тадқиқот натижалари шуни кўрсатдики, коррупцияга қарши курашишда ҳуқуқий чора-тадбирларни кучайтириш муҳим аҳамиятга эга бўлса-да, мазкур иллатни фақат жазо чоралари орқали бартараф этиш

мумкин эмас. Коррупциянинг илдизи кўп ҳолларда шахсий манфаатни жамоат манфаатидан устун қўйиш, ҳуқуқий маданиятнинг етарли даражада шаклланмаганлиги, ахлоқий қадриятларнинг сусайиши ҳамда жамиятда муросасиз муносабатнинг тўлиқ қарор топмаганлиги билан боғлиқ.

Жаҳон тажрибаси шуни кўрсатадики, иқтисодий жиҳатдан ривожланган давлатлар коррупцияга қарши курашишда нафақат қаттиқ жазо чораларини қўллаган, балки давлат бошқарувида очиқлик ва шаффофликни таъминлаш, давлат хизматларини рақамлаштириш, манфаатлар тўқнашувининг олдини олиш ва жамоатчилик назоратини кучайтириш орқали юқори самарага эришган. Бу эса коррупцияга қарши курашишда профилактик ёндашув репрессив чораларга нисбатан самаралироқ эканлигини англатади.

Айрим давлатларда, жумладан, Хитой Халқ Республикасида коррупциявий жиноятлар учун ўта оғир жазолар, ҳатто ўлим жазоси ҳам назарда тутилган. Бироқ халқаро тажриба шуни кўрсатадики, жазонинг оғирлиги эмас, балки унинг муқаррарлиги, қонун устуворлиги ва давлат институтларининг шаффоф фаолияти коррупциянинг камайишида ҳал қилувчи аҳамият касб этади. Шу боис коррупцияга қарши сиёсат жазолаш билан чекланмасдан, уни келтириб чиқарувчи омилларни бартараф этишга қаратилган бўлиши лозим.

Тадқиқот давомида маънавий омилларнинг аҳамияти ҳам алоҳида намоён бўлди. Халқимиз азалдан ҳалоллик, инсоф ва адолатни энг юксак фазилат сифатида қадрлаб келган. Шу нуқтаи назардан, Саййид Бурҳониддин Термизийнинг: «Мақтовдан ҳам кўра каттароқ пора борми? Мақтов бу поранинг каттасидир», деган ҳикмати чуқур фалсафий мазмунга эга. Асоссиз мақтов, кўзбўямачилик ва манфаатдорликка асосланган муносабатлар ҳам коррупция муҳитини шакллантирувчи омиллардан бири ҳисобланади. Демак, коррупцияга қарши курашиш фақат моддий манфаат

билан боғлиқ ҳолатларни эмас, балки маънавий бузилишларни ҳам қамраб олиши лозим.

Сўровнома натижалари ёшларнинг аксарияти пора берувчи ва пора олувчини бирдек айбдор деб ҳисоблашини кўрсатди. Бу ҳолат ёшларда ҳуқуқий тафаккур шаклланаётганидан далолат беради. Бироқ айрим иштирокчиларнинг коррупция ҳолатлари ҳақида ҳеч қаерга мурожаат қилмаслигини билдириши ҳуқуқий фаолликни янада кучайтириш зарурлигини кўрсатади.

Муаллифнинг фикрича, коррупцияга қарши курашишнинг энг самарали йўли – ҳуқуқий ислоҳотлар, маънавий тарбия ва замонавий бошқарув технологияларини ўзаро уйғунлаштиришдан иборат. Хусусан, ёш авлодда ҳалоллик, виждон, масъулият, ватанпарварлик ва қонунга ҳурмат каби фазилатларни шакллантириш, таълим тизимида коррупцияга қарши маданиятни кучайтириш, давлат хизматларини тўлиқ рақамлаштириш ҳамда жамоатчилик назоратини ривожлантириш коррупциянинг олдини олишда муҳим омил бўлиб хизмат қилади.

Шундай қилиб, коррупцияга қарши курашишда давлат, фуқаролик жамияти институтлари, таълим муассасалари, оммавий ахборот воситалари ва ҳар бир фуқаронинг ўзаро ҳамкорлиги ҳал қилувчи аҳамиятга эга. Фақатгина умумий масъулият ва муросасиз муносабат орқали жамиятда ҳалоллик муҳитини қарор топтириш ҳамда барқарор тараққиётга эришиш мумкин.

ХУЛОСА

Олиб борилган тадқиқот натижалари коррупциянинг нафақат ҳуқуқий, балки иқтисодий, ижтимоий ва маънавий тараққиётга ҳам салбий таъсир кўрсатувчи мураккаб ижтимоий иллат эканлигини яна бир бор тасдиқлади. Коррупция давлат бошқарувининг самарадорлигини пасайтиради, инвестиция муҳитини ёмонлаштиради, ижтимоий тенгсизликни кучайтиради ҳамда аҳолининг давлат институтларига бўлган

ишончини сусайтиради. Шунинг учун ҳам мазкур муаммога қарши курашиш ҳар қандай давлат тараққиётининг муҳим шартларидан бири ҳисобланади.

Тадқиқот жараёнида ўтказилган социологик сўров натижалари ёшларнинг коррупцияга нисбатан муросасиз муносабати шаклланаётганини кўрсатди. Бироқ айрим ҳолларда ҳуқуқий фаолликнинг пастлиги, коррупция ҳолатлари ҳақида ваколатли органларга мурожаат қилиш маданиятининг етарли даражада шаклланмаганлиги ҳам аниқланди. Бу эса аҳоли, айниқса ёшлар ўртасида ҳуқуқий онг ва ҳуқуқий маданиятни янада юксалтириш зарурлигини кўрсатади.

Таҳлиллар асосида коррупцияга қарши курашишнинг қуйидаги устувор йўналишлари таклиф этилади:

– давлат бошқарувида очиқлик ва шаффофликни янада кучайтириш;

– давлат хизматларини тўлиқ рақамлаштириш ва инсон омилини қисқартириш;

– бюджет маблағлари сарфланиши устидан жамоатчилик назоратини кенгайтириш;

– таълим муассасаларида коррупцияга қарши маданият ва ҳалоллик тамойилларини тизимли равишда шакллантириш;

– ёшларда миллий қадриятлар, виждон, инсоф, адолат ва ватанпарварлик туйғуларини мустаҳкамлаш;

– коррупция ҳақида хабар берувчи шахсларни ҳуқуқий ҳимоя қилиш механизмларини янада такомиллаштириш.

Тадқиқотнинг муҳим хулосаларидан бири шундан иборатки, коррупцияга қарши курашишда жазонинг оғирлигидан кўра, унинг муқаррарлиги, қонун устуворлиги ва жамиятда коррупцияга нисбатан муросасиз муҳитни шакллантириш муҳимроқ аҳамият касб этади. Шу билан бирга, маънавий тарбия, миллий қадриятлар ва фуқаролик

масъулиятини кучайтириш коррупцияга қарши профилактиканинг энг самарали воситаларидан бири ҳисобланади.

Мазкур тадқиқотнинг илмий янгилиги коррупцияга қарши курашиш масаласини ҳуқуқий ёндашув билан чеклаб қолмасдан, уни маънавий-ахлоқий тарбия, миллий қадриятлар ва ёшларнинг ҳуқуқий маданияти билан ўзаро боғлиқ ҳолда таҳлил қилинганлиги билан изоҳланади. Шунингдек, ёшлар ўртасида ўтказилган социологик сўров натижалари асосида коррупцияга қарши курашишнинг устувор йўналишлари аниқланиб, улар бўйича амалий тавсиялар ишлаб чиқилди.

Хулоса қилиб айтганда, коррупцияга қарши курашиш – фақат давлат органларининг эмас, балки бутун жамиятнинг умумий вазифасидир. Жамиятда ҳалоллик, адолат ва қонун устуворлиги қарор топгандагина коррупциянинг илдизларини заифлаштириш ва барқарор тараққиётга эришиш мумкин.

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ТРАНСФОРМАЦИЯ ГЕНДЕРНЫХ РОЛЕЙ И УЯЗВИМОСТЬ ЖЕНЩИН В УСЛОВИЯХ СОЦИАЛЬНО-ЭКОЛОГИЧЕСКОГО КРИЗИСА В ЮЖНОМ ПРИАРАЛЬЕ

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Республика Каракалпакстан

Abstract.*The article analyzes the transformation of gender roles and women's vulnerability amidst the socio-ecological crisis in the Southern Aral Sea region, specifically focusing on the Republic of Karakalpakstan. The author highlights a key paradox in contemporary gender relations: the gap between symbolic equality within the public sphere and the actual reproduction of patriarchal models in private life. Grounded in the theoretical concepts of the "gender contract" and D. Kandiyoti's "patriarchal bargain," the paper explains the persistence of informal rules, financial dependence, and restrictions on women's autonomy. Special attention is paid to the phenomenon of social indifference (observed in 45% of respondents) acting as a mechanism for the routinization and normalization of inequality. The study demonstrates that the environmental crisis serves as an active factor reinforcing patriarchal norms by increasing women's domestic and caregiving burdens. The*

author concludes that formal state declarations must be combined with the creation of genuine opportunities for women's financial and social independence to achieve real change.

Keywords.*Gender equality, Southern Aral Sea region, Republic of Karakalpakstan, socio-ecological crisis, symbolic equality, patriarchal bargain, gender contract, normalization of inequality, indifference, everyday practices.*

Аннотация.*В статье анализируется трансформация гендерных ролей и уязвимость женщин в условиях социально-экологического кризиса в Южном Приаралье (на примере Республики Каракалпакстан). Автор выявляет ключевой парадокс современных гендерных отношений, заключающийся в разрыве между символическим равенством в публичной сфере и фактическим воспроизводством патриархальных моделей в приватной жизни. На основе теоретических концепций «гендерного контракта» и «патриархальной сделки» Д. Кандийоти объясняются причины устойчивости неформальных порядков, финансовой зависимости и ограничения самостоятельности женщин. Особое внимание уделяется феномену социальной индифферентности (45% опрошенных) как механизму рутинизации и нормализации неравенства. Обосновано, что экологический кризис выступает активным фактором консервации патриархальных норм, увеличивая нагрузку на женщин по уходу и ведению быта. В заключении делается вывод о необходимости сочетания государственных деклараций с созданием реальных условий для финансовой и социальной независимости женщин.*

Ключевые слова.*Гендерное равенство, Южное Приаралье, Республика Каракалпакстан, социально-экологический кризис, символическое равенство, патриархальная сделка, гендерный контракт, нормализация неравенства, индифферентность, повседневные практики.*

ВВЕДЕНИЕ

Гендерное равенство, будучи одной из Целей устойчивого развития ООН (SDG 5), остается сложной и многоуровневой задачей, особенно в регионах, переживающих комплексные социально-экологические кризисы. Южное Приаралье, и в частности Республика Каракалпакстан, представляет собой яркий пример такого «кризисного региона», где последствия экологической катастрофы Аральского моря — деградация окружающей среды, ухудшение здоровья населения, экономические

трудности и миграция — накладываются на традиционные социальные структуры. В подобных условиях гендерные отношения часто выступают как индикатор глубины социальной трансформации и устойчивости к кризису, при этом женщины, как правило, несут непропорциональное бремя последствий. Существующие исследования по Центральной Азии указывают на устойчивое влияние патриархальных норм на распределение власти и ресурсов в семье и обществе, даже на фоне формальных успехов в сфере образования и представительства женщин в отдельных публичных сферах. Однако специфика восприятия гендерных ролей и практик в уникальном контексте Каракалпакстана, где экологическая уязвимость усугубляет социально-экономические проблемы, изучена недостаточно. В частности, остается открытым вопрос о том, как массовое сознание сочетает декларативную поддержку гендерного равенства на макроуровне с воспроизводством асимметричных практик на микроуровне повседневности. Представленное исследование выявляет ключевой «парадокс», лежащий в основе современных гендерных отношений в Каракалпакстане. С одной стороны, значительная часть населения «воспринимает» достигнутым гендерное равенство в сфере публичного представительства (заявляя, что женщины занимают высокие должности). С другой стороны, эмпирические данные демонстрируют устойчивость патриархальных моделей в приватной сфере (контроль мужчин над семейными финансами, более высокий уровень безработицы среди женщин, признание существования особых ограничений для женщин). Этот разрыв между «символическим признанием» равенства и «фактическим воспроизводством» неравенства составляет сердцевину научной проблемы данной статьи. Целью данного исследования является анализ противоречий между публичным восприятием и частными практиками гендерных отношений в условиях социально-экологического кризиса на примере Каракалпакстана. В задачи входит: 1) оценка общего

восприятия гендерного равенства и отношения к женщинам в регионе; 2) выявление конкретных практик гендерной асимметрии в семье и экономике; 3) интерпретация выявленного парадокса в контексте взаимодействия традиционных норм, государственной политики и кризисных условий.

ОСНОВНАЯ ЧАСТЬ

Центральным для нашего анализа является различение между формальным, или символическим, равенством и фактическим, или реальным равенством. Символическое равенство формируется через публичный дискурс (законы, государственные программы, риторику СМИ) и может успешно инкорпорироваться в массовое сознание как общепринятая норма, особенно в странах с сильной традицией государственного патернализма в социальной сфере. Однако это восприятие часто существует параллельно с неформальными приватными порядками — устойчивыми, часто неартикулируемыми правилами распределения власти, труда и ресурсов в семье и локальном сообществе, которые продолжают воспроизводить гендерную иерархию. Данные нашего исследования, где респонденты одновременно признают высокое представительство женщин на должностях и мужской контроль над семейным бюджетом, являются классической иллюстрацией этого разрыва.

Для объяснения устойчивости неформальных порядков в меняющемся обществе продуктивна концепция гендерного контракта — негласного, исторически сложившегося соглашения о распределении прав и обязанностей между мужчинами и женщинами. В контексте постсоветской Центральной Азии Дениз Кандийоти ввела понятие «патриархальной сделки», описывающее стратегическую адаптацию женщин к существующей патриархальной системе для получения определенных гарантий и защиты в обмен на подчинение ее

правилам. Распад советского «контракта работающей матери» привел не к либерализации, а часто к ретрадиционализации гендерных ролей и возрождению патриархальных норм как символа стабильности и культурной идентичности в период социально-экономической неопределенности. Эта теоретическая линия поможет интерпретировать, почему женщины и мужчины могут воспроизводить неравные практики (например, соглашаясь с мужским контролем над финансами), не воспринимая это как острую несправедливость, а рассматривая как часть «нормального», хотя и ограничивающего, порядка.

Высокий процент безразличного или индифферентного отношения к вопросу положения женщин (45% в наших данных) требует отдельного теоретического осмысления. Эта индифферентность может быть не просто отсутствием мнения, а активной формой нормализации существующего неравенства. Социальные теоретики указывают, что практики, повторяющиеся изо дня в день, становятся настолько рутинными и «естественными», что перестают проблематизироваться. В гендерном измерении это проявляется как невидимость повседневной дискриминации: неравномерное распределение домашнего труда, ограничение мобильности или финансовой самостоятельности женщин воспринимаются не как результат властных отношений, а как данность, обусловленная «природой» или «традицией». Таким образом, индифферентность выступает мощным механизмом поддержания статус-кво, блокируя коллективное осознание проблемы.

Наконец, специфический контекст социально-экологического кризиса в Приаралье выступает не нейтральным фоном, а активным фактором, обостряющим описанные противоречия. Теории уязвимости и феминистская политическая экология подчеркивают, что кризисы непропорционально воздействуют на женщин, увеличивая их нагрузку по уходу, ограничивая доступ к ресурсам и одновременно усиливая давление

в сторону консервации традиционных гендерных ролей как стратегии выживания семьи и сообщества. В таких условиях разрыв между публичными декларациями (например, о поддержке женского спорта или здоровья) и реальными возможностями (отсутствие условий, высокий уровень заболеваемости) становится особенно болезненным и наглядным.

Объединяя эти подходы, мы предлагаем анализировать ситуацию в Каракалпакстане как результат взаимодействия трех уровней: 1) публичного дискурса о равенстве, унаследованного от советского прошлого и поддерживаемого современной государственной риторикой; 2) неформального патриархального контракта, ревитализированного в период трансформации и кризиса; 3) повседневных практик, в которых этот контракт реализуется и одновременно маскируется через механизмы рутинизации и индифферентности. Эта рамка позволит не просто констатировать выявленный парадокс, но и предложить многофакторное объяснение его причин и устойчивости.

ЗАКЛЮЧЕНИЕ

Проведенное исследование показывает, что современная гендерная ситуация в Каракалпакстане строится на глубоком противоречии. В регионе существует очевидный разрыв между официальным, символическим равенством и реальным положением дел в повседневной жизни. На уровне публичного дискурса — в законах, государственных программах и риторике — идея равноправия полов успешно прижилась и одобряется обществом. Однако в приватной сфере, за рамками официальных деклараций, продолжают действовать устойчивые патриархальные правила. Классической иллюстрацией этого разрыва стали данные опроса: респонденты одновременно признают право женщин на карьерные достижения и одобряют единоличный мужской контроль над семейным бюджетом. Устойчивость этих неформальных порядков объясняется несколькими взаимосвязанными факторами:

Во-первых, возврат к традиционным гендерным ролям после распада советской системы стал для многих семей понятным способом адаптации к экономической нестабильности. В таких условиях женщины часто осознанно соглашаются на подчиненное положение в семье. Это своего рода «патриархальная сделка», при которой женщина принимает ограничения своих прав в обмен на материальную стабильность, защиту и поддержку со стороны мужчины и родственников.

Во-вторых, сохранению статус-кво способствует высокая степень нормализации неравенства. Тот факт, что 45% опрошенных демонстрируют индифферентное отношение к положению женщин, говорит о глубокой рутинизации проблемы. Неравномерное распределение домашнего труда, финансовая зависимость и ограничения мобильности повторяются изо дня в день и начинают восприниматься обществом не как дискриминация, а как «естественный» порядок вещей или культурная традиция. Это равнодушие блокирует коллективное осознание проблемы.

В-третьих, ситуация усугубляется специфическим контекстом социально-экологического кризиса в Приаралье. Экологическое благополучие региона напрямую влияет на повседневную жизнь: именно на женщин ложится возросшая нагрузка по ведению быта в тяжелых условиях и уходу за здоровьем членов семьи. В кризисной ситуации традиционная семейная структура становится главным механизмом выживания сообщества, что приводит к еще большей консервации патриархальных норм. На этом фоне разрыв между декларируемой заботой о женщинах и их реальными возможностями становится особенно заметным. Таким образом, гендерные дисбалансы в Каракалпакстане невозможно устранить исключительно принятием новых законов или декларациями на государственном уровне. Любые меры социальной политики останутся сугубо символическими, если они не учитывают экономические корни неформального патриархального контракта. Чтобы

изменить ситуацию, необходимо разрушать механизмы повседневной рутинизации неравенства и создавать для женщин реальные условия для финансовой и социальной самостоятельности.

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НАВОИЙ ВИЛОЯТИ ХАТИРЧИ, КАРМАНА ВА НАВБАҲОР ТУМАНЛАРИДА ДЕМОГРАФИК ЖАРАЁНЛАР ВА АҲОЛИ ДИНАМИКАСИ (1991–2025 ЙИЛЛАР)

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Аннотация: *Ушбу мақолада Ўзбекистон Республикаси мустақилликка эришганидан кейинги даврда (1991–2026 йиллар) Навоий вилоятининг Хатирчи, Кармана ва Навбаҳор туманларида кечган демографик жараёнлар тарихий нуқтаи назардан таҳлил қилинган. Тадқиқотда аҳоли сонининг ўсиш динамикаси, шаҳар ва қишлоқ аҳолиси таркибидаги ўзгаришлар, маъмурий-ҳудудий ривожланиш ҳамда демографик кўрсаткичларнинг ўзига хос хусусиятлари қиёсий таҳлил асосида ёритилган. Шунингдек, мазкур туманларнинг ташкил топиш тарихи ва мустақиллик йилларида амалга оширилган ижтимоий-иқтисодий ислоҳотларнинг демографик ривожланишга таъсири баҳоланган. Тадқиқотда тарихийлик, қиёсий-тарихий, статистик ва тизимли таҳлил усулларидан фойдаланилди. Илмий натижаларга кўра, 1991–2026 йиллар давомида учала туманда ҳам аҳоли сонининг барқарор ўсиши кузатилган бўлиб, бу жараёнлар ҳудудларнинг ижтимоий-иқтисодий ривожланиши ва давлат демографик сиёсати билан узвий боғлиқ эканлиги аниқланди. Мақола натижалари Навоий вилоятининг замонавий демографик тарихини ўрганишда ҳамда ҳудудий демографик жараёнларни илмий жиҳатдан баҳолашда муҳим аҳамият касб этади.*

Калит сўзлар: *демографик тарих, Навоий вилояти, Хатирчи тумани, Кармана тумани, Навбаҳор тумани, аҳоли динамикаси, аҳоли сони, шаҳар аҳолиси, қишлоқ аҳолиси, демографик ривожланиш, мустақиллик йиллари, урбанизация, маъмурий-ҳудудий ўзгаришлар, табиий кўпайиш, статистик таҳлил.*

Abstract*: This article provides a historical analysis of demographic processes in the Khatirchi, Karmana, and Navbahor districts of Navoi Region during the period following the independence of the Republic of Uzbekistan (1991–2026). The study examines the dynamics of population growth, changes in the urban and rural population structure, administrative-territorial development, and the distinctive characteristics of demographic indicators through a comparative analysis. It also evaluates the history of the formation of these districts and the impact of the socio-economic reforms implemented during the years of independence on their*

demographic development. The research employs historical, comparative-historical, statistical, and systems analysis methods. The findings indicate that all three districts experienced steady population growth between 1991 and 2026, demonstrating that these demographic processes were closely associated with the socio-economic development of the territories and the demographic policy of the state. The results of the study contribute to a deeper understanding of the contemporary demographic history of Navoi Region and provide a scientific basis for assessing regional demographic processes.

Keywords: *demographic history, Navoi Region, Khatirchi District, Karmana District, Navbahor District, population dynamics, population size, urban population, rural population, demographic development, years of independence, urbanization, administrative-territorial changes, natural population growth, statistical analysis.*

КИРИШ

Глобаллашув ва ахборот технологиялари жадал ривожланаётган ҳозирги шароитда мамлакатнинг тарихий тараққиётини, айниқса, унинг ҳудудлари демографик ривожланиш хусусиятларини ўрганиш муҳим илмий ва амалий аҳамият касб этади. Мустақиллик йилларида Ўзбекистонда миллий тарихни холисона тадқиқ этиш, ҳудудларнинг ижтимоий-иқтисодий ва демографик тараққиётини илмий асосда баҳолашга алоҳида эътибор қаратилди. Бу борада Ўзбекистон Республикаси Президенти Шавкат Мирзиёев таъкидлаганидек, «…халқнинг бой тарихий меросини чуқур ўрганиш ва уни келажак авлодга етказиш мамлакат тараққиётининг муҳим вазифаларидан бири ҳисобланади…».[65]

Навоий вилояти Ўзбекистоннинг ҳудуди бўйича энг йирик, аҳоли зичлиги бўйича эса энг паст кўрсаткичларга эга вилоятлардан бири ҳисобланади. Вилоят 1982 йил 20 апрелда Ўзбекистон ССР Олий Совети Президиумининг №2247-X сонли Фармони асосида ташкил этилган.[66] 1988 йилда маъмурий-ҳудудий ислоҳотлар натижасида Навоий вилояти тугатилиб, унинг ҳудуди Самарқанд ва Бухоро вилоятлари таркибига

[65] Ўзбекистон Республикаси Президенти Шавкат Мирзиёевнинг тарих фани ва миллий меросни ўрганишга бағишланган нутқи. https://www.president.uz/uz/2208

[66] «Ўзбекистон ССР составида Навоий вилояти ташкил этиш тўғрисида»ги Ўзбекистон ССР Олий Совети Президиумининг Фармони // Ўзбекистон ССР Олий Совет Ведомостлари. – 1982. – №10. – Б. 3.

қўшилди.[67] Кейинчалик, мамлакат мустақилликка эришгач, 1992 йилда вилоят қайта тикланди.[68]

Навоий вилояти иқтисодий салоҳияти, саноат тармоқларининг ривожланганлиги ҳамда кенг ҳудудни эгаллаши билан бир қаторда, демографик хусусиятлари билан ҳам ажралиб туради. Хусусан, Хатирчи, Кармана ва Навбаҳор туманлари аҳоли сони, аҳолининг жойлашуви, табиий ўсиш кўрсаткичлари ҳамда ижтимоий-иқтисодий ривожланиш даражаси жиҳатидан вилоятнинг муҳим ҳудудлари ҳисобланади. Мазкур туманларда кечган демографик жараёнларни таҳлил қилиш Навоий вилояти аҳолиси ривожланишининг умумий тенденцияларини аниқлаш имконини беради.

Мақоланинг мақсади 1991–2025 йилларда Хатирчи, Кармана ва Навбаҳор туманларида аҳоли динамикаси, унинг ўсиш суръатлари ҳамда демографик ривожланишга таъсир этган асосий омилларни тарихий-қиёсий таҳлил қилишдан иборат.

Тадқиқотда тарихийлик, қиёсий таҳлил, статистик таҳлил ва тизимли ёндашув усулларидан фойдаланилди. Манбалар сифатида норматив-ҳуқуқий ҳужжатлар, статистик маълумотлар, илмий адабиётлар ҳамда туманлар тарихига бағишланган монографиялардан фойдаланилди.

АСОСИЙ ҚИСМ

Хатирчи тумани Навоий вилоятининг қадимий ва аҳоли зич жойлашган ҳудудларидан бири бўлиб, унинг шаклланиш тарихи XX аср бошларида Бухоро Халқ Совет Республикаси ҳамда кейинчалик Ўзбекистон ССРда амалга оширилган маъмурий-ҳудудий ислоҳотлар билан узвий боғлиқдир. Туман ҳудуди 1920–1921 йилларда Бухоро Халқ Совет Республикаси таркибида вилоят, 1922–1924 йилларда Кармана

[67] «Об объединении Навоийской и Самаркандской областей Узбекской ССР». Указ Президиума Верховного Совета Узбекской ССР // Ўзбекистон ССР Олий Совет Ведомостлари. – 1988. – №25. – С. 12.
[68] Навоий вилояти тарихи. https://old.navoi.uz/uz/home/blog/viloyat-tarixi

вилояти таркибида уезд, 1925–1926 йилларда эса Кармана уездининг волости сифатида мавжуд бўлган.[69]

1926 йил 29 сентябрда Ўзбекистон ССР Марказий Ижроия Қўмитасининг V сессиясида қабул қилинган маъмурий-иқтисодий районлаштириш тўғрисидаги қарор республика ҳудудий бошқарув тизимида муҳим бурилиш ясади. Мазкур қарорга мувофиқ вилоятлар, уездлар ва волостлар тугатилиб, улар ўрнига округ ва районлар ташкил этилди. Бу ҳақдаги қарор 1926 йил 18 октябрда «Правда Востока» газетасида ҳам эълон қилинган. Районлаштириш натижасида Ўрта Зарафшон округи таркибида Нурота, Кармана, Хатирчи, Нарпай, Қорадарё ва Дамариқ районлари ташкил этилди.[70]

Кейинги маъмурий ўзгаришлар жараёнида Хатирчи тумани бир неча бор қайта ташкил этилди ва ниҳоят 1964 йил 3 декабрда ҳозирги маъмурий чегаралари доирасида қайта тикланди.[71] Бу жараён республикада қишлоқ хўжалиги бошқарувини такомиллаштириш, аҳолига давлат хизматларини яқинлаштириш ҳамда ҳудудларнинг иқтисодий ихтисослашувини кучайтириш сиёсати билан боғлиқ эди.

Мустақиллик йилларида Хатирчи тумани аҳолиси барқарор ўсиш суръатларини намоён этди. Агар мустақилликнинг илк йилларида туманда тахминан 119 минг нафар аҳоли истиқомат қилган бўлса, 2001 йилга келиб бу кўрсаткич 144,9 минг нафарга етди. 2011 йилда аҳоли сони 173,2 минг нафарни ташкил этган бўлса[72], 2025 йилга келиб 216,4 минг нафарга етди.[73] Демак, мустақиллик йилларида аҳоли сони қарийб 82 фоизга ўсган. Бу

[69] “Хатирчи тумани: кеча ва бугун” [Матн] : илмий-оммабоп / Х. Қурбонов [ва бошқ.] . – Тошкент : SAHHOF, 2021- 97-бет

[70] “Хатирчи тумани: кеча ва бугун” [Матн] : илмий-оммабоп / Х. Қурбонов [ва бошқ.] . – Тошкент : SAHHOF, 2021- 97-бет

[71] https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fapi-portal.gov.uz%2Fuploads%2F327%2F2026%2F06%2F06%2F8c24db71-9375-35e2-1a76-2e13833b1749_media_.docx&wdOrigin=BROWSELINK

[72] Ўзбекистон ҳудудларининг ижтимоий иқтисодий ва тарихий ривожланиш таҳлили (Навоий вилояти мисолида). Нарзуллаев У.О. Ўзбекистон кончилик хабарнома.№1 (56) 2014. 108-бет.

[73] navstat.uz/uz/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=293&id=5011&Itemid=1000000000000

кўрсаткич Хатирчи туманининг нафақат Навоий вилоятида, балки республикада ҳам аҳоли тез ўсиб бораётган қишлоқ туманларидан бири эканлигини кўрсатади.

Аҳоли сонининг изчил ўсиши бир нечта омиллар билан изоҳланади. Аввало, туманда табиий кўпайиш даражаси узоқ йиллар давомида юқори сақланиб келди. Қишлоқ аҳолисининг салмоқли улушга эгалиги, кўп болали оилалар анъанасининг сақланиб қолгани ва туғилиш кўрсаткичларининг нисбатан юқорилиги демографик ўсишнинг асосий манбаи бўлди. Шу билан бирга, қишлоқ хўжалиги маҳсулотлари етиштириш, хизмат кўрсатиш соҳаси ва хусусий тадбиркорликнинг ривожланиши аҳолининг иқтисодий фаоллигини оширди.

2021 йил ҳолатига кўра, туманда 36 667 та хонадон ва 45 881 та оила мавжуд бўлиб, аҳолининг асосий қисмини ўзбеклар ташкил этади. Шу билан бирга, татар, рус, тожик, озарбайжон, туркман, қорақалпоқ, қозоқ, корейс ва бошқа миллат вакиллари ҳам истиқомат қилади.[74] Бу ҳолат туманнинг кўп миллатли таркибини ҳамда миллатлараро тотувлик анъаналари мустаҳкам шаклланганлигини кўрсатади.

2013 йил 1 январь ҳолатига кўра Хатирчи тумани аҳолиси 176,6 минг нафарни ташкил этган бўлиб, шундан 42,2 минг нафари шаҳар, 134,4 минг нафари эса қишлоқ аҳолиси ҳиссасига тўғри келган.[75] Мазкур кўрсаткичлар аҳолининг қарийб учдан икки қисми қишлоқ жойларда яшаганлигини англатади. Бу эса туман иқтисодиётида аграр тармоқнинг устун мавқега эга бўлганлигини ҳамда демографик ўсиш асосан қишлоқ аҳолиси ҳисобига таъминланганлигини кўрсатади.

Умуман олганда, Хатирчи тумани демографик ривожланиши Навоий вилоятининг бошқа туманларига нисбатан ўзига хос хусусиятларга эга.

[74] “Хатирчи тумани: кеча ва бугун” [Матн] : илмий-оммабоп / Х. Қурбонов [ва бошқ.] . – Тошкент : SAHHOF, 2021-12-бет

[75] Население Узбекистана. Статистический сборник. 30.07.2013.www.stat.uz-120 бет.

Агар Кармана туманида аҳоли ўсишига шаҳарлашув ва саноатлашув жараёнлари кучли таъсир кўрсатган бўлса, Хатирчи туманида демографик ўсишнинг асосий манбаи табиий кўпайиш ҳамда қишлоқ аҳолисининг юқори улуши бўлиб қолмоқда. Шу боис туман Навоий вилоятида аҳоли энг тез ўсиб бораётган ҳудудлардан бири сифатида ажралиб туради.

Кармана тумани Навоий вилоятининг тарихий жиҳатдан энг қадимий ҳудудларидан бири ҳисобланади. Ушбу ҳудуд узоқ асрлар давомида Зарафшон воҳасининг муҳим сиёсий, иқтисодий ва маданий марказларидан бири бўлиб келган. XX асрнинг бошларида Кармана Бухоро амирлиги таркибидаги маъмурий ҳудудлардан бири эди. XX асрнинг 20 йилларда Бухоро амирлигида 16 вилоят, 58 туман, 177 кент бўлган. Кармана вилоятида эса 4 беклик (туман маскани), 13 кент бўлган.

Кармана вилоятида аҳоли зич яшаганлиги боис 1920-1924 йиллар оралиғида Бухоро Республикасида Шаҳрисабз вилоятидан кейин иккинчи ўринда турган. 1924 йилда Кармана вилоятида аҳолининг 1 кв. км даги зичлиги ўртача 12,2 кишини ташкил этган. 1920 йилда Зиёвуддин, Боғчакалон, Хатирчи бекликлари битта бекликка бўйсунган ва Кармана вилояти тасарруфида бўлган. Бухоро Халқ Совет Республикаси ташкил этилгандан кейин ҳудуднинг маъмурий тузилишида бир қатор ўзгаришлар амалга оширилди. Бухоро Халқ Шўро Жумҳурияти бир неча туманларни ўз ичига олган 4 округдан ташкил топади. Ўша округлардан бири Зарафшон округи Бухоро, Зиёвуддин, Қоракўл, Кармана, Нурота, Хатирчи каби собиқ бекликлардан иборат. Бухоро, Кармана, Нурота вилоятларидан ташкил этилган бўлиб, 2202 қишлоқни бирлаштирган эди. Зиёвуддин туманига Тоткент, Мир, Найман, Тошкўприк кентлари қарар эди. Кармана тумани эса Султонобод, Қалқонота, Янгиқўрғон, Конимех кентларидан ташкил топган.[76]

[76] Кармана тарихи. / Олмахон Хаитова, Хуршид Қурбонов – Тошкент: «MASHHUR-PRESS» нашриёти, 2018. – 101-бет.

Кармана тумани 1926 йил 29 сентябрда Бухоро таркибида ташкил топган. 1958 йилда туманнинг номи ўзгартирилиб, Навоий тумани деб аталган. 1999 йил 27 майда Навоий шаҳри таркибида Ўзбекистон Республикаси Биринчи Президенти Ислом Каримов фармонига асосан Кармана тумани ташкил топди,[77] ва 2003 йилнинг 27 декабрида яна қайта Кармана тумани деб ташкил этилди.[78]

Навоий туманида Навоий вилояти ташкил топишидан сал олдин яъни 1981 йилда аҳолиси сони 16.158 нафар кишини, 1986 йилда эса 18487 нафар кишини ташкил этган.[79]

Мустақиллик йилларида Кармана тумани Навоий вилоятининг аҳоли энг тез ўсган ҳудудларидан бирига айланди. 2001 йилда туман аҳолиси 70,2 минг нафарни ташкил этган бўлса, 2011 йилда бу кўрсаткич 105,6 минг нафарга етди. Демак, ўн йил давомида аҳоли сони 35,4 минг нафарга ёки қарийб 50,4 фоизга ошган.[80] Бу ўсиш суръати вилоятнинг кўплаб туманларига нисбатан юқори бўлган.

2013 йил 1 январь ҳолатига кўра Кармана тумани аҳолиси 107,3 минг нафарни ташкил этган. Шундан 39,0 минг нафари шаҳар аҳолиси, 68,3 минг нафари эса қишлоқ аҳолиси ҳиссасига тўғри келган. Бу маълумотлар туманда қишлоқ аҳолиси устунлик қилганини кўрсатса-да, шаҳар аҳолиси улушининг ҳам йил сайин ортиб борганлигини тасдиқлайди.[81]

Навоий вилояти статистика бошқармасининг маълумотларига кўра, 2026 йил 1 апрель ҳолатида Кармана тумани аҳолиси 145,4 минг нафарга етган.[82] Агар 2001 йилдаги кўрсаткич билан қиёсланса, кейинги йигирма беш йил мобайнида аҳоли сони икки бараварга яқин ўсганлиги кузатилади.

[77] Ҳотамов А.,Бекниёзов Н.,/Кармана - қадимий диёр– Тошкент: «Ўзбекистон» НМИУ, 2007. – 116-бет.
[78] Кармана тарихи . / Олмахон Хаитова, Хуршид Қурбонов – Тошкент: «MASHHUR-PRESS» нашриёти, 2018. – 135-бет.
[79] Кармана тарихи. / Олмахон Хаитова, Хуршид Қурбонов – Тошкент: «MASHHUR-PRESS» нашриёти, 2018. – 131-бет.
[80] Ўзбекистон ҳудудларининг ижтимоий иқтисодий ва тарихий ривожланиш таҳлили (Навоий вилояти мисолида). Нарзуллаев У.О. Ўзбекистон кончилик хабарнома.№1 (56) 2014. 108-бет.
[81] Население Узбекистана. Статистический сборник. 30.07.2013.www.stat.uz-120 бет.
[82] https://api-portal.gov.uz/uploads/45/2026/05/26/345fdaeb-5134-3297-21f6-cdb93dbcb01b_media_.pdf

Бу эса мустақиллик йилларида туман демографик ривожланишининг барқарор хусусият касб этганлигини кўрсатади.

Кармана тумани аҳолиси динамикаси таҳлили шуни кўрсатадики, аҳоли сонининг ўсиши босқичма-босқич кечган. Айниқса, 2001–2011 йиллар ҳамда 2013–2026 йиллар оралиғида аҳоли ўсиш суръати юқори бўлган. Бу ҳолат туманнинг Навоий вилояти ижтимоий-демографик ривожланишида муҳим ўрин эгаллаганлигини тасдиқлайди.

Умуман олганда, мустақиллик йилларида Кармана тумани аҳолиси сонининг изчил кўпайиши, шаҳар ва қишлоқ аҳолиси таркибидаги ўзгаришлар ҳамда маъмурий барқарорлик демографик жараёнларнинг асосий хусусиятларидан бири бўлди.

Навбаҳор тумани Навоий вилояти таркибидаги нисбатан янги ташкил этилган маъмурий ҳудудлардан бири ҳисобланади. Туман 1980 йил 12 мартда ташкил этилган бўлиб, унинг ташкил этилиши Навоий вилояти ҳудудида аҳолига давлат бошқаруви ва ижтимоий хизматларни янада яқинлаштириш, шунингдек, ҳудуднинг ижтимоий-иқтисодий ривожланишини таъминлаш мақсадлари билан боғлиқ бўлган.[83]

Туман номи ташкил этилиш жараёнида аҳоли ва фахрийлар таклифи асосида «Навбаҳор» деб белгиланган. «Навбаҳор» атамаси «янги баҳор», «янгиланиш» маъноларини англатиб, ҳудуднинг истиқболдаги тараққиёти ва равнақини ифода этувчи рамзий ном сифатида қабул қилинган. 1980 йил март ойида Кескантерак қишлоғида ўтказилган йиғилишда янги ташкил этилаётган туманнинг номланиши ва ташкилий масалалари муҳокама қилиниб, мазкур ном расман тасдиқланган.[84]

Географик жиҳатдан Навбаҳор тумани Хатирчи, Нурота, Кармана, Қизилтепа ва Конимех туманлари билан чегарадош бўлиб, ҳудудда 41 та

[83] https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fapi-portal.gov.uz%2Fuploads%2F234%2F2026%2F06%2F12%2Fbf586120-bfbc-a926-b227-9284b76c026f_media_.docx
[84] Одинаева З. Қизилқум саҳросида баҳор. – Т.: “Муҳаррир”, 2008. – Б. 190

маҳалла фуқаролар йиғини ҳамда 67 та аҳоли пункти мавжуд. Бу маъмурий тузилиш мустақиллик йилларида ҳам сақланиб қолган бўлиб, аҳолига хизмат кўрсатиш тизимининг барқарор фаолият юритишига хизмат қилди.[85]

Ўзбекистон Республикаси мустақилликка эришганидан кейин Навбаҳор тумани аҳолиси сонининг барқарор ўсиши кузатилди. Агар 1991 йилда туманда 66,0 минг нафар аҳоли яшаган бўлса, 2012 йилда бу кўрсаткич 96,4 минг нафарга етди. Демак, йигирма бир йил давомида аҳоли сони 30,4 минг нафарга ёки қарийб 46,1 фоизга кўпайган.[86]

Демографик ўсиш кейинги йилларда ҳам давом этди. 2020 йил 1 январь ҳолатига кўра туман аҳолиси 112,9 минг нафарни ташкил этган. Бу эса 2012–2020 йиллар оралиғида аҳоли сони 16,5 минг нафарга ошганлигини кўрсатади.[87]

2025 йил якунига келиб Навбаҳор тумани аҳолиси 124,1 минг нафарга етди. Агар мазкур кўрсаткич 1991 йилги аҳоли сони билан қиёсланса, мустақиллик йиллари мобайнида аҳоли қарийб икки бараварга яқин кўпайганлиги маълум бўлади. Бу эса туманнинг демографик ривожланиши барқарор хусусият касб этганлигини кўрсатади.[886]

2013 йил 1 январь ҳолатига кўра Навбаҳор тумани аҳолиси 99,2 минг нафарни ташкил этган бўлиб, шундан 15,8 минг нафари шаҳар аҳолиси, 83,4 минг нафари эса қишлоқ аҳолиси ҳиссасига тўғри келган.[7] Ушбу кўрсаткичлар туманда қишлоқ аҳолиси мутлақ устунликка эга бўлганлигини тасдиқлайди.

Шундай қилиб, Навбаҳор туманида мустақиллик йилларида аҳоли сонининг мунтазам ўсиши кузатилди. Айниқса, 1991–2025 йиллар

[85] Навоий.Ўтмиши қадим,келажаги нурли диёр:китоб-альбом/тузувчи муаллифлар Р.Сулаймонов, Р.Ҳайдаров, С.Иноятов [ва бошқ.] . – Тошкент : Маънавият, 2012- 6-бет
[86] Навбаҳор тумани: кеча ва бугун [Матн]. илмий-оммабоп / У. Нарзуллаев [ва бошқ.] – Тошкент: “SAHHOF” нашриёти, 2020. –326бет
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[88] https://api-portal.gov.uz/uploads/45/2026/05/26/345fdaeb-5134-3297-21f6-cdb93dbcb01b_media_.pdf

мобайнида аҳоли сони 66,0 минг нафардан 124,1 минг нафарга етди. Бу даврда аҳолининг ўсиш суръати изчил давом этган бўлиб, туман Навоий вилоятининг демографик жиҳатдан барқарор ривожланаётган ҳудудларидан бири сифатида шаклланди.

Хатирчи, Кармана ва Навбаҳор туманларида демографик жараёнларнинг қиёсий таҳлили

Мустақиллик йилларида Навоий вилояти таркибидаги Хатирчи, Кармана ва Навбаҳор туманларида демографик жараёнлар ўзига хос хусусиятларга эга бўлди. Мазкур туманларда аҳоли сонининг ўсиши умумий тенденция сифатида кузатилган бўлса-да, ўсиш суръатлари, аҳолининг жойлашуви ҳамда шаҳар ва қишлоқ аҳолиси нисбатида маълум фарқлар мавжуд.

Хатирчи тумани аҳоли сони бўйича таҳлил қилинаётган туманлар орасида етакчи ўринни эгаллайди. 1991 йилда туманда 119,0 минг нафар аҳоли истиқомат қилган бўлса, 2025 йилга келиб бу кўрсаткич 216,4 минг нафарга етди. Демак, мустақиллик йиллари давомида аҳоли сони 97,4 минг нафарга кўпайди. Бу ҳолат Хатирчи туманининг Навоий вилоятида аҳоли энг зич жойлашган ҳудудлардан бири эканлигини яна бир бор тасдиқлайди.

Кармана туманида ҳам аҳоли сонининг барқарор ўсиши кузатилди. 2001 йилда аҳоли 70,2 минг нафарни ташкил этган бўлса, 2026 йил 1 апрель ҳолатига кўра бу кўрсаткич 145,4 минг нафарга етди. Таҳлил шуни кўрсатадики, ушбу даврда аҳоли сони икки бараварга яқин ортган. Бу эса туманнинг мустақиллик йилларида барқарор демографик ривожланиш босқичини босиб ўтганлигини кўрсатади.

Навбаҳор туманида ҳам аҳоли сонининг мунтазам ўсиши қайд этилди. Агар 1991 йилда аҳоли 66,0 минг нафарни ташкил этган бўлса, 2025 йилга келиб 124,1 минг нафарга етди. Натижада аҳоли сони 58,1 минг нафарга кўпайди. Бу кўрсаткич туманда демографик ўсишнинг узлуксиз давом этганлигини кўрсатади.

2013 йил 1 январь ҳолатига кўра аҳолининг шаҳар ва қишлоқ бўйича тақсимланиши ҳам туманлар ўртасида маълум фарқларни намоён этади. Хатирчи туманида жами аҳолининг 76,1 фоизи қишлоқ аҳолиси ҳиссасига тўғри келган бўлса, Кармана туманида мазкур кўрсаткич 63,7 фоизни, Навбаҳор туманида эса 84,1 фоизни ташкил этган. Бу эса Навбаҳор туманида қишлоқ аҳолиси улуши таҳлил қилинаётган туманлар ичида энг юқори бўлганлигини кўрсатади.[4]

Туманлар аҳолиси динамикасини қиёсий таҳлил қилиш шуни кўрсатадики, мустақиллик йилларида учала туманда ҳам аҳоли сонининг барқарор ўсиш тенденцияси сақланган. Бироқ аҳоли сони бўйича Хатирчи тумани етакчилик қилган бўлса, Кармана тумани аҳоли ўсиш суръати бўйича юқори кўрсаткичларга эришган. Навбаҳор тумани эса аҳоли сони нисбатан кам бўлишига қарамай, демографик ўсишнинг барқарорлиги билан ажралиб туради.

Шунингдек, таҳлил натижалари Навоий вилоятида мустақиллик йилларида аҳолининг асосий қисми қишлоқ ҳудудларида истиқомат қилганлигини кўрсатади. Айниқса, Хатирчи ва Навбаҳор туманларида қишлоқ аҳолиси улушининг юқорилиги мазкур ҳудудларнинг демографик ривожланишида муҳим хусусиятлардан бири бўлиб қолди.

Умуман олганда, 1991–2026 йиллар давомида Хатирчи, Кармана ва Навбаҳор туманларида аҳоли сонининг мунтазам ўсиши кузатилди. Бу жараёнлар Навоий вилояти демографик ривожланишининг барқарор кечганлигини ҳамда мустақиллик йилларида аҳоли сонининг изчил ортиб борганлигини тасдиқлайди

ХУЛОСА

Ўзбекистон Республикаси мустақилликка эришгач, мамлакатда амалга оширилган ижтимоий-иқтисодий ислоҳотлар аҳолининг демографик ривожланишига ҳам ижобий таъсир кўрсатди. Бу жараёнлар Навоий вилояти мисолида ҳам яққол намоён бўлиб, аҳоли сонининг

барқарор ўсиши, ҳудудлар бўйича жойлашувидаги ўзгаришлар ҳамда шаҳар ва қишлоқ аҳолиси нисбатидаги динамик силжишлар кузатилди.

Тадқиқот натижаларига кўра, 1991–2026 йиллар давомида Хатирчи, Кармана ва Навбаҳор туманларида аҳоли сони мунтазам ўсиб борган. Хатирчи тумани аҳоли сони бўйича вилоятда етакчи ўринни сақлаб қолган бўлса, Кармана туманида аҳоли ўсиш суръатлари юқори бўлган. Навбаҳор туманида эса аҳоли сони нисбатан кам бўлишига қарамасдан, демографик ўсиш барқарор давом этган.

Таҳлиллар шуни кўрсатадики, мустақиллик йилларида мазкур туманларда аҳоли ўсиши биринчи навбатда табиий кўпайиш ҳисобига таъминланган. Шу билан бирга, иқтисодий ислоҳотлар, аҳоли турмуш даражасининг яхшиланиши, таълим, тиббиёт ва ижтимоий инфратузилманинг ривожланиши демографик жараёнларга ижобий таъсир кўрсатган. Айниқса, Кармана туманида Навоий шаҳрининг иқтисодий салоҳияти аҳолининг ўсиши ва ҳудуднинг жозибадорлигини оширишда муҳим омиллардан бири бўлган.

Туманлар кесимида аҳолининг шаҳар ва қишлоқ бўйича жойлашуви таҳлили қишлоқ аҳолиси улуши ҳануз устунлигини кўрсатади. Хатирчи ва Навбаҳор туманларида қишлоқ аҳолиси асосий салмоқни ташкил этган бўлса, Кармана туманида шаҳар аҳолиси улушининг ўсиши урбанизация жараёнларининг фаоллашганлигини кўрсатади.

Мустақиллик йилларида амалга оширилган давлат демографик сиёсати, аҳолини ижтимоий муҳофаза қилиш, оналик ва болаликни қўллаб-қувватлаш, соғлиқни сақлаш тизимини такомиллаштириш ҳамда ҳудудларни комплекс ривожлантиришга қаратилган чора-тадбирлар мазкур туманларда демографик барқарорликни таъминлашда муҳим аҳамият касб этди.

Умуман олганда, Хатирчи, Кармана ва Навбаҳор туманларининг 1991–2026 йиллардаги демографик ривожланишини ўрганиш Навоий

вилояти аҳолиси тарихи бўйича илмий тасаввурларни янада бойитишга хизмат қилади. Тадқиқот натижалари ушбу ҳудудларда кечган демографик жараёнларнинг ўзига хос хусусиятларини очиб бериш билан бирга, мустақиллик йилларида Ўзбекистонда амалга оширилган демографик ва ижтимоий сиёсатнинг ҳудудий натижаларини баҳолашда ҳам муҳим илмий манба сифатида аҳамият касб этади.

THE IMPORTANCE OF TRUST INDEX BETWEEN SUPERVISOR AND EMPLOYEE IN THE OCCUPATIONAL SAFETY SYSTEM

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Abstract: *This article analyzes the role and importance of the trust index between supervisor and employee in the occupational safety system from a scientific-theoretical perspective. The trust index is considered as a key factor in shaping safety culture in the organisation, and its impact on the level of workplace injuries, safety climate, and employees' safety-related behaviour is examined. The research results show that a high level of trust in the supervisor is associated with a decrease in injury rates, strengthening of the safety climate, and increased activity in safety citizenship behaviour. The article covers methods for measuring the trust index, its mediating role in the occupational safety system, and prospects for application in enterprises of Uzbekistan.*

Keywords: *trust index, occupational safety, supervisor-employee relations, safety climate, organisational trust, safety citizenship behaviour.*

I. INTRODUCTION

The effectiveness of an occupational safety system is largely determined not only by the availability of technical means and regulatory framework, but also by the socio-psychological environment within the organisation and the quality of the relationship between supervisor and employee. Recent scientific studies show that in preventing workplace accidents, alongside technical solutions, the human factor – in particular, employees' trust in the management – plays a significant role [1, 2].

The concept of trust index is relatively new in organisational psychology and occupational safety, yet it is a rapidly developing research area. The Trust Index™ developed by the Great Place to Work Institute is a global standard for employee surveys, measuring the atmosphere of trust, pride, and camaraderie within an organisation [3]. This index reflects trust-based relationships between supervisors and employees, employees' pride in their work, and the solidarity among colleagues.

The importance of the trust index in the context of occupational safety has been confirmed by a number of fundamental studies. The research conducted by Ordysiński [1] provided reliable statistical evidence that employees' trust in management significantly affects the level of safety in the enterprise. In particular, the findings show that employees' trust in management has an indirect (fully mediating) effect on safety outcomes, because trust increases employees' engagement in safety citizenship behaviour (SCB) [1].

The relationship between social trust and workplace safety has also been studied using data from the US Occupational Safety and Health Administration (OSHA) [4]. According to the results, enterprises located in regions with higher levels of social trust have lower worker injury rates. This demonstrates the role of trust as an informal governance mechanism protecting human capital.

At the same time, the relationship between trust and safety climate has been thoroughly investigated by Zohar and other researchers [5]. When supervisors establish trusting relationships with their subordinates, they are more likely to create a safe working environment and foster a high and robust safety climate among their teams.

The aim of this article is to provide a systematic analysis, in accordance with IMRAD requirements, of the theoretical foundations of the trust index between supervisor and employee in the occupational safety system, its mechanisms of influence on safety, and its practical significance.

II. METHODS

2.1. Research design

This article is a theoretical-analytical study focused on the importance of the trust index between supervisor and employee in the occupational safety system. The study analysed scientific articles, international research reports, and regulatory legal documents published between 2010 and 2026.

2.2. Data sources

The main data sources for the study were as follows:

1. International scientific databases: articles on occupational safety, organisational trust, and safety climate published in databases such as ScienceDirect, Semantic Scholar, PubMed, and MEDLINE [6];

2. The Great Place to Work Trust Index™ methodology and survey materials [4];

3. Research on the relationship between social trust and workplace safety conducted using OSHA data [7];

4. The Law of the Republic of Uzbekistan "On Occupational Safety" and related regulatory legal acts [8].

2.3. Analytical methods

The following analytical methods were used in the study:

- systematic analysis – to systematically examine the interrelationship between the trust index and occupational safety;

- comparative analysis – to compare findings obtained by different researchers [1, 3, 5, 6];

- statistical data analysis – to assess the correlational relationships between trust and safety indicators [9, 10].

III. RESULTS

3.1. Structural composition of the trust index

The Great Place to Work Trust Index™ consists of 60 statements across five universal dimensions, rated on a 5-point Likert scale. These five dimensions are:

Credibility – includes open and two-way communication by management, competence and management skills, and commitment to high ethical standards [4].

Respect – measures the provision of training, resources, and equipment, recognition of professional achievements, quality of collaboration, and management's concern for employee well-being.

Fairness – assesses balance in the distribution of material and non-material rewards, impartiality in employee evaluation, and the absence of discrimination.

Pride – reflects the employee's sense of pride in their work and in the organisation [4].

Camaraderie – captures the atmosphere of solidarity and mutual support among employees.

3.2. Relationship between trust index and safety climate

The results show that trust between supervisor and employee positively affects both the level and the strength of the safety climate. In a study involving 2,524 military personnel (analysed at the level of 105 platoons), trust was negatively correlated with injury rates and positively correlated with the level and strength of safety climate [4]. Furthermore, the level of safety climate was found to mediate the relationship between trust and injury rates [4].

3.3. Mechanisms of trust index influence on safety outcomes

The study by Ordysiński [1] identified three main mechanisms through which trust affects safety outcomes:

First, employees' trust in management has an indirect (fully mediating) effect on safety outcomes. This effect operates by increasing employees' engagement in safety citizenship behaviour (SCB) [11].

Second, the increase in SCB engagement improves employees' compliance with health and safety (H&S) rules, which in turn reduces the number of accidents.

Third, improved perception of management's commitment to health and safety further strengthens the positive relationship between trust and safety citizenship behaviour.

3.4. Social trust and workplace injuries

Research based on OSHA data on the impact of social trust on workplace safety revealed the following important findings:

- Enterprises in regions with higher levels of social trust have lower worker injury rates [12];
- This effect is more pronounced in firms with weak corporate governance, in industries with low union representation, and in enterprises with less oversight [2];
- Social trust can serve as an informal governance mechanism to protect human capital.

3.5. Safety-related trust and leadership

Studies indicate that safety-related trust plays a significant mediating role in the relationship between transformational leadership and safety behaviour. Safety leaders are advised to actively collaborate with colleagues and family members to encourage employees' safety behaviour.

Ethical leadership acts as a mediator in the relationship between safety climate and trust in the organisation. Employees' perceptions of safety culture influence their level of trust in the organisation [6].

IV. DISCUSSION

4.1. Central role of the trust index in the occupational safety system

The obtained results indicate that the trust index occupies a central place in the occupational safety system [1, 2, 4]. The traditional approach focuses mainly on technical safety measures – protective equipment, safety devices, and regulatory requirements. However, technical solutions cannot completely eliminate injuries, because human behaviour remains a decisive factor in the physical environment [12].

The trust index provides a systematic way to measure and manage precisely this "human factor". The Great Place to Work Trust Index™ converts intangible topics such as safety, autonomy, and job satisfaction into clear, data-based indicators. This gives organisations concrete directions for improving employee experience [5].

4.2. Mechanisms of trust influence on safety: theoretical foundations

The mechanisms by which trust affects occupational safety can be explained through several theoretical approaches:

From the perspective of social exchange theory, trusting relationships between supervisor and employee enhance mutual commitment and loyalty [9]. When employees believe that management cares about their safety, they, in turn, exhibit "extra-role" behaviours such as complying with safety rules and supporting safety-related initiatives.

The concept of psychological safety reveals another important aspect of trust. When supervisors create an atmosphere of psychological safety, employees are able to freely express their mistakes, concerns, and suggestions. This enables early identification and resolution of safety issues. The benefits of psychological safety include collaboration, open expression of opinions, experience sharing and learning, as well as trust and team effectiveness [12].

Social capital theory views trust as a core element of organisational social capital. Trust, shared norms, and loyalty provide the foundation for the formation of a safety culture. In a high-trust environment, employees are more inclined to cooperate with each other, exchange safety-related information, and monitor each other's safe behaviour.

4.3. Measuring the trust index and its practical application

When measuring the trust index, special attention should be paid to the following aspects:

- survey methodology. The Trust Index™ is a standardised questionnaire consisting of 60 statements, used in more than 60 countries and over 10,000

organisations. The survey is conducted anonymously, and the results allow the organisation to be assessed as a “great place to work” [4].

- interpretation of indicators. The results of the trust index provide not only an overall score, but also detailed information on the five dimensions (credibility, respect, fairness, pride, and camaraderie). This enables the organisation to identify its strengths and weaknesses [5].

- practical measures. Based on the trust index results, the following practical measures can be developed:

1. Developing managers’ communication skills;
2. Involving employees in decision-making processes;
3. Encouraging and recognising safety-related initiatives;
4. Implementing a transparent and fair reward system;
5. Creating an environment of psychological safety.

4.4. Application of the trust index in the Uzbek context

The Law of the Republic of Uzbekistan “On Occupational Safety” [12] requires organisations with 50 or more employees to establish an occupational safety service. In organisations with fewer employees, these responsibilities are assigned to one of the managers.

Introducing the trust index in Uzbek enterprises can offer the following advantages:

First, the trust index provides an additional criterion for evaluating the effectiveness of the occupational safety system. Alongside traditional indicators (number of injuries, occupational disease rates), the trust index allows the “health” of the safety culture in the organisation to be assessed.

Second, the trust index serves as a basis for systematically improving the relationship between supervisors and employees [1]. Research shows that employees’ trust in management significantly affects safety.

Third, implementing the trust index in Uzbekistan's rapidly developing economy and industrial sectors can help create a safety culture that meets international standards.

4.5. Limitations and future research directions

This study has the following limitations:

1. The research is based mainly on international scientific sources, and empirical data on the trust index in Uzbek enterprises are limited [1, 2, 3, 10];

2. The relationship between the trust index and safety indicators is largely correlational; establishing causal relationships requires additional research;

3. The impact of the trust index may vary across different industries and types of organisations.

Future research directions may include:

- empirical measurement of the trust index in Uzbek enterprises and examination of its relationship with safety indicators;

- comparative analysis of the impact of the trust index across different industries (construction, industry, services);

- evaluation of the effectiveness of intervention programmes aimed at increasing the trust index;

- in-depth study of the relationship between the trust index and leadership styles.

V. CONCLUSION

The trust index between supervisor and employee is of significant importance in the occupational safety system. The analyses conducted allow the following main conclusions to be drawn:

1. The trust index is a key indicator of safety culture**.** A high level of trust is associated with reduced injury rates, strengthened safety climate, and increased employee engagement in safety citizenship behaviour.

2. The influence of trust on safety is exercised through complex mediating mechanisms**.** Employees' trust in management activates their safety citizenship

behaviour, which in turn improves compliance with rules and reduces the number of accidents.

3. Measuring and managing the trust index enables organisations to systematically improve safety culture. Standardised tools such as the Great Place to Work Trust Index™ help translate intangible topics (safety, trust, psychological environment) into clear indicators [4].

4. Introducing the trust index in Uzbek enterprises can help elevate the occupational safety system to international standards. This will not only reduce injuries but also enhance overall organisational effectiveness and employee satisfaction.

In conclusion, the effectiveness of the occupational safety system is determined not only by technical means and regulatory requirements, but also by the quality of trust-based relationships between supervisor and employee. The trust index is an effective tool for measuring and managing these relationships, and its implementation in occupational safety practice is a pressing task.

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ВЛИЯНИЕ ВИДЕОИГР НА СОЦИАЛЬНОЕ ФУНКЦИОНИРОВАНИЕ МОЛОДЕЖИ: РАЗВИТИЕ ДОМОСЕДСТВА И СНИЖЕНИЕ ПОТРЕБНОСТИ В ОБЩЕНИИ ЛИЦОМ К ЛИЦУ

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Аннотация. *В статье анализируется проблема трансформации социального функционирования современной молодежи под влиянием видеоигр. На основе обзора эмпирических исследований рассматриваются механизмы замещения непосредственного межличностного общения виртуальными взаимодействиями, формирование поведенческих паттернов домоседства, а также изменения в структуре социальных потребностей молодых людей. Особое внимание уделяется феномену эскапизма как психологическому механизму, опосредующему влияние видеоигр на социальную активность. Делается вывод о необходимости дифференцированного подхода к оценке последствий игровой активности, учитывающего как риски социальной изоляции, так и потенциал видеоигр как средства киберсоциализации.*

Ключевые слова: *видеоигры, социальное функционирование, молодежь, домоседство, эскапизм, социальная изоляция, киберсоциализация.*

Abstract. *This article examines the transformation of the social functioning of contemporary youth under the influence of video games. Based on a review of empirical studies, it analyzes the mechanisms through which face-to-face interpersonal communication is increasingly replaced by virtual interactions, the development of home-centered behavioral patterns, and changes in the structure of young people's social needs. Particular attention is paid to escapism as a psychological mechanism mediating the impact of video games on social activity. The article concludes that the consequences of gaming should be assessed through a differentiated approach that takes into account both the risks of social isolation and the potential of video games as a means of cyber-socialization.*

Keywords: *video games, social functioning, youth, home-centered lifestyle, escapism, social isolation, cyber-socialization.*

ВВЕДЕНИЕ

Цифровая трансформация досуговых практик современной молодежи представляет собой одну из наиболее значимых тенденций последних десятилетий. Видеоигры, некогда воспринимавшиеся как периферийное развлечение, сегодня стали доминирующей формой проведения досуга среди подрастающего поколения, оказывая существенное влияние на формирование моделей социального поведения. В условиях, когда игровая активность становится значимой частью жизни большинства молодых людей, вопрос о ее влиянии на социальное функционирование приобретает не только академическую, но и выраженную практическую значимость.

Цель статьи — систематизировать имеющиеся эмпирические данные о влиянии видеоигр на социальное функционирование молодежи, сфокусировавшись на феноменах домоседства и снижения потребности в непосредственном общении, а также выявить психологические механизмы, опосредующие данные эффекты.

Современная молодежь функционирует в условиях принципиально иной социальной экосистемы по сравнению с предыдущими поколениями. Цифровая среда не просто дополняет, но во многом замещает традиционные формы социального взаимодействия. Как отмечает Е.Н. Волкова, среда жизни и развития современного ребенка — это принципиально новый тип объективной реальности, характеризующейся интеграцией цифровых и виртуальных сред и реальной жизни. Развитие личности подростка сегодня происходит в новом гибридном жизненном пространстве, в котором опыт жизни и оценка его успешности строятся не по законам традиционной социализации в условиях реального и непосредственного взаимодействия с другими людьми [1, с. 25-26].

Особую актуальность данная проблематика приобретает в связи с тем, что подростковый и юношеский возраст являются сензитивным периодом для формирования социальных навыков, ценностно-нормативной сферы и моделей межличностного взаимодействия. Анализ исследований показывает, что видеоигры выполняют в жизни молодежи широкий спектр функций, выходящих за пределы простого развлечения. Исследователи отмечают, что игры могут выступать инструментом киберсоциализации, предоставляя пространство для тренировки социальных навыков в безопасной виртуальной среде. Вместе с тем, исследователи фиксируют тревожную тенденцию: проявления увлеченности компьютерными играми варьируются от естественного уровня вовлеченности до патологических состояний [1, с. 27]. Это смещение временного бюджета в пользу виртуальной активности может рассматриваться как один из ключевых факторов развития домоседства — поведенческого паттерна, характеризующегося предпочтением времяпрепровождения внутри домашнего пространства с активным использованием цифровых технологий.

ОСНОВНАЯ ЧАСТЬ

Дискуссия о влиянии видеоигр на социальное функционирование молодежи характеризуется значительной поляризацией взглядов. Сторонники позитивного влияния акцентируют внимание на том, что многопользовательские игры создают пространство для социального взаимодействия, формирования командных навыков и установления значимых отношений. В исследовании, проведенном на основе анализа коммуникативных практик молодежи в нарративных играх, показано, что игры выступают своеобразным «симулятором» для ролевого экспериментирования, позволяя игрокам апробировать различные поведенческие стратегии без реальных последствий. Вместе с тем авторы

отмечают, что перенос этих моделей в реальность ограничен из-за воспринимаемой искусственности игрового пространства [3, с. 78-79].

Значительный массив эмпирических данных свидетельствует о наличии обратной зависимости. Согласно результатам исследований, игровая зависимость создает риск возникновения проблем с развитием коммуникативных навыков и самоуважения, а патологическая увлеченность компьютерными играми приводит к проблемам взаимодействия в семье и взаимоотношений со сверстниками [1, с. 27-28]. В работе А.А. Неруша, посвященной анализу конфликтов в онлайн-играх среди российской молодежи, установлено, что конфликты между игроками возникают из-за проблем коммуникации, различий в навыках и эмоциональной реакции игроков, а также конкуренции. При этом молодые игроки редко разрешают конфликты конструктивно, за исключением случаев с друзьями [2, с. 77-78]. Данный факт свидетельствует о том, что виртуальные коммуникативные навыки не всегда транслируются в эффективные стратегии реального социального взаимодействия.

Центральным психологическим механизмом, опосредующим влияние видеоигр на социальное функционирование, выступает эскапизм. С.Л. Таланов в своем исследовании отмечает, что большинство молодых людей играют в видеоигры, так как их жизнь скучна или наполнена стрессом в силу разных причин (большая нагрузка в школе, конфликты со сверстниками или родителями и т. д.). Видеоигры предоставляют игроку возможность уйти из серой повседневности в захватывающий мир, выступая, таким образом, формой эскапистских развлечений [3]. Как подчеркивается в психологической литературе, эскапизм как мотивация бегства от реальности может приобретать дезадаптивные формы, ведущие к социальной изоляции [1].

Важно отметить, что эскапизм не является исключительно негативным феноменом — в умеренных формах он может выполнять

адаптивную функцию, обеспечивая психологическую разрядку и восстановление ресурсов. Однако при переходе в патологические формы эскапизм ведет к дезадаптации, снижению социальной активности и, как следствие, к ограничению социальных связей.

Важным аспектом, зачастую остающимся вне поля зрения исследователей, является лингвистическая специфика игровой коммуникации. Анализ социальных паттернов, формируемых в игровой среде, показывает, что доминирующие модели взаимодействия — ориентация на отдельных партнеров, инструментальные дружеские связи, игнорирование второстепенных персонажей — отражают прагматизм и избирательность, характерные для современных социальных взаимодействий. При этом игровой язык часто лингвистически ограничен, что подтверждают данные исследований о коммуникативных практиках в визуальных новеллах [3, с. 77-79].

Данный факт имеет существенное значение для понимания социальных последствий увлечения видеоиграми. В условиях, когда значительная часть социального взаимодействия смещается в виртуальное пространство, ограниченность языкового репертуара может препятствовать развитию полноценных коммуникативных навыков, необходимых для эффективного функционирования в разнообразных социальных контекстах. Как показывают исследования, у подростков с высоким уровнем вовлеченности в видеоигры наблюдается снижение социальной компетентности, что создает замкнутый круг [1, с. 28].

ЗАКЛЮЧЕНИЕ

Проведенный анализ позволяет сделать вывод о том, что влияние видеоигр на социальное функционирование молодежи носит сложный, многомерный и неоднозначный характер. С одной стороны, видеоигры выступают важным средством социализации, предоставляя молодым людям возможности для установления социальных связей, развития

навыков взаимодействия и удовлетворения базовых психологических потребностей. С другой стороны, чрезмерное увлечение видеоиграми сопряжено с рисками социальной изоляции, снижения частоты и качества офлайн-взаимодействий, а также деформации коммуникативных навыков.

Ключевым фактором, определяющим вектор влияния видеоигр, выступает баланс между виртуальной и реальной активностью. В случаях, когда видеоигры становятся доминирующей формой социального взаимодействия и средством эскапизма, они объективно способствуют развитию домоседства и снижению потребности в непосредственном общении. Напротив, при сохранении многообразия социальных практик видеоигры могут выполнять позитивную функцию, расширяя социальный репертуар молодежи.

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7-SECTION

FANLARARO ALOQADORLIK ASOSIDA TALABALARNING AXBOROT MADANIYATINI RIVOJLANTIRISH OMILLARI

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Annotatsiya: *Ushbu maqolada talabalarda fanlararo aloqadorlik asosida axborot madaniyatini rivojlantirishning nazariy-metodologik asoslari hamda pedagogik mexanizmlari tahlil qilingan. Ta'lim jarayonida fanlararo integratsiya, kompetensiyaviy yondashuv va zamonaviy axborot-kommunikatsiya texnologiyalaridan foydalanish orqali talabalarning axborotni izlash, tahlil qilish, tanqidiy baholash, qayta ishlash va undan samarali foydalanish kompetensiyalarini rivojlantirish masalalari yoritilgan. Shuningdek, axborot madaniyatini shakllantirishning samarali metodlari, pedagogik shart-sharoitlari hamda o'qituvchilarning metodik faoliyatini takomillashtirish yo'llari asoslab berilgan.*

Kalit so'zlar: *axborot madaniyati, fanlararo aloqadorlik, pedagogik mexanizm, kompetensiyaviy yondashuv, raqamli ta'lim, axborot-kommunikatsiya texnologiyalari, tanqidiy fikrlash, axborot kompetensiyasi, oliy ta'lim, talaba.*

Аннотация: *В статье проанализированы теоретико-методологические основы и педагогические механизмы развития информационной культуры студентов на основе междисциплинарного подхода. Освещены вопросы формирования у студентов компетенций поиска, анализа, критической оценки, обработки и эффективного использования информации посредством интеграции межпредметных связей, компетентностного подхода и современных информационно-коммуникационных технологий в образовательный процесс. Также обоснованы эффективные методы формирования информационной культуры, педагогические условия её развития и пути совершенствования методической деятельности преподавателей.*

Ключевые слова: *информационная культура, междисциплинарный подход, педагогический механизм, компетентностный подход, цифровое образование, информационно-коммуникационные технологии, критическое мышление, информационная компетентность, высшее образование, студент.*

Abstract: *This article analyzes the theoretical and methodological foundations and pedagogical mechanisms for developing students' information culture through an interdisciplinary approach. It examines the development of students' competencies in information searching, analysis, critical evaluation, processing, and effective use through the integration of interdisciplinary learning, competency-based education, and modern information and communication technologies into the educational process. The study also substantiates effective methods for fostering information culture, identifies pedagogical conditions for its development, and proposes approaches to improving teachers' methodological practices.*

Keywords: *information culture, interdisciplinary approach, pedagogical mechanism, competency-based approach, digital education, information and communication technologies (ICT), critical thinking, information competence, higher education, student.*

KIRISH

Jahon miqyosida raqamli transformatsiya jarayonlarining jadallashuvi, sun’iy intellekt, katta hajmdagi ma’lumotlar (Big Data), bulutli texnologiyalar va raqamli ta’lim muhitining keng joriy etilishi ta’lim tizimi oldiga mutlaqo yangi vazifalarni qo‘ymoqda. Zamonaviy axborotlashgan jamiyatda oliy ta’lim muassasalarining asosiy vazifalaridan biri talabalarda kasbiy bilim, ko‘nikma va malakalarni shakllantirish, balki ularga axborotni izlash, tahlil qilish, tanqidiy baholash, qayta ishlash, undan maqsadli va samarali foydalanish, axborot xavfsizligi hamda axloqiy-me’yoriy talablarga rioya etish kompetensiyalarini rivojlantirishdan iboratdir. Mazkur kompetensiyalar axborot madaniyatining muhim tarkibiy qismlarini tashkil etadi.

Bugungi kunda axborot resurslari hajmining keskin ortishi, internet tarmog‘i, ijtimoiy media platformalari va raqamli xizmatlarning ommalashuvi natijasida turli mazmundagi axborotlar oqimi tobora kuchayib bormoqda. Ushbu sharoitda talabalarning ishonchli va ilmiy asoslangan axborotni noto‘g‘ri yoki manipulyativ ma’lumotlardan ajrata olish, axborot manbalarining ishonchliligini baholash, media kontentni tanqidiy tahlil qilish hamda undan kasbiy va ilmiy faoliyatda oqilona foydalanish ko‘nikmalarini rivojlantirish dolzarb pedagogik

muammolardan biri hisoblanadi. Shu sababli oliy ta’lim tizimida axborot madaniyatini rivojlantirish masalasi kompetensiyaviy yondashuvning muhim yo‘nalishlaridan biri sifatida qaralmoqda.

Talabalarda axborot madaniyatini shakllantirish faqat bitta fan doirasida amalga oshirilishi yetarli emas. Chunki axborot bilan ishlash kompetensiyalari barcha o‘quv fanlari mazmuni bilan uzviy bog‘liq bo‘lib, ularni integratsiyalashgan holda rivojlantirish yuqori samaradorlikni ta’minlaydi. Shu nuqtai nazardan fanlararo aloqadorlik asosida tashkil etilgan ta’lim jarayoni talabalarning bilimlarini tizimlashtirish, fanlar o‘rtasidagi mantiqiy bog‘liqlikni anglash, nazariy bilimlarni amaliy vaziyatlarda qo‘llash, mustaqil va ijodiy fikrlash, muammoli vaziyatlarni tahlil qilish hamda axborot bilan ishlash kompetensiyalarini rivojlantirish uchun qulay pedagogik muhitni yaratadi.

Fanlararo aloqadorlik asosida tashkil etilgan ta’lim jarayonida axborot-kommunikatsiya texnologiyalaridan, zamonaviy raqamli ta’lim platformalaridan, elektron ta’lim resurslaridan, loyiha va muammoli ta’lim metodlaridan, interfaol pedagogik texnologiyalardan kompleks foydalanish talabalarning motivatsion, kognitiv va konativ komponentlarini izchil rivojlantirishga xizmat qiladi. Bunday yondashuv axborotni izlash, saralash, tahlil qilish, qayta ishlash, vizuallashtirish, taqdim etish hamda axborot almashish madaniyatini shakllantirish bilan bir qatorda ularning kasbiy kompetentligini ham mustahkamlaydi.

Shu bilan birga, oliy ta’lim amaliyotida fanlararo integratsiya imkoniyatlaridan axborot madaniyatini rivojlantirish vositasi sifatida foydalanish, pedagogik mexanizmlar, metodik ta’minot, baholash mezonlari hamda diagnostik usullarni takomillashtirish zarurati saqlanib qolmoqda. Bu esa talabalarda axborot madaniyatini rivojlantirishning ilmiy-metodik asoslarini takomillashtirish, uning faoliyatli-transformatsion modelini ishlab chiqish, kompetensiyaviy yondashuv asosida pedagogik shart-sharoitlarni aniqlash va ularni ta’lim jarayoniga joriy etishni taqozo etadi.

Mazkur tadqiqotda talabalarda axborot madaniyatini fanlararo aloqadorlik asosida rivojlantirishning nazariy-metodologik asoslari, pedagogik mexanizmlari, didaktik imkoniyatlari hamda samaradorligini ta’minlovchi metodik yondashuvlar tahlil qilinadi. Tadqiqot natijalari oliy ta’lim muassasalarida axborot madaniyatini rivojlantirishning innovatsion modelini takomillashtirish, ta’lim sifatini oshirish va raqamli kompetensiyalarga ega, zamonaviy kasbiy faoliyat talablariga mos, raqobatbardosh mutaxassislarni tayyorlashga xizmat qiladi.

2. **Axborot madaniyati tushunchasi va uning zarurati** Axborotlashgan jamiyat sharoitida axborot madaniyati shaxsning umumiy madaniyati va kasbiy kompetentligining ajralmas tarkibiy qismi sifatida namoyon bo‘lmoqda. Raqamli texnologiyalar, internet tarmoqlari, sun’iy intellekt tizimlari hamda elektron axborot resurslarining jadal rivojlanishi natijasida axborot hajmi misli ko‘rilmagan darajada ortib bormoqda. Bunday sharoitda axborotni izlash, saralash, tahlil qilish, baholash, qayta ishlash, saqlash va undan maqsadli foydalanish ko‘nikmalariga ega bo‘lish har bir bo‘lajak mutaxassis uchun zarur kompetensiya hisoblanadi.

Axborot madaniyati deganda shaxsning axborotga bo‘lgan ehtiyojini anglash, axborot manbalarini tanlash, ularning ishonchliligini baholash, axborot-kommunikatsiya texnologiyalaridan samarali foydalanish, axborotni ilmiy va kasbiy faoliyatda qo‘llash hamda axborot almashinuvi jarayonida axloqiy va huquqiy me’yorlarga rioya etish bilan bog‘liq bilim, ko‘nikma, malaka va kompetensiyalar majmui tushuniladi. Mazkur tushuncha faqat texnik savodxonlikni emas, balki tanqidiy fikrlash, media savodxonlik, raqamli etikaga rioya qilish, kiberxavfsizlik madaniyati hamda axborot xavfsizligini ta’minlash kabi komponentlarni ham o‘z ichiga oladi.

Oliy ta’lim tizimida axborot madaniyatini rivojlantirish talabalarning mustaqil ta’lim faoliyatini tashkil etish, ilmiy izlanishlar olib borish, elektron ta’lim resurslaridan samarali foydalanish, akademik halollik tamoyillariga rioya

qilish hamda raqamli ta’lim muhitida faol ishtirok etish imkoniyatlarini kengaytiradi. Shu bois axborot madaniyatini rivojlantirish zamonaviy kompetensiyaviy ta’limning muhim yo‘nalishlaridan biri sifatida e’tirof etiladi.

Fanlararo yondashuvning ta’limdagi ahamiyati. Fanlararo aloqadorlik zamonaviy pedagogikaning ustuvor tamoyillaridan biri bo‘lib, turli fanlarning mazmuni, metodlari va texnologiyalarini o‘zaro integratsiyalash orqali yaxlit bilimlar tizimini shakllantirishga xizmat qiladi. Bunday yondashuv talabalarda o‘rganilayotgan hodisa va jarayonlarni kompleks tahlil qilish, fanlar o‘rtasidagi mantiqiy bog‘liqlikni anglash hamda nazariy bilimlarni amaliy faoliyatga tatbiq etish kompetensiyalarini rivojlantiradi.

Talabalarda axborot madaniyatini rivojlantirish jarayonida fanlararo aloqadorlik alohida ahamiyat kasb etadi. Chunki axborot bilan ishlash kompetensiyalari faqat informatika yoki axborot texnologiyalari fanlarida emas, balki barcha o‘quv fanlari mazmunida shakllanadi. Masalan, pedagogika fanida elektron ta’lim resurslarini tahlil qilish, matematikada statistik ma’lumotlarni raqamli vositalar yordamida qayta ishlash, tarix fanida elektron arxivlar va raqamli kutubxonalardan foydalanish, biologiyada virtual laboratoriyalar bilan ishlash, iqtisodiyot fanida katta hajmdagi ma’lumotlarni tahlil qilish kabi faoliyatlar axborot madaniyatining rivojlanishiga xizmat qiladi.

Fanlararo integratsiya asosida tashkil etilgan ta’lim talabalarda tizimli fikrlash, muammoli vaziyatlarni tahlil qilish, kreativ yondashuv, jamoada ishlash, ilmiy-tadqiqot kompetensiyasi hamda axborotdan samarali foydalanish ko‘nikmalarini rivojlantiradi. Shu bilan birga, u axborot madaniyatining motivatsion, kognitiv va konativ komponentlarini kompleks ravishda shakllantirish imkonini beradi.

Talabalarda axborot madaniyatini shakllantirish usullari. Talabalarda axborot madaniyatini rivojlantirish murakkab va ko‘p bosqichli pedagogik jarayon bo‘lib, zamonaviy ta’lim texnologiyalari, interfaol metodlar hamda fanlararo integratsiyaga asoslangan metodik yondashuvlarni qo‘llashni

talab etadi. Tadqiqot natijalari hamda ilg‘or pedagogik tajribalar asosida quyidagi usullar samarali hisoblanadi:

1. elektron kutubxonalar, ilmiy ma’lumotlar bazalari va raqamli ta’lim resurslaridan maqsadli foydalanishni tashkil etish;
2. interfaol metodlar, multimedia vositalari va raqamli platformalar asosida mashg‘ulotlarni tashkil qilish;
3. tanqidiy fikrlashni rivojlantirishga xizmat qiluvchi muammoli vaziyatlar, keyslar va tahliliy topshiriqlardan foydalanish;
4. media savodxonlik, axborot xavfsizligi va kiberxavfsizlik bo‘yicha treninglarni tashkil etish;
5. fanlararo loyiha ishlari, tadqiqot faoliyati va jamoaviy muhokamalarni yo‘lga qo‘yish;
6. sun’iy intellekt, virtual laboratoriyalar, bulutli texnologiyalar va masofaviy ta’lim platformalaridan foydalanish asosida mustaqil ta’lim faoliyatini rivojlantirish.

Mazkur usullar talabalarning axborot bilan ishlash kompetensiyalarini, ijodiy va tanqidiy fikrlashini, raqamli savodxonligini hamda ilmiy-tadqiqot faoliyatiga tayyorgarligini oshiradi.

O‘qituvchilarning roli. Talabalarda axborot madaniyatini rivojlantirish samaradorligi ko‘p jihatdan pedagogning kasbiy kompetentligiga, innovatsion faoliyatiga va raqamli texnologiyalarni qo‘llash mahoratiga bog‘liq. Zamonaviy o‘qituvchi nafaqat bilim beruvchi, balki ta’lim jarayonining tashkilotchisi, fasilitatori, konsultanti va motivatori sifatida faoliyat yuritishi zarur.

Pedagog fanlararo aloqadorlikni ta’minlash orqali turli fanlarning mazmunini integratsiyalash, axborot-kommunikatsiya texnologiyalarini ta’lim jarayoniga samarali joriy etish, innovatsion pedagogik metodlardan foydalanish hamda talabalarni mustaqil bilim olishga yo‘naltirish vazifalarini bajaradi. Shuningdek, o‘qituvchi akademik halollik tamoyillariga rioya etish, axborot manbalaridan to‘g‘ri foydalanish, plagiatning oldini olish, raqamli etika va

axborot xavfsizligi madaniyatini shakllantirish bo‘yicha talabalarga namuna bo‘lishi lozim.

Pedagogning axborot-kommunikatsiya texnologiyalari bo‘yicha kompetentligi, fanlararo integratsiyani tashkil etish mahorati hamda innovatsion pedagogik faoliyati talabalarda axborot madaniyatini rivojlantirishning muhim pedagogik shartlaridan biri hisoblanadi.

XULOSA

Fanlararo aloqadorlik asosida talabalarda axborot madaniyatini rivojlantirish oliy ta’lim tizimini modernizatsiya qilishning ustuvor yo‘nalishlaridan biri hisoblanadi. Mazkur yondashuv ta’lim mazmunining integratsiyasini ta’minlab, talabalarda axborotni izlash, tahlil qilish, baholash, qayta ishlash va undan samarali foydalanish kompetensiyalarini kompleks ravishda rivojlantirish imkonini beradi.

Fanlararo integratsiyaga asoslangan pedagogik mexanizmlarni takomillashtirish, zamonaviy raqamli texnologiyalar va sun’iy intellekt vositalaridan foydalanish, innovatsion ta’lim metodlarini joriy etish hamda o‘qituvchilarning kasbiy kompetentligini muntazam rivojlantirish talabalarda axborot madaniyatining motivatsion, kognitiv va konativ komponentlarini samarali shakllantirishga xizmat qiladi. Natijada oliy ta’lim muassasalarida zamonaviy axborot makonida mustaqil faoliyat yurita oladigan, tanqidiy fikrlovchi, raqamli kompetensiyalarga ega va raqobatbardosh mutaxassislarni tayyorlash uchun mustahkam pedagogik asos yaratiladi.

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BO‘LAJAK O‘QITUVCHILARDA KASBIY ETIKA VA AKDEMIK HALOLLIKNI SHAKLLANTIRISHNING PEDAGOGIK ASOSLARI

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Annotatsiya: *Mazkur maqolada bo’lajak o’qituvchilarda kasbiy etika madaniyati va akademik halollikni rivojlantirishning nazariy pedagogik asoslari tahlil qilingan. Kasbiy etika va akademik halollik tushunchalarining mazmun-mohiyati, ularning o’zaro bog’liqligi hamda pedagog shaxsini shakllantirishdagi ahamiyati yoritilgan.Xorijiy va milliy ilmiy manbaalar asosida mazkur tushunchalarning ilmiy talqinlari qiyosiy tahlil qilinib, zamonaviy oliy ta’lim sharoitida bo’lajak o’qituvchilarda kasbiy ma’suliyat, akademik halollikva pedagogic madaniyatni rivojlantirishning ustuvor yo’nalishlari asoslab berilgan. Shuningdek, sun’iy intellect va raqamli ta’lim texnologiyalarining rivojlanishi sharoitida akademik halollikni ta’minlashning dolzarb jihatlari ochib berilgan.*

Kalit so’zlari: *kasbiy etika, kademik halollik, bo’lajak o’qituvchi,pedagogik tamoyillar, akademik madaniyat, pedagogik kompetentlik, oliy ta’lim, sun’iy intellekt*

Abstract: *This article analyzes the theoretical and pedagogical foundations for developing professional ethics culture and academic integrity among prospective teachers. The essence of professional ethics and academic integrity, their interrelationship, and their role in improving future teachers' professional competence are discussed. Based on an analysis of international, CIS, and Uzbek scientific literature, the study identifies contemporary approaches to strengthening ethical culture in teacher education. The article concludes that integrating professional ethics and academic integrity into the teacher education process contributes to improving educational quality, fostering responsible professional behavior, and ensuring transparency and trust in higher education.*

Keywords: *prospective teacher, professional ethics, academic integrity, ethical culture, pedagogical competence, teacher education, higher education, educational quality.*

KIRISH

Jahonda ta'lim sifatini oshirish, pedagog kadrlarning kasbiy kompetentligini takomillashtirish hamda ta'lim jarayonida akademik halollik tamoyillarini qaror toptirish ustuvor yo'nalishlardan biri sifatida e'tirof etilmoqda.[1;2] Globallashuv, raqamli texnologiyalar va generativ sun'iy intellekt vositalarining ta'lim jarayoniga keng kirib kelishi sharoitida bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni rivojlantirishga bo'lgan ehtiyoj yanada ortmoqda.[3;4] Chunki zamonaviy o'qituvchi nafaqat o'z fanini mukammal bilishi, balki kasbiy faoliyatida halollik, adolat, mas'uliyat va pedagogik odob me'yorlariga qat'iy amal qilishi zarur[5]. Bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni shakllantirish oliy ta'lim tizimining muhim vazifalaridan biri hisoblanadi. Mazkur sifatlar pedagogning kasbiy faoliyat samaradorligini oshirish, ta'lim jarayonida shaffoflik va ishonch muhitini yaratish hamda ta'lim oluvchilarda halol o'qish va ilmiy izlanish madaniyatini qaror toptirishda muhim ahamiyat kasb etadi. Mavzuga oid ilmiy adabiyotlar tahlili shuni ko'rsatadiki, xorijiy olimlar kasbiy etika va akademik halollikni asosan professional kompetentlik, institutsional ishonch hamda akademik madaniyat bilan bog'liq holda tadqiq etgan bo'lsalar, MDH mamlakatlari olimlari pedagogik deontologiya, kasbiy burch va vijdoniy mas'uliyat masalalariga alohida e'tibor qaratgan[6;7;8]. O'zbekiston pedagogika ilmida esa mazkur tushunchalar ko'proq ma'naviy-axloqiy tarbiya, pedagogik odob va muomala madaniyati bilan uzviy bog'liq holda yoritilgan[9;10] Shu bilan birga, bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni yagona integrativ pedagogik tizim sifatida rivojlantirish masalasi qo'shimcha ilmiy tadqiqotlarni talab etmoqda. Mazkur maqolaning maqsadi bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni rivojlantirishning nazariy-pedagogik asoslarini tahlil qilish hamda ularni takomillashtirishga oid ilmiy xulosalarni ishlab chiqishdan iborat.

TADQIQOT METODOLOGIYASI

Mazkur tadqiqot bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni rivojlantirishning nazariy-pedagogik asoslarini aniqlashga qaratilgan. Tadqiqotning metodologik asosini pedagogik hodisalarni tizimli, kompetensiyaviy, aksiologik va shaxsga yo'naltirilgan yondashuvlar tashkil etdi[2;5]. Tadqiqot jarayonida ilmiy bilishning tahlil va sintez, qiyosiy tahlil, umumlashtirish, tizimlashtirish hamda mantiqiy xulosalash metodlaridan foydalanildi[1;6] Shuningdek, UNESCO, International Center for Academic Integrity (ICAI) hamda xorijiy va mahalliy olimlarning kasbiy etika va akademik halollikka oid ilmiy ishlari qiyosiy tahlil qilindi. O'zbekiston Respublikasining ta'lim sohasiga oid me'yoriy-huquqiy hujjatlari, oliy ta'limni rivojlantirishga qaratilgan davlat dasturlari va ilmiy adabiyotlar mazmunan tahlil etildi. Tadqiqot davomida kasbiy etika madaniyati va akademik halollik tushunchalarining mazmuni, ularning o'zaro bog'liqligi hamda bo'lajak o'qituvchilar kasbiy kompetentligini rivojlantirishdagi o'rni ilmiy-nazariy jihatdan asoslandi. Olingan natijalar asosida mazkur yo'nalishda pedagogik xulosalar va ilmiy-amaliy tavsiyalar ishlab chiqildi.

NAZARIY TAHLIL

Zamonaviy oliy pedagogik ta'lim tizimida bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni rivojlantirish ta'lim sifatini ta'minlashning muhim omillaridan biri sifatida e'tirof etilmoqda. Kasbiy etika pedagogning kasbiy burchi, mas'uliyati, adolatliligi, pedagogik odobi va shaxsiy namunasini ifodalovchi axloqiy me'yorlar majmui bo'lsa, akademik halollik ilmiy va ta'lim faoliyatida halollik, mualliflik huquqiga hurmat, mustaqil fikrlash hamda baholashning shaffofligini ta'minlovchi qadriyatlar tizimini anglatadi[5;7]

Ilmiy adabiyotlar tahlili shuni ko'rsatadiki, xorijiy tadqiqotchilar kasbiy etika va akademik halollikni institutsional madaniyat hamda professional kompetentlikning tarkibiy qismi sifatida baholaydilar. MDH olimlari esa ushbu tushunchalarni pedagogik deontologiya, kasbiy burch va vijdoniy mas'uliyat

bilan bog'laydi. O'zbek pedagogika maktabida esa kasbiy etika ko'proq ma'naviy qadriyatlar, pedagogik mahorat, muomala madaniyati va ustozning shaxsiy namunasi orqali talqin qilinadi. Muallifning fikricha, bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni alohida-alohida emas, balki o'zaro uzviy bog'liq pedagogik hodisa sifatida rivojlantirish zarur. Chunki kelajakdagi pedagogning kasbiy faoliyati nafaqat chuqur bilim va metodik tayyorgarlikni, balki halol ilmiy faoliyat, adolatli baholash, mas'uliyatli qaror qabul qilish hamda ta'lim jarayonida axloqiy me'yorlarga qat'iy rioya etishni ham talab etadi. Shu bois pedagog kadrlarni tayyorlash jarayonida kasbiy etika va akademik halollikni kompetensiyaviy yondashuv asosida shakllantirish, ularni ta'lim mazmuniga integratsiya qilish hamda zamonaviy raqamli va sun'iy intellekt texnologiyalaridan mas'uliyatli foydalanish ko'nikmalarini rivojlantirish dolzarb vazifalardan biri hisoblanadi.

MUALLIFLIK TAHLILI VA MUNOZARA

Ilmiy manbalar tahlili shuni ko'rsatadiki, xorijiy tadqiqotlarda kasbiy etika va akademik halollik asosan institutsional boshqaruv, akademik madaniyat hamda baholashning shaffofligi bilan bog'liq holda talqin etiladi. MDH mamlakatlari olimlari esa mazkur tushunchalarni pedagogik deontologiya, kasbiy burch va vijdoniy mas'uliyat nuqtai nazaridan yoritadilar. O'zbekiston pedagogik tadqiqotlarida esa ushbu masala ko'proq ma'naviy-axloqiy tarbiya, pedagogik odob va muomala madaniyati doirasida o'rganilgan. Biroq mavjud tadqiqotlar tahlili shuni ko'rsatadiki, bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni yagona integrallashgan pedagogik tizim sifatida rivojlantirish masalasi yetarli darajada ochib berilmagan[2;4;8] Ayniqsa, generativ sun'iy intellekt texnologiyalarining ta'lim jarayoniga keng kirib kelishi akademik halollikni ta'minlashning yangi pedagogik yondashuvlarini ishlab chiqishni talab etmoqda. Muallifning fikricha, kasbiy etika madaniyati va akademik halollikni alohida kompetensiyalar sifatida emas, balki bo'lajak o'qituvchining kasbiy kompetentligini belgilovchi o'zaro bog'liq integrativ tizim

sifatida shakllantirish maqsadga muvofiqdir. Bunda aksiologik, kompetensiyaviy va shaxsga yo'naltirilgan yondashuvlarning uyg'unligi pedagoglarni nafaqat kasbiy faoliyatga, balki ilmiy va akademik faoliyatda ham mas'uliyatli qaror qabul qilishga tayyorlaydi. Shu nuqtai nazardan, oliy ta'lim muassasalarida kasbiy etika va akademik halollikni rivojlantirishga qaratilgan maxsus pedagogik mexanizmlar, baholash mezonlari va o'quv-uslubiy ta'minotni takomillashtirish zarur. Bu esa bo'lajak o'qituvchilarning kasbiy tayyorgarligi sifatini oshirish hamda ta'lim tizimida akademik halollik madaniyatini mustahkamlashga xizmat qiladi.

XULOSA

Tadqiqot natijalari shuni ko'rsatdiki, bo'lajak o'qituvchilarda kasbiy etika madaniyati va akademik halollikni rivojlantirish zamonaviy pedagogik ta'limning ustuvor yo'nalishlaridan biri hisoblanadi. Kasbiy etika pedagogning kasbiy faoliyatini tartibga soluvchi axloqiy me'yorlar tizimi bo'lsa, akademik halollik ilmiy va ta'lim jarayonida halollik, adolat, mas'uliyat hamda mualliflik huquqiga hurmatni ta'minlovchi muhim qadriyat sifatida namoyon bo'ladi. Nazariy tahlillar xorijiy, MDH va milliy ilmiy maktablarda mazkur tushunchalarning turli metodologik yondashuvlar asosida talqin etilganligini ko'rsatdi. Shu bilan birga, ularning bo'lajak o'qituvchi kasbiy kompetentligini rivojlantirishdagi o'zaro uzviy bog'liqligi ilmiy jihatdan asoslandi. Muallifning fikricha, kasbiy etika madaniyati va akademik halollikni alohida yo'nalishlar sifatida emas, balki bo'lajak o'qituvchining kasbiy tayyorgarligini belgilovchi yagona integrativ pedagogik tizim sifatida rivojlantirish maqsadga muvofiqdir. Bunda kompetensiyaviy, aksiologik va shaxsga yo'naltirilgan yondashuvlarni ta'lim jarayoniga izchil tatbiq etish muhim ahamiyat kasb etadi. Shuningdek, generativ sun'iy intellekt va raqamli ta'lim texnologiyalarining keng qo'llanilishi sharoitida akademik halollikni ta'minlash bo'yicha yangi pedagogik mexanizmlarni ishlab chiqish, ta'lim jarayonini takomillashtirish hamda bo'lajak

o'qituvchilarda mas'uliyatli akademik xulq-atvorni shakllantirish dolzarb ilmiy-amaliy vazifa hisoblanadi.

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COGNITIVE, SOCIO-EMOTIONAL, AND ACADEMIC IMPACTS OF CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL)

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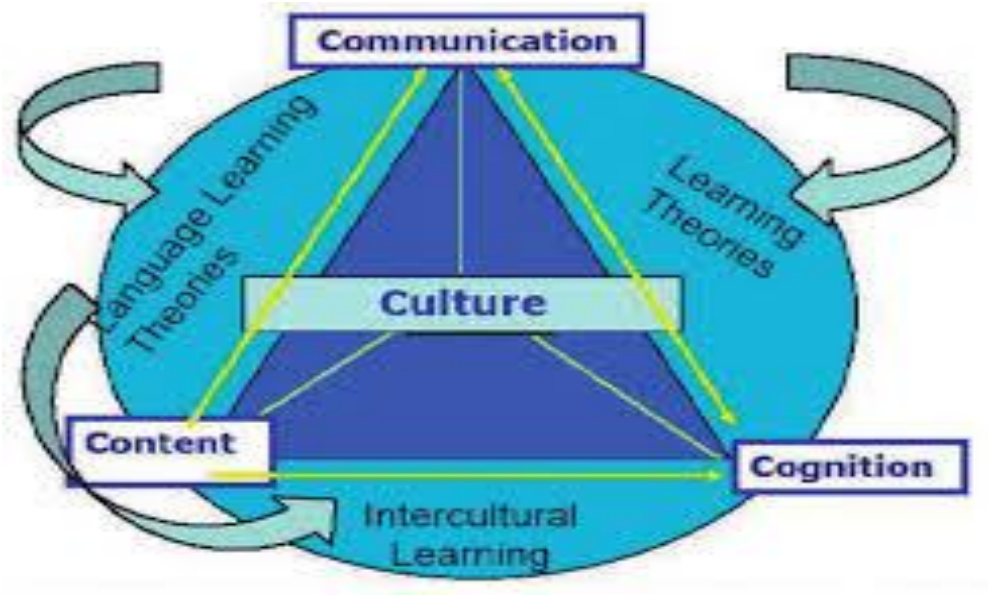
Annotation. *Content and Language Integrated Learning (CLIL) is an innovative educational approach that combines subject content and language learning within multilingual settings. This article explores the cognitive, socio-emotional, and academic impacts of CLIL through a qualitative review of empirical and theoretical studies. The findings indicate that CLIL enhances higher-order thinking, cognitive flexibility, collaboration, self-regulation, and learner motivation while improving academic achievement. However, its effectiveness depends on appropriate pedagogical design, teacher competence, and the integration of social and emotional learning principles. The study concludes that CLIL is a holistic approach that promotes both cognitive and personal development and recommends further research on integrating socio-emotional learning into CLIL practice.*

Key words: *CLIL, socio-emotional, academic, learning.*

INTRODUCTION

Content and Language Integrated Learning (CLIL) has gained widespread recognition over recent decades as an effective pedagogical approach aimed at promoting multilingual education. By integrating subject content and language instruction, CLIL seeks to develop not only learners' linguistic competence but also their cognitive processes, socio-emotional development, and academic achievement. The "4C model" proposed by Coyle, Hood, and Marsh (2010)—comprising content, communication, cognition, and culture—conceptualizes CLIL as a multidimensional educational framework. Although existing research highlights the positive impact of CLIL on academic achievement, its effects on cognitive and socio-emotional development have not yet been sufficiently examined in a systematic manner. In particular, the role of CLIL in fostering

higher-order thinking skills and its alignment with social and emotional learning (SEL) require further scholarly attention. Therefore, the main aim of this article is to provide a comprehensive analysis of the cognitive, socio-emotional, and academic impacts of CLIL.



Methods. This study is based on a qualitative bibliographic analysis methodology. on scientific articles, empirical studies and literature reviews on CLIL. The main sources included Mortimore (2023), Campillo-Ferrer et al. (2020), Nieto Moreno de Diezmas (2012), García and Vélez Yanza (2025), and the international requirement for the integration of CLIL and SEL. During the analysis, the articles were coded according to three main thematic areas:

COGNITIVE	SOCIAL-EMOTIONAL COMPETENCIES	ACADEMIC DOCUMENTS
Critical Thinking	Communication Skills	Academic Writing
Creativity	Emotional Intelligence	Research Proposal
Problem Solving	Teamwork	Scientific Article
Analytical Thinking	Leadership & Collaboration	Thesis / Dissertation

The impact of the formation, adjustment and implementation of CLIL along each path was identified and summarized based on the resulting analysis.

The literature review showed a significant positive impact of CLIL in three areas.

Cognitive outcomes. Campillo-Ferrer et al. (2020) research shows that although cognitive processes in CLIL lessons are often focused on low-level thinking operations (remembering and understanding), properly planned CLIL has the potential to develop higher-level thinking skills (analyzing, evaluating and creating). A bilingual environment increases cognitive flexibility and problem-solving skills in students.

Socio-emotional outcomes. Mortimore (2023) and Nieto Moreno de Diezmas (2012) research show a strong synergy between CLIL and SEL. Teamwork, communication and reflection in CLIL lessons develop empathy, self-regulation and social responsibility in students. A positive classroom environment reduces the stress and anxiety that can arise during the process of learning a foreign language.

Academic outcomes. According to a literature review by García and Vélez Yanza (2025), CLIL increases students' academic achievement, especially by allowing them to understand content more deeply and use language in real-world contexts. CLIL also increases students' motivation and engagement in the classroom.

The results show that the cognitive, socio-emotional and academic effects of CLIL are closely related. When cognitively complex tasks are combined with socio-emotional support, academic achievement increases significantly. This situation provides the basis for interpreting CLIL not only as a language teaching model, but also as a pedagogical platform for the comprehensive development of the individual.

However, some studies show that higher-level thinking skills are not sufficiently developed in CLIL practice. This situation is directly related to the

methodological preparation of teachers and the planning of subject-language integration. Also, the conscious integration of socio-emotional components into the lesson process is shown to be an important factor in increasing the effectiveness of CLIL.

CONCLUSION

The results of the analysis show that the CLIL approach has a complex and interrelated impact on the cognitive, socio-emotional and academic development of students. CLIL is not only a language learning tool, but also a pedagogical platform for the comprehensive development of the individual. In particular, a positive classroom environment, high-level cognitive tasks and emotional support are the main factors that increase the effectiveness of CLIL.

In order to implement CLIL more effectively in the future, it is necessary to strengthen the professional development of teachers, the systematic integration of SEL components and methodological approaches aimed at developing higher-level thinking.

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LOYIHA ASOSIDA O‘QITISHNING ZAMONAVIY YONDASHUVLARI VA BESH BOSQICHLI MODELI

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Annotatsiya: *Mazkur maqolada loyiha asosida o‘qitish (LAO‘) metodining nazariy asoslari, rivojlanish bosqichlari va zamonaviy ta’limdagi o‘rni tahlil qilinadi. Tadqiqotda loyiha metodining shakllanishiga hissa qo‘shgan mahalliy va xorijiy olimlarning ilmiy qarashlari ko‘rib chiqilib, Sheppard va Stollerning sakkiz bosqichli modeli, Alan va Stollerning o‘n bosqichli modeli hamda Stoller va Myers tomonidan taklif etilgan besh bosqichli model qiyosiy tahlil qilinadi. Maqolada besh bosqichli modelning tayyorgarlik, ma’lumot yig‘ish, ma’lumotlarni qayta ishlash, natijalarni taqdim etish va refleksiya bosqichlari mazmuni yoritiladi. Shuningdek, loyiha asosida o‘qitishning talabalarda mustaqil ta’lim olish, tanqidiy fikrlash, hamkorlikda ishlash, muammoni hal etish hamda kommunikativ kompetensiyalarni rivojlantirishdagi ahamiyati asoslab beriladi. Tadqiqot natijalari loyiha metodining chet tillarini o‘qitish jarayonida samarali pedagogik texnologiya sifatida qo‘llanishini tasdiqlaydi.*

Kalit so‘zlar: *loyiha asosida o‘qitish , pedagogik texnologiya, besh bosqichli model, refleksiya, kommunikativ kompetensiya, chet tillarini o‘qitish.*

Abstract*: This article examines the theoretical foundations, developmental stages, and significance of Project-Based Learning (PBL) in contemporary education. The study reviews the scholarly contributions of both international and regional researchers to the development of the project method and provides a comparative analysis of the eight-stage model proposed by Sheppard and Stoller, the ten-stage model developed by Alan and Stoller, and the five-stage framework introduced by Stoller and Myers. Particular attention is paid to the content and structure of the five stages: preparation, information gathering, information processing, information display, and reflection. The article also highlights the role of PBL in fostering*

independent learning, critical thinking, collaboration, problem-solving abilities, and communicative competence among students. The findings suggest that Project-Based Learning serves as an effective pedagogical approach for enhancing both language acquisition and the development of essential 21st-century skills in foreign language education.

Keywords: *Project-Based Learning (PBL), project method, pedagogical technology, five-stage framework, reflection, communicative competence, foreign language teaching.*

KIRISH

Loyiha asosida o‘qitish (LAO‘) metodologiyasi uzoq yillar davomida takomillashib borgan bo‘lib, zamonaviy tadqiqotlarda uning bosqichma-bosqich tashkil etilgan modeli alohida ahamiyat kasb etadi. LAO‘ning besh bosqichli modeli ushbu yondashuvni amaliyotga tatbiq etish jarayonida to‘plangan ko‘p yillik tajribalar asosida shakllangan.

Loyiha asosida o‘qitish metodologiyasining rivojlanishi turli davrlarda turli olimlar tomonidan taklif etilgan bosqichli modellar orqali namoyon bo‘ladi. Dastlab loyiha metodining nazariy asoslari amerikalik pedagog Jon Dyui va uning shogirdi Uilyam Kilpatrik tomonidan ishlab chiqilgan bo‘lsa, keyingi tadqiqotlarda loyihani amalga oshirishning amaliy bosqichlari batafsil tavsiflandi. Masalan, Sheppard va Stoller (1995) chet tilini o‘qitish jarayonida loyiha ishlarini tashkil etish uchun sakkiz bosqichli modelni taklif etdilar. Ushbu model loyiha mavzusini tanlash, ma’lumot to‘plash, tahlil qilish va yakuniy mahsulotni taqdim etish kabi jarayonlarni qamrab oladi. Keyinchalik Alan va Stoller (2005) loyiha faoliyatini yanada batafsil tavsiflash maqsadida o‘n bosqichli modelni ishlab chiqdilar. Mazkur modelda rejalashtirish, axborotni qayta ishlash, oraliq natijalarni muhokama qilish va yakuniy refleksiya bosqichlariga alohida e’tibor qaratilgan. Tomas (2000) loyiha asosida o‘qitishning asosiy komponentlarini aniqlab, loyihaning markazida muammo yoki muhim savol turishi, o‘quvchilarning mustaqil tadqiqot olib borishi va real mahsulot yaratishi zarurligini ta’kidlagan.

ASOSIY QISM

Rossiyalik olim E. S. Polat (2000) loyiha metodini ta’lim texnologiyasi sifatida tavsiflab, uni muammoni aniqlash, faoliyatni rejalashtirish, tadqiqot olib borish, natijalarni rasmiylashtirish va himoya qilish bosqichlariga ajratadi. Uning modeli MDH mamlakatlarida loyiha metodini amaliyotga joriy etishda keng qo‘llanilgan. Shuningdek, Pakhomova (2005) loyiha faoliyatini tayyorgarlik, rejalashtirish, tadqiqot, natijalarni taqdim etish va baholash bosqichlari orqali tashkil etishni taklif qilgan. Tadqiqotchining fikricha, loyiha faoliyatining har bir bosqichida o‘quvchilarning mustaqilligi va ijodkorligini rivojlantirish muhim ahamiyatga ega.

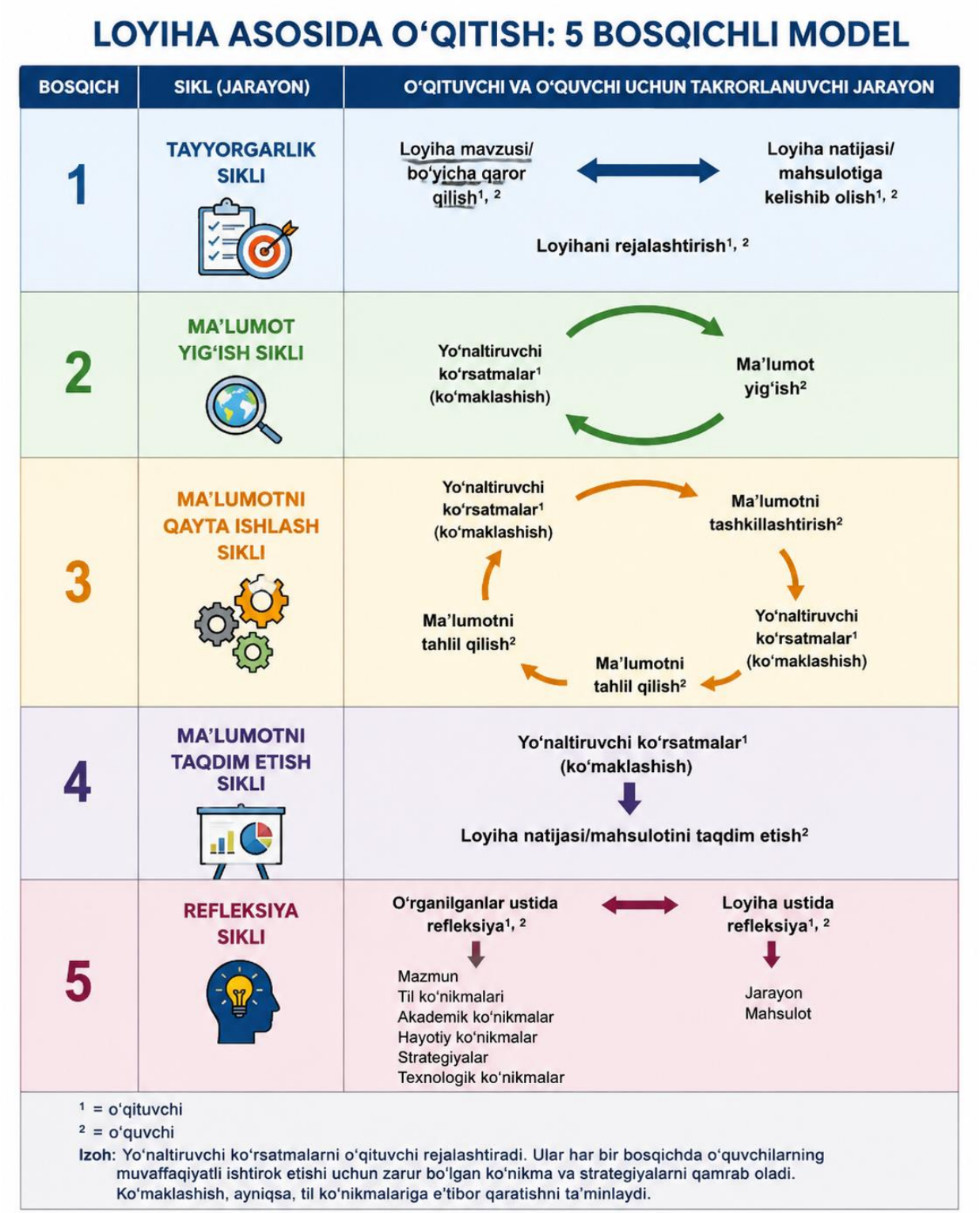
So‘nggi yillarda Stoller va Myers (2020) tomonidan ishlab chiqilgan besh bosqichli model loyiha asosida o‘qitishning iterativ xarakterini, til rivojlantirish ehtiyojlarini hamda refleksiya jarayonlarini hisobga olishi bilan ajralib turadi. Ushbu model zamonaviy chet tili ta’limida eng mukammal va tizimli yondashuvlardan biri sifatida e’tirof etilmoqda. (Rasm 1).

Mazkur model o‘quvchilarning loyihadagi faol ishtiroki hamda o‘qituvchining maqsadli pedagogik ko‘magi uyg‘unligini ta’minlaydi. Uning asosiy afzalligi loyiha faoliyatining chiziqli emas, balki takrorlanuvchi va rivojlanuvchi xarakterga ega ekanligini e’tirof etishidadir. Har bir bosqichda o‘quvchilardan turli ko‘nikma va strategiyalarni qo‘llash talab qilinadi, shu bilan birga o‘qituvchining roli ham loyiha jarayonining rivojlanishiga mos ravishda o‘zgarib boradi.

Besh bosqichli LAO‘ modeli loyihaning yakuniy natijasiga erishish bilan bir qatorda refleksiya va baholash jarayonlariga ham alohida e’tibor qaratadi. Ushbu yondashuv o‘quvchilarning til kompetensiyalarini rivojlantirish zaruratini ham hisobga oladi, chunki amaliyotda loyiha mazmuniga haddan tashqari e’tibor qaratilishi natijasida til ko‘nikmalarini rivojlantirish masalasi ba’zan ikkinchi darajaga tushib qolishi mumkin.

Shuningdek, mazkur model o‘quvchilarga loyiha faoliyatining boshlanishidan yakunigacha bo‘lgan jarayonni aniq tasavvur qilish imkonini

beradi, ularning motivatsiyasi va o‘quv faoliyatiga jalb etilganlik darajasini oshiradi. Jarayon davomida o‘quvchilar axborotni izlash, tahlil qilish, qayta ishlash va taqdim etish uchun zarur bo‘lgan ko‘nikmalarni egallaydilar. Natijada ular mustaqil yoki hamkorlikda ishlash orqali muvaffaqiyatga erishish uchun zarur bo‘lgan ishonch va tajribani shakllantiradilar hamda o‘z faoliyatini tahlil qilish va baholash imkoniyatiga ega bo‘ladilar.



XULOSA

Loyiha asosida o‘qitish zamonaviy ta’limning talaba markazli yondashuvlaridan biri bo‘lib, o‘quvchilarning bilimlarni amaliy faoliyat orqali egallashiga xizmat qiladi. Tadqiqot davomida loyiha metodining tarixiy

rivojlanishi va turli olimlar tomonidan taklif etilgan bosqichli modellar tahlil qilindi. Tahlillar shuni ko‘rsatdiki, Stoller va Mayers tomonidan ishlab chiqilgan besh bosqichli model loyiha faoliyatining barcha muhim jihatlarini qamrab olishi, o‘quvchilar faoliyatini bosqichma-bosqich tashkil etishi hamda refleksiya jarayoniga alohida e’tibor qaratishi bilan ajralib turadi.

Mazkur modelni chet tillarini o‘qitish jarayonida qo‘llash talabalarning til kompetensiyasi, tadqiqotchilik ko‘nikmalari, axborot bilan ishlash malakalari va hamkorlikda ishlash qobiliyatlarini rivojlantirishga xizmat qiladi. Shuningdek, loyiha asosida o‘qitish talabalarni mustaqil fikrlashga, real muammolar yechimini izlashga va o‘z ta’lim natijalari uchun mas’uliyatni his etishga undaydi. Shu sababli loyiha metodini zamonaviy ta’lim amaliyotiga keng joriy etish hamda uning metodik imkoniyatlarini yanada chuqur tadqiq etish muhim ilmiy va amaliy ahamiyatga ega.

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O'QUV JARAYONIDA INNOVATSION FORSAYT-TEXNOLOGIYALARDAN FOYDALANISHNING PEDAGOGIK SAMARADORLIK SHARTLARI

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Annotatsiya: *Maqolada oliy ta'lim tizimida Delphi metodi, yo'l xaritalari va ssenariylashtirish kabi innovatsion forsayt-texnologiyalardan foydalanishning pedagogik samaradorlik shartlari tadqiq etilgan. Ma'ruzalarni strategik tahlil platformasiga aylantirish mexanizmlari yoritilib, talabalarning prognostik kompetensiyalarini hamda tizimli fikrlash qobiliyatlarini rivojlantirish bo'yicha ilmiy-amaliy tavsiyalar asoslab berilgan.*

Kalit so'zlar: *Forsayt-texnologiya, Delphi metodi, yo'l xaritalari, ssenariylashtirish, pedagogik samaradorlik, strategik kompetensiya, ta'lim trayektoriyasi, modellashtirish, innovatsion ta'lim, integratsiya, interaktiv metodlar.*

Abstract: *The article investigates the pedagogical effectiveness conditions of utilizing innovative foresight technologies, such as the Delphi method, roadmapping, and scenario planning, within higher education. It highlights mechanisms for transforming lectures into strategic analysis platforms and substantiates scientific-practical recommendations for developing students' prognostic competencies and systemic thinking abilities.*

Keywords: *Foresight technology, Delphi method, roadmapping, scenario planning, pedagogical effectiveness, strategic competence, educational trajectory, modeling, innovative education, integration, interactive methods.*

KIRISH

Jahonda globallashuv va raqamli transformatsiya jarayonlarining jadallashishi oliy ta'lim tizimi oldiga nafaqat bugungi kun talablariga javob beradigan, balki uzoq muddatli istiqbolda mehnat bozoridagi o'zgarishlarni oldindan ko'ra biladigan va ularga moslasha oladigan yuqori malakali kadrlarni

tayyorlash vazifasini qo’ymoqda. An’anaviy ta’lim modellari ko’p hollarda o’tmish tajribasi va bugungi kunning statik ehtiyojlariga asoslangani sababli, yaqin kelajakda paydo bo’ladigan mutaxassisliklar va texnologik tendensiyalarni oldindan prognoz qilishda ojizlik qilmoqda. Shu bois, zamonaviy pedagogikada ta’lim mazmuni va uning strategik yo’nalishlarini belgilashda prognozlashtirish, loyihalash va kelajakni modellashtirish imkonini beruvchi innovatsion forsayt-texnologiyalarni (inglizcha “foresight”- kelajakni ko’ra bilish, istiqbolni belgilash) o’quv jarayoniga integratsiya qilish obgktiv zaruriyatga aylanmoqda. O’quv jarayonida forsayt-texnologiyalardan foydalanish shunchaki o’qitishning yangi metodikasini joriy etish emas, balki ta’lim oluvchilarning strategik va kreativ fikrlash, muqobil kelajak ssenariylarini tahlil qilish hamda nostandart sharoitlarda optimal qarorlar qabul qilish ko’nikmalarini shakllantirishga qaratilgan fundamental pedagogik tizimdir. Ushbu tadqiqot doirasida forsayt instrumentariyasining eng samarali vositalari hisoblangan Delphi metodi, “Yo’l xaritalari” (Roadmapping) va Ssenariylashtirish (Scenario planning) texnologiyalarining o‘quv jarayonidagi o‘rni hamda ularni qo’llashning pedagogik samaradorlik shartlari ilmiy jihatdan asoslab beriladi.

Muammoning pedagogik jihati shundaki, forsayt-texnologiyalar dastlab iqtisodiy, texnologik va harbiy-strategik sohalarda uzoq muddatli rejalashtirish vositasi sifatida shakllangan bo’lsa-da, ularning ta’lim muhitiga transfer qilinishi o’ziga xos didaktik va metodologik o’zgarishlarni talab etadi. Pedagogik forsayt talabalarda mustaqil tadqiqotchilik kompetensiyalarini rivojlantirish bilan bir qatorda, ularni passiv tinglovchidan faol strategik subektga aylantiradi. Biroq, ta’lim amaliyotida ushbu texnologiyalardan tizimli foydalanmaslik, pedagog kadrlarning metodik tayyorgarligi pastligi va ta’lim dasturlarining moslashuvchan emasligi forsaytning potensial samaradorligini pasaytirmoqda. Shuning uchun, ushbu texnologiyalarni ta’lim jarayonida muvaffaqiyatli

realizatsiya qilishning pedagogik, tashkiliy va psixologik shart-sharoitlarini aniqlash va tizimlashtirish dolzarb ilmiy muammo hisoblanadi.

ASOSIY QISM

Tadqiqotning metodologik asosi sifatida tizimli yondashuv, shaxsga yo'naltirilgan ta'lim paradigmasi hamda kompetensiyaviy yondashuv tamoyillari belgilab olindi. O'quv jarayonida Delphi metodi ekspert baholash tizimi va jamoaviy konsensusga erishish vositasi sifatida, "Yo'l xaritalari" shaxsiy va kasbiy rivojlanish trayektoriyasini vizuallashtirish instrumenti sifatida, ssenariylashtirish esa muqobil kelajak variantlarini modellashtirish didaktik asosi sifatida tahlil qilinadi. Pedagogik samaradorlik mezoni sifatida talabalarning strategik tahlil qilish ko'nikmalari, prognostik kompetensiyalari va jamoada ishlash qobiliyatlarining o'sish dinamikasi o'rganiladi.

O'quv jarayonida forsayt-texnologiyalarni muvaffaqiyatli qo'llash ularning pedagogik tabiatini to'g'ri tushunish va har bir metodni aniq bir didaktik maqsadga yo'naltirishni talab qiladi. An'anaviy pedagogikadan farqli o'laroq, forsayt ta'lim oluvchilarga tayyor bilimlarni taqdim etmaydi, balki ularni doimiy o'zgarib turuvchi axborot oqimida mustaqil ravishda tendensiyalarni aniqlashga va kelajakni loyihalashga o'rgatadi. Ushbu tizimning asosi hisoblangan uchta fundamental vosita - Delphi metodi, "Yo'l xaritalari" va Ssenariylashtirish - o'quv jarayonida bir-biri bilan mantiqiy zanjir hosil qilgan holda integratsiyalashishi lozim. Delphi metodi klassik ko'rinishda mutaxassislarning anonim, ko'p bosqichli so'rovnomalar orqali ma'lum bir muammo bo'yicha yagona konsensusga kelish tizimidir. Uni ta'lim jarayoniga moslashtirish, talabalarda ekspertlik va analitik fikrlash madaniyatini shakllantirishda yuksak pedagogik samara beradi.

Didaktik jarayonda Delphi metodini qo'llash quyidagi bosqichlarni qamrab oladi:

1. Muammoni shakllantirish: Tizimli va ko'p qirrali tahlilni talab qiladigan muammo (masalan, "2035-yilda qayta tiklanuvchi energiya

manbalarining o’rni” yoki “Sun’iy intellekt davrida tilshunoslikning istiqbollari”) tanlanadi.

2. Ekspert guruhlarini tuzish: Talabalar guruhlarga bo’linadi va ularga ma’lum bir ijtimoiy-iqtisodiy yoki ilmiy rollar (olimlar, investorlar, davlat xizmatchilari) yuklatiladi.

3. Ko’p bosqichli anonim so’rov: Birinchi bosqichda talabalar muammo bo‘yicha o‘zlarining erkin prognozlarini yozma ravishda taqdim etadilar. Pedagog (yoki moderator talaba) barcha javoblarni umumlashtirib, statistik tahlil qiladi (mediana va kvartillarni aniqlaydi). Ikkinchi bosqichda talabalarga umumiy natijalar ko’rsatiladi va o’z fikrlarida qolish yoki ko‘pchilikning fikriga qarab uni o’zgartirish imkoniyati beriladi. Agar guruh fikridan keskin farq qiladigan prognoz bo’lsa, talaba buni argumentlar bilan asoslashi shart.

Ushbu metodning pedagogik samaradorlik sharti - anonimlik va bosqichma-bosqich qayta aloqadir. Anonimlik talabalarni guruhdagi yetakchi shaxslarning psixologik bosimidan himoya qiladi, bu esa ularda mustaqil fikr bildirish, o’z nuqtayi nazarini mantiqiy argumentlar va ilmiy faktlar bilan himoya qilish ko’nikmasini keskin oshiradi. Delphi metodi orqali kelajak tendensiyalari aniqlangach, navbatdagi bosqichda ularga erishishning vaqtinchalik va mantiqiy traektoriya modeli -“Yo‘l xaritalari” tuziladi. Ta’limda yo’l xaritalari obekt va subekt yo’naltirilganligiga ko’ra ikki guruhga bo’linadi: texnologik hamda tarmoq yo’l xaritalari (talabalar ma’lum bir soha rivojini loyihalashtiradilar) va shaxsiy rivojlanish yo’l xaritalari (talabalar o’zlarining kelajakdagi kasbiy kompetensiyalari o’sishini rejalashtiradilar).

Pedagogik samaradorlik nuqtayi nazaridan, yo’l xaritasi talabaga maqsadlar, ushbu maqsadlarga erishish vositalari texnologiyalar, resurslar va mavjud holat ya’ni bugungi kun o’rtasidagi sabab-oqibat aloqalarini ko’rish imkonini beradi. Grafik jihatdan u vaqt o’qi (masalan, 3 yil, 5 yil, 10 yil) va bir nechta parallelqatlamlardan iborat bo’ladi. Talaba ushbu qatlamlarni o’zaro bog’lash jarayonida tizimli tahlil qilish, resurslarni to’g’ri taqsimlash va

potentsial risklarni oldindan hisobga olishni o’rganadi. Kelajak hech qachon chiziqli bo’lmaydi. Shu sababli, forsayt metodologiyasining eng yuqori bosqichi ssenariylashtirish hisoblanadi. Bunda talabalar voqealarning faqat bitta variantini emas, balki bir nechta muqobil rivojlanish ssenariylarini ishlab chiqadilar. Odatda optimistik, pessimistik, barqaror va kutilmagan to’rtta klassik ssenariy modeli qo’llaniladi.

Talabalar drayverlarni ya’ni o’zgarishlar keltirib chiqaruvchi omillarni tahlil qilish orqali har bir ssenariy uchun harakatlar rejasini tuzadilar. Bu jarayon talabalarda moslashuvchanlik va tahliliy hushyorlikni tarbiyalaydi. Ular “Agar voqealar bunday rivojlansa, biz nima qilamiz?” degan savol atrofida intellektual izlanish olib boradilar.

Innovatsion forsayt-texnologiyalardan foydalanishning pedagogik samaradorlik shartlariga to’xtaladigan bo’lsak oliy ta’lim amaliyotida ushbu vositalarning shunchaki mexanik bajarilishi kutilgan natijani bermaydi. Tadqiqotlarimiz va empirik tahlillar ko’rsatishicha, forsayt-texnologiyalarning pedagogik samaradorligini ta’minlovchi quyidagi kritik shart-sharoitlar mavjud:

Kasbiy-amaliy yo‘naltirilganlik: Forsayt vazifalari talabalarning mutaxassislik fanlari va kelajakdagi kasbiy faoliyati bilan uzviy bog’liq bo‘lishi shart. Mavhum, amaliyotdan yiroq mavzular talabalarda motivatsiyani so’ndiradi.

Kognitiv moslashuvchanlik muhiti: Akademik erkinlik va xato qilish huquqining ta’minlanishi. Forsaytda “noto‘g‘ri javob” tushunchasi bo‘lmaydi - har bir prognoz uning qanchalik argumentlangani bilan baholanadi.

Raqamli vositalar bilan integratsiya: Delphi so’rovlarini yoki yo’l xaritalarini tuzishda zamonaviy raqamli platformalardan (masalan, Miro, Mentimeter, Padlet, Google Workspace) foydalanish jarayonning dinamikligi va interaktivligini oshiradi.

Kriterial baholash tizimi: Talabalar faoliyatini baholashda yakuniy natijaga emas, balki prognozlash jarayoniga, argumentlarning sifati, kreativlik darajasi va jamoaviy hamkorlik qobiliyatiga e'tibor qaratilishi lozim.

Zamonaviy xorijiy tadqiqotlar, Yevropa Ittifoqining ta'lim loyihalari va OECD tadqiqotlari shuni ko'rsatadiki, oliy ta'lim dasturlariga forsayt elementlarining kiritilishi bitiruvchilarning ishga joylashish ko'rsatkichini 25-30% gacha oshiradi. Chunki bunday talabalar mehnat bozoridagi transformatsiyalarni tezroq ilg'aydilar va o'zlarining shaxsiy professional yo'nalishlarini mustaqil ravishda korreksiya qila oladilar.

XULOSA

Yuqoridagi tahlillar asosida hamda o'quv jarayonida innovatsion forsayt-texnologiyalardan (Delphi metodi, "Yo'l xaritalari", Ssenariylashtirish) foydalanishning pedagogik samaradorlik shartlarini tadqiq etish natijasida quyidagi ilmiy-nazariy va amaliy xulosalar tahlil qilindi va tizimlashtirildi:

1. Forsayt-texnologiyalar oliy ta'lim tizimida shunchaki interaktiv metodlar majmuasi bo'lib qolmasdan, balki ta'lim oluvchini kelajak muammolarini bugungi kunda modellashtirishga o'rgatuvchi, uning prognostik va strategik kompetensiyalarini rivojlantiruvchi konseptual pedagogik tizim funksiyasini bajaradi. U dars xonasini passiv ma'ruzalar maydonidan faol analitik va strategik markazga aylantiradi.

2. Delphi metodi orqali guruh intellekti va anonim ekspertlik konsensusiga erishish, "Yo'l xaritalari" yordamida ushbu kelajak modellarini vizual-xronologik trayektoriyaga o'tkazish hamda Ssenariylashtirish orqali muqobil variantlarni tahlil qilish talabalarda kognitiv moslashuvchanlikni va nostandart sharoitlarda qaror qabul qilish ko'nikmalarini maksimal darajada oshiradi.

3. Forsayt-texnologiyalarning pedagogik samaradorligi ularni qo'llashda akademik erkinlik muhitining yaratilganligi, ta'lim dasturlarining moslashuvchanligi, jarayonning raqamli platformalar (Miro, Padlet, Google

Workspace va boshqalar) bilan integratsiyalashganligi hamda talabalarning shaxsiy kasbiy manfaatlari bilan bog'liqligi kabi kritik pedagogik shart-sharoitlarga to'g'ridan-to'g'ri korrelyatsiya qiladi.

Maqolada keltirilgan model va pedagogik shartlar oliy ta'lim muassasalarida talabalarning XXI asr ko'nikmalarini rivojlantirish uchun nazariy zamin va metodik dasturlamal bo'lib xizmat qiladi.

Tadqiqot natijalaridan kelib chiqqan holda, zamonaviy ta'lim amaliyotiga forsayt-texnologiyalarni keng joriy etish uchun quyidagi tavsiyalar ilgari suriladi:

O'quv dasturlarini modernizatsiya qilish: Oliy ta'lim muassasalarining bitiruvchi bosqich (bakalavriat va magistratura) o'quv rejalariga mutaxassislik yo'nalishidan kelib chiqib "Professional forsayt" yoki "Tarmoq rivojlanish strategiyalari" kabi maxsus modullarni kiritish;

Pedagoglar malakasini oshirish: Professor-o'qituvchilar tarkibi uchun Delphi, yo'l xaritalari va ssenariylashtirish metodikalarini raqamli platformalarda qo'llash bo'yicha maxsus treninglar va mahorat darslarini tizimli tashkil etish;

Baholash tizimini o'zgartirish: Forsayt topshiriqlarini baholashda yakuniy natijaning "to'g'riligi"ga emas, balki talabaning tahliliy yondashuviga, argumentlarining ilmiy asoslanganligiga, muqobil variantlarni ko'ra olish va jamoada ishlash qobiliyatiga urg'u berish;

Talabalarning shaxsiy rivojlanish xaritalarini joriy etish: Har bir talaba birinchi kursdanoq o'zining individual ta'lim va kasbiy rivojlanish "Yo'l xaritasi" ni (Individual Learning Pathway) forsayt metodlari yordamida mustaqil loyihalashi va har o'quv yilida unga korreksiya kiritib borish mexanizmini yo'lga qo'yish.

Xulosa qilib aytish mumkinki, ta'limda forsayt-texnologiyalarni qo'llash - bu shunchaki bugungi kun talabi emas, balki ertangi kun mehnat bozorida raqobatbardosh, strategik fikrlaydigan va har qanday global inqirozlarga

intellektual jihatdan tayyor bo’lgan mutaxassislarni shakllantirishning eng samarali kafolatidir.

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TABIIY FANLARNI O‘QITISHDA EKOLOGIK-HUDUDIY VA IJTIMOIY-IQTISODIY JARAYONLARNING AHAMIYATI

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Annotatsiya. *Mazkur maqolada tabiiy fanlarni, ayniqsa geografiyani o‘qitishda ekologik-hududiy hamda ijtimoiy-iqtisodiy jarayonlardan foydalanishning ilmiy-metodik ahamiyati yoritilgan. Unda o‘quvchilarda tabiat, jamiyat va xo‘jalik o‘rtasidagi o‘zaro bog‘liqlikni anglash, ekologik madaniyatni rivojlantirish, hududiy tafakkur va amaliy ko‘nikmalarni shakllantirish masalalari tahlil qilingan. Maqolada muammoli ta’lim, loyiha usuli, xarita va statistik ma’lumotlar bilan ishlash, mahalliy materiallardan foydalanish kabi metodik yondashuvlarning samaradorligi asoslab berilgan.*

Kalit so‘zlar: *tabiiy fanlar, geografiya ta’limi, ekologik-hududiy jarayonlar, ijtimoiy-iqtisodiy jarayonlar, hududiy tafakkur, ekologik madaniyat, metodik yondashuv, o‘quvchi kompetensiyasi.*

Abstract. *This article examines the scientific and methodological significance of using ecological-territorial and socio-economic processes in teaching natural sciences, particularly geography. It analyzes the role of these processes in developing students’ understanding of the interrelationship between nature, society, and economic activities, as well as in fostering environmental awareness, spatial thinking, and practical skills. The article substantiates the effectiveness of methodological approaches such as problem-based learning, project-based learning, the use of maps and statistical data, and the integration of local materials into the teaching process.*

Keywords: *natural sciences, geography education, ecological-territorial processes, socio-economic processes, spatial thinking, environmental awareness, methodological approaches, student competence.*

KIRISH

Zamonaviy ta’lim jarayonida tabiiy fanlarning o‘rni tobora ortib bormoqda. Chunki tabiatda va jamiyatda yuz berayotgan murakkab jarayonlarni tushunish, ularni ilmiy asosda tahlil qilish hamda amaliy hayotda to‘g‘ri qaror

qabul qilish koʻnikmalari koʻp jihatdan tabiiy fanlar orqali shakllanadi. Ayniqsa geografiya fani tabiat, aholi, xoʻjalik va hudud oʻrtasidagi oʻzaro aloqadorlikni ochib berishi bilan boshqa fanlardan ajralib turadi. Bugungi kunda iqlim oʻzgarishi, suv tanqisligi, yer resurslaridan oqilona foydalanish, choʻllanish, shaharlarning kengayishi, sanoat va transportning ekologik ta’siri kabi masalalar oʻquvchilar uchun nafaqat nazariy bilim, balki hayotiy ahamiyatga ega muammolardir. Shu sababli tabiiy fanlarni oʻqitishda ekologik-hududiy va ijtimoiy-iqtisodiy jarayonlarni dars mazmuniga singdirish muhim pedagogik vazifa hisoblanadi.

Mazkur yondashuv oʻquvchilarda atrof-muhitga mas’uliyatli munosabat, hududiy farqlarni anglash, statistik va kartografik axborotlardan foydalanish, mahalliy muammolarni tahlil qilish hamda ularga yechim taklif etish kabi koʻnikmalarni rivojlantiradi. Natijada oʻquvchi tabiatni alohida, jamiyatni alohida hodisa sifatida emas, balki yagona hududiy tizim doirasida tushuna boshlaydi. Ekologik-hududiy jarayonlar muayyan hududda tabiiy muhit holatiga ta’sir koʻrsatuvchi hodisa va oʻzgarishlarni ifodalaydi. Bular suv resurslarining kamayishi, tuproq shoʻrlanishi va eroziyasi, havoning ifloslanishi, chiqindilar muammosi, oʻsimlik qoplamining qisqarishi, landshaftlarning oʻzgarishi kabi jarayonlarni oʻz ichiga oladi. Tabiiy fanlar darslarida ushbu jarayonlarni oʻrganish oʻquvchilarning ekologik tafakkurini rivojlantiradi. Geografiya ta’limida ekologik jarayonlarni hududiy yondashuv asosida oʻrgatish ayniqsa samaralidir. Masalan, suv resurslari mavzusi faqat daryo, koʻl yoki yer osti suvlari haqidagi umumiy ma’lumotlar bilan cheklanib qolmasligi kerak. Uni oʻquvchilar yashaydigan hududdagi ichimlik suvi, sugʻorish tizimi, suvni tejash madaniyati va mahalliy ekologik muammolar bilan bogʻlash darsning amaliy ahamiyatini oshiradi.

Ekologik-hududiy yondashuv oʻquvchiga har bir ekologik muammo ma’lum bir hududda, aniq tabiiy va ijtimoiy sharoitda yuzaga kelishini koʻrsatadi. Bu esa sabab-oqibat aloqalarini tushunishga yordam beradi. Masalan,

qishloq xo‘jaligi hududlarida yer va suv resurslaridan noto‘g‘ri foydalanish tuproq unumdorligining pasayishiga, shahar hududlarida transport oqimining ortishi havoning ifloslanishiga olib kelishi mumkin. Shu jihatdan tabiiy fanlar darsida ekologik jarayonlarni oddiy ma’lumot sifatida emas, balki o‘quvchini fikrlashga undaydigan muammo sifatida berish maqsadga muvofiqdir.

Tabiiy fanlarni o‘qitishda ijtimoiy-iqtisodiy jarayonlarni hisobga olish ta’lim mazmunini yanada hayotiy va kompleks qiladi. Aholi soni va zichligi, migratsiya, urbanizatsiya, sanoatning joylashuvi, qishloq xo‘jaligi, transport, xizmat ko‘rsatish, turizm va infratuzilma kabi jarayonlar tabiiy muhit bilan bevosita bog‘liq. Ularni o‘rganish orqali o‘quvchilar inson faoliyatining hududiy va ekologik oqibatlarini anglaydi. Masalan, yirik shaharlarda aholining ko‘payishi uy-joy, transport, energiya va suv ta’minoti bilan bog‘liq ehtiyojlarni oshiradi. Bu holat tabiiy resurslarga bosimni kuchaytiradi va ekologik muammolarni yuzaga keltiradi. Qishloq xo‘jaligi hududlarida esa yer va suv resurslaridan oqilona foydalanish iqtisodiy samaradorlik bilan birga ekologik barqarorlikni ham talab qiladi.

Ijtimoiy-iqtisodiy jarayonlardan foydalanish o‘quvchilarda kompleks geografik fikrlashni shakllantiradi. Ular biror hududning rivojlanishini faqat tabiiy sharoit yoki faqat iqtisodiy ko‘rsatkichlar orqali emas, balki ularning o‘zaro bog‘liqligi asosida baholashni o‘rganadi. Bu esa geografik kompetensiyaning muhim tarkibiy qismi hisoblanadi. Dars jarayonida aholi, ishlab chiqarish, resurslar va ekologik holatga oid statistik ma’lumotlar bilan ishlash ham muhimdir. O‘quvchilar jadval, diagramma va xaritalar asosida hududiy farqlarni aniqlaydi, taqqoslaydi va xulosa chiqaradi. Bunday faoliyat ularning tahliliy fikrlashi, raqamli savodxonligi va mustaqil xulosa chiqarish qobiliyatini rivojlantiradi.

1-jadval.

Ekologik-hududiy va ijtimoiy-iqtisodiy jarayonlardan foydalanishning metodik imkoniyatlari

Yo‘nalish	Ta’lim mazmuni	Kutiladigan pedagogik natija
Ekologik-hududiy tahlil	Suv tanqisligi, tuproq degradatsiyasi, chiqindilar, landshaft o‘zgarishi	Ekologik madaniyat va hududiy tafakkur shakllanadi
Ijtimoiy-iqtisodiy tahlil	Aholi joylashuvi, urbanizatsiya, transport, sanoat va qishloq xo‘jaligi	Tabiat-jamiyat-xo‘jalik aloqalari anglanadi
Xarita bilan ishlash	Tematik xaritalar, hududiy farqlar, resurslar va infratuzilma joylashuvi	Fazoviy tasavvur va xaritani o‘qish malakasi rivojlanadi
Statistik ma’lumotlar	Jadval, diagramma, foiz, dinamik qatorlar va taqqoslash	Raqamli axborot asosida xulosa chiqarish ko‘nikmasi kuchayadi
Loyiha va kuzatuv ishlari	Mahalliy ekologik muammo, maktab atrofi, mahalla yoki tuman misolida tadqiqot	Mustaqil izlanish va amaliy qaror qabul qilish rivojlanadi

Jadval muallif tadqiqotlari asosida tayyorlangan

Tabiiy fanlarni o‘qitishda ekologik-hududiy va ijtimoiy-iqtisodiy jarayonlarning ahamiyatini ochib berish uchun o‘qituvchi turli metodik yondashuvlardan foydalanishi zarur. Eng avvalo, muammoli ta’lim usuli samarali hisoblanadi. Bunda o‘quvchiga tayyor xulosa berilmaydi, aksincha, u muammoni anglash, sabablarini aniqlash va yechim izlash jarayoniga jalb qilinadi. Loyiha usuli ham o‘quvchilarning mustaqil izlanish faolligini oshiradi. Xarita bilan ishlash tabiiy fanlar, ayniqsa geografiya darslarining ajralmas qismidir. Ekologik muammolar, aholi joylashuvi, iqtisodiy tarmoqlar, transport yo‘llari va resurslar joylashuvini xaritada tahlil qilish o‘quvchilarda fazoviy tasavvurni kuchaytiradi. Bu jarayonda o‘quvchi hududiy tafovutlarni ko‘radi va ularning sabablarini izohlashga harakat qiladi. Mahalliy materiallardan foydalanish darsni hayotga yaqinlashtiradi. O‘quvchiga o‘z tumani, shahri, qishlog‘i yoki maktab atrofi misolida berilgan topshiriqlar yanada tushunarli va qiziqarli bo‘ladi. Mahalliy daryo, kanal, yo‘l, sanoat korxonasi, dehqonchilik maydoni, yashil hudud yoki chiqindi to‘planadigan joy kabi obyektlar dars

uchun muhim amaliy manba bo‘lib xizmat qiladi. Fanlararo integratsiya ham katta ahamiyatga ega.

Ekologik va ijtimoiy-iqtisodiy jarayonlarni tushuntirishda biologiya, kimyo, fizika, iqtisodiyot, tarix va informatika fanlari bilan bog‘liqlikdan foydalanish mumkin. Bu o‘quvchilarda hodisalarni bir tomonlama emas, balki tizimli va kompleks ko‘rish ko‘nikmasini shakllantiradi. Ekologik-hududiy va ijtimoiy-iqtisodiy jarayonlarni o‘qitish o‘quvchilarda bir necha muhim kompetensiyalarni rivojlantiradi. Avvalo, ular geografik obyekt va jarayonlarning hududiy joylashuvini tushunadi, xarita va statistik manbalarni tahlil qiladi, tabiat va jamiyat o‘rtasidagi aloqalarni izohlaydi. Bu geografik kompetensiyaning asosiy mazmunini tashkil etadi.

Ikkinchidan, o‘quvchilarda ekologik mas’uliyat shakllanadi. Ular suv, yer, havo, o‘simlik va hayvonot dunyosining inson hayoti uchun ahamiyatini chuqurroq anglaydi. Ekologik muammolarni o‘rganish orqali o‘quvchilar tabiatga ehtiyotkor munosabatda bo‘lish, resurslarni tejash va atrof-muhitni asrash zarurligini tushunadi.

Uchinchidan, bunday yondashuv o‘quvchilarning amaliy fikrlashini rivojlantiradi. Ular real hayotdagi holatlarni kuzatish, ma’lumot yig‘ish, taqqoslash, baholash va xulosa chiqarishga o‘rganadi. Natijada o‘quvchi darsda olgan bilimini kundalik hayotda qo‘llashga intiladi.

XULOSA

Xulosa qilib aytganda, tabiiy fanlarni o‘qitishda ekologik-hududiy va ijtimoiy-iqtisodiy jarayonlarning ahamiyati juda katta. Ular o‘quvchilarda tabiat, jamiyat va xo‘jalik o‘rtasidagi murakkab aloqalarni tushunish, hududiy tafakkur, ekologik madaniyat, tahliliy fikrlash va amaliy ko‘nikmalarni shakllantirishga xizmat qiladi. Geografiya va boshqa tabiiy fanlar darslarida real hududiy misollar, mahalliy materiallar, xaritalar, statistik ma’lumotlar, muammoli savollar va loyiha ishlaridan foydalanish ta’lim samaradorligini oshiradi. Bunday metodik yondashuv o‘quvchini passiv tinglovchidan faol izlanishga

undaydi. Demak, ekologik-hududiy va ijtimoiy-iqtisodiy jarayonlarni o‘qitish mazmuniga tizimli kiritish zamonaviy tabiiy fanlar ta’limining muhim sharti hisoblanadi. Bu orqali kelajak avlodda ekologik mas’uliyat, hududiy fikrlash va barqaror rivojlanish g‘oyalariga asoslangan dunyoqarash shakllanadi.

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MILLIY QADRIYAT VA AN'ANALAR ORQALI KICHIK SINF O'QUVCHILARNI TARBIYALASH YO'LLARI

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Annotatsiya: *Mazkur maqolada milliy qadriyat va an'analar asosida o'quvchilarni tarbiyalashning pedagogik, ma'naviy va ijtimoiy ahamiyati tahlil qilingan. Shuningdek, zamonaviy ta'lim tizimida kompetensiyaviy yondashuv, raqamli texnologiyalar, sun'iy intellekt, interfaol metodlar hamda oila–maktab–mahalla hamkorligi asosida milliy qadriyatlarni yosh avlod ongiga singdirishning samarali yo'llari yoritilgan. Globallashuv sharoitida milliy o'zlikni anglash, ma'naviy immunitetni shakllantirish va milliy tarbiyaning ustuvor yo'nalishlari ilmiy jihatdan asoslab berilgan.*

Kalit so'zlar: *milliy qadriyat, milliy an'ana, tarbiya, kompetensiya, ma'naviyat, sun'iy intellekt, raqamli ta'lim, pedagogika, innovatsion texnologiyalar, ma'naviy immunitet.*

Abstract

This article examines the pedagogical importance of educating students through national values and traditions. It discusses effective approaches to integrating national values into the modern educational process through competency-based education, digital technologies, artificial intelligence, interactive teaching methods, and cooperation among families, schools, and communities. The paper also highlights the importance of strengthening students' spiritual identity and cultural awareness in the context of globalization.

Keywords: *national values, traditions, education, upbringing, competency-based approach, digital education, artificial intelligence, pedagogy, innovation, spiritual development.*

KIRISH

Bugungi globallashuv va raqamli transformatsiya sharoitida yosh avlodni milliy qadriyatlar asosida tarbiyalash davlat siyosatining ustuvor yo'nalishlaridan biri hisoblanadi. Zamonaviy axborot oqimining keskin ortishi,

internet va ijtimoiy tarmoqlarning keng rivojlanishi yoshlarning dunyoqarashi, tafakkuri va ma'naviy qiyofasiga kuchli ta'sir ko‘rsatmoqda. Shu sababli milliy qadriyatlarni zamonaviy pedagogik texnologiyalar bilan uyg‘unlashtirish bugungi kunning dolzarb masalalaridan biri bo‘lib qolmoqda.

Yangi O‘zbekiston taraqqiyot strategiyasida ham yoshlarni vatanparvarlik, milliy g‘urur, umuminsoniy qadriyatlar va innovatsion fikrlash ruhida tarbiyalash ustuvor vazifa sifatida belgilangan. Ta'lim tizimida amalga oshirilayotgan islohotlar milliy qadriyatlarni zamonaviy ta'lim mazmuni bilan integratsiyalashga xizmat qilmoqda.

Bugungi kunda ta'lim tizimida **kompetensiyaviy yondashuv** keng joriy qilinmoqda. Ushbu yondashuv nafaqat bilim berishni, balki o‘quvchilarda amaliy ko‘nikmalar, fuqarolik mas'uliyati, milliy qadriyatlarga hurmat va ijtimoiy faollikni shakllantirishni ham nazarda tutadi. Milliy qadriyatlarni kompetensiyalar bilan uyg‘unlashtirish orqali o‘quvchilarda tanqidiy fikrlash, mustaqil qaror qabul qilish va ijtimoiy mas'uliyat rivojlanadi.

Bugungi yoshlar hayotining ajralmas qismiga aylangan **ijtimoiy tarmoqlar** ham tarbiyaviy vosita sifatida foydalanilishi mumkin. Telegram, YouTube, Instagram va boshqa platformalarda milliy qadriyatlarni targ‘ib qiluvchi sifatli videolar, podkastlar, elektron kitoblar va ma'rifiy loyihalarni yaratish yoshlarning ma'naviy rivojlanishiga xizmat qiladi.

Yana bir muhim yo‘nalish — **media savodxonlikni rivojlantirish** hisoblanadi. Axborot oqimi kuchaygan hozirgi davrda o‘quvchilar internetdagi yolg‘on axborotlar va yot g‘oyalardan himoyalanishni o‘rganishlari zarur. Milliy qadriyatlar media madaniyati bilan uyg‘unlashtirilganda yoshlarning ma'naviy immuniteti yanada mustahkamlanadi.

Oila, maktab va mahalla hamkorligi milliy tarbiyaning asosiy mexanizmlaridan biridir. Zamonaviy pedagogik tajribada "Ota-onalar universiteti", "Mahalla maktabi", "Mentorlik tizimi" kabi loyihalar orqali ota-onalarning tarbiya jarayonidagi ishtiroki yanada kuchaymoqda.

Shuningdek, maktablarda "Milliy liboslar kuni", "Kitobxonlik haftaligi", "Qadriyatlar festivali", "Ajdodlar merosi" tanlovlari, robototexnika va milliy hunarmandchilikni birlashtirgan innovatsion loyihalar o‘quvchilarning milliy o‘zligini rivojlantirishda samarali vosita bo‘lib xizmat qilmoqda.

Zamonaviy pedagogik tadqiqotlar shuni ko‘rsatadiki, milliy qadriyatlar bilan boyitilgan ta'lim jarayoni o‘quvchilarning ijtimoiy moslashuvchanligi, vatanparvarligi, fuqarolik mas'uliyati hamda ma'naviy barkamolligini sezilarli darajada oshiradi.

Yosh avlodni har tomonlama barkamol inson etib tarbiyalash har qanday jamiyat taraqqiyotining asosiy omillaridan biridir. Tarbiya jarayonida milliy qadriyat va an’analardan samarali foydalanish yoshlarning ma’naviy dunyosini boyitadi, ularda Vatanga muhabbat, milliy g‘urur, insonparvarlik, halollik va mehnatsevarlik kabi fazilatlarni shakllantiradi. Milliy qadriyatlar xalqning tarixiy tajribasi, urf-odatlari, an’analari, tili, dini, san’ati va madaniyatini o‘zida mujassam etgan bebaho ma’naviy boylik bo‘lib, ularni yosh avlod ongiga singdirish bugungi ta’lim tizimining ustuvor vazifalaridan biridir.

Globallashuv jarayonida turli madaniy ta’sirlarning kuchayishi milliy qadriyatlarni asrab-avaylash va ularni zamonaviy ta’lim tizimiga integratsiya qilish zaruratini yanada oshirmoqda. Shu sababli milliy qadriyatlar asosida tarbiya berishning samarali yo‘llarini ishlab chiqish va amaliyotga tatbiq etish muhim ilmiy-pedagogik masala hisoblanadi.

Milliy qadriyatlar orqali o‘quvchilarni tarbiyalashning eng muhim yo‘li oiladan boshlanadi. Oila farzandning ilk tarbiya maskani bo‘lib, unda milliy urf-odatlar, odob-axloq me’yorlari va qadriyatlar shakllanadi. Ota-onalarning shaxsiy namunasi, oiladagi ma’naviy muhit, milliy bayramlarni nishonlash, xalq og‘zaki ijodi namunalaridan foydalanish bolalarda milliy o‘zlikni anglash hissini rivojlantiradi.

Maktab milliy tarbiyaning asosiy markazlaridan biri hisoblanadi. Tarix, adabiyot, ona tili, musiqa, tasviriy san’at va tarbiya fanlari orqali o‘quvchilar

milliy meros, buyuk ajdodlarimizning hayoti va faoliyati, xalqimizning urf-odat hamda an’analari bilan yaqindan tanishadilar. O‘qituvchilarning dars jarayonida milliy qadriyatlarni hayotiy misollar asosida yoritishi o‘quvchilarning qiziqishini oshiradi va bilimlarini mustahkamlaydi.

Badiiy adabiyot milliy tarbiyaning muhim vositasi hisoblanadi. Alisher Navoiy, Zahiriddin Muhammad Bobur, Abdulla Avloniy, Abdulla Qodiriy va Cho‘lpon asarlarida ilgari surilgan g‘oyalar yoshlarning ma’naviy kamolotiga xizmat qiladi. Ushbu asarlar orqali o‘quvchilarda milliy g‘urur, insonparvarlik va ilm-fanga hurmat tuyg‘ulari shakllanadi.

Mahalla va jamoatchilik institutlari ham milliy tarbiya tizimining ajralmas qismi hisoblanadi. Mahallalarda tashkil etiladigan ma’naviy-ma’rifiy tadbirlar, milliy bayramlar, xalq sayillari, sport musobaqalari va ijodiy uchrashuvlar yoshlarning milliy qadriyatlarga bo‘lgan qiziqishini oshiradi. Nuroniylar va ziyolilar bilan uchrashuvlar esa ularda hayotiy tajribani o‘rganishga bo‘lgan intilishni kuchaytiradi.

Bugungi kunda axborot-kommunikatsiya texnologiyalari ta’limning ajralmas qismiga aylangan. Elektron darsliklar, virtual muzeylar, multimedia taqdimotlari, hujjatli filmlar va mobil ilovalar orqali milliy qadriyatlarni zamonaviy shaklda o‘quvchilarga yetkazish mumkin. Internet tarmog‘ida sifatli milliy kontent yaratish yoshlarning milliy o‘zligini mustahkamlashga xizmat qiladi.

Milliy qadriyatlar orqali tarbiya berish faqat nazariy bilim bilan cheklanib qolmasligi kerak. O‘quvchilarni tarixiy obidalarga, muzeylarga, teatrlarga, hunarmandchilik markazlariga ekskursiyalarga olib borish, milliy taomlar tayyorlash, xalq o‘yinlari va urf-odatlarini amalda o‘rgatish ularning milliy madaniyatni chuqur his etishiga yordam beradi.

XULOSA

Milliy qadriyat va an'analar orqali o‘quvchilarni tarbiyalash bugungi ta'lim tizimining eng muhim vazifalaridan biridir. Zamonaviy pedagogik

texnologiyalar, sun'iy intellekt, raqamli ta'lim platformalari, interfaol metodlar va kompetensiyaviy yondashuv milliy tarbiyaning samaradorligini yanada oshirmoqda. Oila, maktab, mahalla va jamiyatning uzviy hamkorligi asosida tashkil etilgan tarbiya jarayoni yosh avlodni milliy o‘zligiga sodiq, yuksak ma'naviyatli, raqobatbardosh va zamonaviy bilimlarga ega shaxs sifatida voyaga yetkazishga xizmat qiladi.

Milliy qadriyat va an’analar orqali o‘quvchilarni tarbiyalash barkamol avlodni voyaga yetkazishning eng muhim shartlaridan biridir. Oila, maktab, mahalla va jamiyatning o‘zaro hamkorligi milliy tarbiya samaradorligini oshiradi. Zamonaviy pedagogik texnologiyalar, xalq pedagogikasi, badiiy adabiyot va axborot-kommunikatsiya vositalaridan oqilona foydalanish o‘quvchilarning milliy o‘zligini anglashiga, ma’naviy barkamol, vatanparvar va mas’uliyatli shaxs bo‘lib shakllanishiga xizmat qiladi. Shu bois ta’lim tizimida milliy qadriyatlarni yanada kengroq targ‘ib qilish va ularni amaliy faoliyat bilan uyg‘unlashtirish dolzarb vazifalardan biri hisoblanadi.

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JANUBIY KOREYA VA O‘ZBEKISTONDAGI INGLIZ TILI O‘QITISH METODLARINI QIYOSLASH

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Abstract. *This article presents a comparative analysis of the developmental trends in English language teaching methodology in South Korea and Uzbekistan. Both countries have made English language teaching a priority direction of their national education systems, yet their reform strategies, teacher training systems, and approaches to implementing international standards such as the CEFR differ. The study is based on a systematic review of existing scholarly literature. The findings show that in South Korea there is a gap between the formal adoption and the practical application of the Communicative Language Teaching (CLT) approach, which is largely linked to high-stakes assessment pressure (the CSAT) and a culture of private tutoring. In Uzbekistan, CEFR-based reforms have begun relatively recently, with teacher competence and infrastructural shortcomings identified as the main challenges. The article concludes by proposing practical recommendations for drawing on the experience of both systems.*

Keywords: *English language teaching methodology, Communicative Language Teaching (CLT), CEFR, South Korea, Uzbekistan, language education reform, teacher competence, assessment system.*

Annotatsiya. *Mazkur maqolada Janubiy Koreya va O‘zbekistonda ingliz tilini o‘qitish metodikasining rivojlanish yo‘nalishlari qiyosiy tahlil qilinadi. Ikki mamlakat ham ingliz tilini milliy ta’lim tizimining ustuvor yo‘nalishiga aylantirgan, biroq islohot strategiyalari, o‘qituvchilar tayyorlash tizimi va CEFR kabi xalqaro standartlarni joriy etish yo‘llari farq qiladi. Tadqiqot mavjud ilmiy adabiyotlarni tizimli tahlil qilish metodiga asoslanadi. Natijalar shuni ko‘rsatadiki, Janubiy Koreyada CLT (Communicative Language Teaching) yondashuvining rasmiy joriy etilishi va amaliy qo‘llanilishi orasida tafovut mavjud, bu ko‘p jihatdan yuqori baholash bosimi (CSAT) va xususiy repetitorlik madaniyati bilan bog‘liq. O‘zbekistonda CEFR asosidagi islohotlar yaqinda boshlangan bo‘lib, o‘qituvchilar malakasi*

va infratuzilma yetishmovchiligi asosiy muammo sifatida qayd etiladi. Maqola yakunida ikki tizim tajribasidan foydalanish bo‘yicha amaliy tavsiyalar taklif etiladi.

Kalit so‘zlar: *ingliz tilini o‘qitish metodikasi, kommunikativ yondashuv (CLT), CEFR, Janubiy Koreya, O‘zbekiston, til ta’limi islohoti, o‘qituvchilar malakasi, baholash tizimi.*

KIRISH

Globallashuv sharoitida ingliz tili xalqaro muloqot va iqtisodiy raqobatbardoshlikning asosiy vositasiga aylandi, shu sababli Janubiy Koreya va O‘zbekiston kabi mamlakatlar uni milliy taraqqiyot strategiyasining muhim qismi sifatida belgilagan. Ikki mamlakat farqli tarixiy yo‘l bosib o‘tgan bo‘lsa-da, ularning ingliz tili o‘qitish islohotlari qiziqarli o‘xshashlik va farqlarni namoyon etadi.

Janubiy Koreya 1990-yillardan kommunikativ yondashuvni (CLT) milliy dasturga joriy etgan bo‘lib, bu tajriba rivojlanayotgan davlatlar uchun qimmatli manba hisoblanadi. O‘zbekiston esa so‘nggi o‘n yillikda CEFR (Umumevropa til kompetensiyalari tizimi) asosida chuqur islohotlarni amalga oshirmoqda.

Maqolaning maqsadi — ikki mamlakatdagi o‘qitish metodlarini, o‘qituvchilar tayyorlash va baholash tizimlarini qiyosiy tahlil qilishdir. Tadqiqot savollari: (1) metodologik asoslar qanday farqlanadi? (2) baholash va malaka oshirish tizimlari qanday o‘xshash va farqli? (3) qanday amaliy xulosa chiqarish mumkin?

MAVZUGA OID ADABIYOTLARNING TAHLILI

Janubiy Koreyada ELT bo‘yicha ilmiy tadqiqotlar keng qamrovga ega. Moodie va Nam (2016) 2009–2014-yillarda chop etilgan minglab maqola orasidan tanlangan to‘qson beshta tadqiqotni tahlil qilib, milliy dasturda CLT rasman e’lon qilingan bo‘lsa-da, amaliyotda an’anaviy grammatik usullar hamon ustunlik qilishini ko‘rsatdi. Li (1998) buning sabablarini — katta sinf hajmi, grammatikaga asoslangan milliy imtihon va o‘qituvchilarning yetarli tayyorgarligi yo‘qligini — yoritgan bo‘lib, Jeon (2009) bu muammolar keyingi o‘n yillikda ham saqlanganini tasdiqlaydi.

Park (2009) “ingliz tili isitmasi” hodisasini tahlil qilib, jamiyatdagi yuqori talab xususiy repetitorlik o‘sishiga olib kelganini ko‘rsatadi; buni Kim va Li (2010) ham tasdiqlaydi. Song (2011) ingliz tilining norasmiy “ikkinchi til” maqomiga ega bo‘lish jarayonini til siyosati nuqtai nazaridan baholaydi.

O‘zbekistondagi tadqiqotlar nisbatan yosh, ammo jadal rivojlanmoqda. Tolibjonov va boshqalar (2020) CEFR islohotlarining barcha bosqichlarda joriy etilishini tahlil qilib, uning modernizatsiyadagi markaziy o‘rnini ta’kidlaydi. Maxmudjonovna (2023) esa o‘qituvchilarning yangi mezonlarga moslashishidagi qiyinchiliklarni qayd etadi. Jalolov (2015) va Xoshimov-Yaqubov (2003) tomonidan shakllantirilgan milliy metodika xalqaro yondashuvlar bilan tobora integratsiyalashmoqda; Little (2007) CEFRni o‘qitish falsafasini o‘zgartiruvchi omil deb talqin qilsa, Richards (2006) kommunikativ yondashuvni mahalliy kontekstga moslashtirish zarurligini ta’kidlaydi.

TADQIQOT METODOLOGIYASI

Tadqiqot sifat tahlili metodologiyasiga asoslangan. Manba sifatida 2009–2024-yillarda chop etilgan, ikki mamlakatdagi ELT ta’limiga bag‘ishlangan ilmiy maqolalar va rasmiy hujjatlar tanlandi. Tanlash mezonlari: manbaning ilmiy va rasmiy maqomi, metodologik islohot yoki baholash masalalarini yoritishi va so‘nggi o‘n besh yil ichida chop etilganligi.

Tahlil uch bosqichda olib borildi: mamlakatlar bo‘yicha mustaqil kontent-tahlil; o‘qitish metodlari, o‘qituvchilar malakasi va baholash mexanizmlari bo‘yicha qiyosiy taqqoslash; olingan natijalar asosida amaliy xulosalar shakllantirish. Tadqiqot statistik ma’lumot to‘plamagan, balki sifat jihatidan xulosa chiqarishga yo‘naltirilgan.

TAHLIL VA NATIJALAR

O‘tkazilgan tahlil ikki mamlakat tizimi orasida bir qancha muhim o‘xshashlik va farqlarni ko‘rsatdi.

1. Metodologik yondashuv. Janubiy Koreyada CLT 1990-yillardan milliy dasturga kiritilgan bo‘lsa-da, amaliyotda an’anaviy grammatik metodlar

hamon keng tarqalgan (Moodie & Nam, 2016; Li, 1998) — “rasmiy siyosat va real amaliyot” orasidagi tanish tafovut. O‘zbekistonda milliy metodika (Jalolov, 2015; Xoshimov-Yaqubov, 2003) CEFR asosida qayta ko‘rilmoqda (Tolibjonov va boshqalar, 2020), biroq integratsiya hali boshlang‘ich bosqichda.

2. Baholash tizimi. Janubiy Koreyaning CSAT imtihoni ta’lim jarayoniga kuchli “washback” ta’sirini ko‘rsatadi (Jeon, 2009) — imtihon grammatika va o‘qishga yo‘naltirilgani sababli og‘zaki nutq ikkinchi darajali qoladi. O‘zbekistonda CEFR mezonlari (Maxmudjonovna, 2023) muloqotga ko‘proq e’tibor qaratsa-da, barcha OTMlarda bir xilda amalga oshirilmayapti.

3. Xususiy ta’lim va ijtimoiy bosim. Park (2009) tasvirlagan “ingliz tili isitmasi” va Kim-Li (2010) tasdiqlagan xususiy repetitorlikka yuqori talab ingliz tilining Janubiy Koreyada ijtimoiy-iqtisodiy muvaffaqiyat garovi sifatida qaralishini ko‘rsatadi. O‘zbekistonda ham xususiy til kurslariga talab oshgan, biroq bu hodisa hali keng ilmiy tahlil obyektiga aylanmagan.

4. O‘qituvchilar tayyorgarligi va texnologiya. Song (2011) Janubiy Koreyada malaka oshirish dasturlarining amaliy samaradorligi cheklanganligini ta’kidlaydi; O‘zbekistonda esa (Maxmudjonovna, 2023) o‘qituvchilar malakasi hududlar kesimida notekis. Texnologiya borasida ham farq katta: Janubiy Koreyaning yuqori infratuzilmasi multimedia va onlayn platformalardan foydalanishni osonlashtirsa, O‘zbekistonda, ayniqsa qishloq hududlarida, infratuzilma cheklovlari saqlanib qolmoqda (Tolibjonov va boshqalar, 2020).

Umuman olganda, tahlil Janubiy Koreya tajribasining rasmiy islohotni amaliyotga singdirish qanchalik uzoq va murakkab jarayon ekanligini, shuningdek yuqori baholash bosimining kommunikativ ko‘nikmalarga salbiy ta’sirini ko‘rsatadi. O‘zbekiston uchun bu baholash tizimini ehtiyotkorlik bilan loyihalash, o‘qituvchilar malakasini muntazam oshirish va mintaqaviy tengsizlikni kamaytirish zarurligini anglatadi.

XULOSA VA TAKLIFLAR

O‘tkazilgan qiyosiy tahlil ikki mamlakat o‘qitish metodlari o‘rtasida bir qator muhim o‘xshashlik va tafovutlarni ochib berdi. Ikki mamlakat ham ingliz tilini ustuvor yo‘nalish sifatida belgilagan, biroq islohotlarning amaliyotga tatbiq etilish sur’ati va usullari farq qiladi. Janubiy Koreya tajribasi shuni ko‘rsatadiki, faqat rasmiy dastur darajasida islohot e’lon qilishning o‘zi yetarli emas — baholash tizimi va o‘qituvchilar tayyorgarligi ham mos ravishda o‘zgarishi zarur.

Shu asosda quyidagi tavsiyalar beriladi: 1) CSAT tajribasidagi kamchilikni — yozma ko‘nikmalarga ortiqcha yo‘naltirilganlikni — hisobga olib, og‘zaki muloqotni baholashga alohida e’tibor qaratish; 2) malaka oshirish dasturlarini amaliy sinf boshqaruvi va kommunikativ metodikaga yo‘naltirish; 3) qishloq hududlaridagi OTMlarda raqamli ta’lim platformalarini kengroq joriy etish; 4) xususiy ta’lim bozori o‘sishi sharoitida davlat ta’limi sifatini ustuvor vazifa sifatida belgilash.

Kelgusi tadqiqotlarda o‘qituvchilar va talabalar orasida empirik so‘rovnoma o‘tkazish hamda CEFR islohotining O‘zbekiston OTMlaridagi real natijalarini miqdoriy baholash tavsiya etiladi.

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THE IMPORTANCE OF ADAPTATION OF FIRST-GRADERS TO THE EDUCATIONAL ENVIRONMENT AT SCHOOL AND THE LEVELS OF ADAPTATION

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Abstract. *This article discusses the barriers to adaptation and the levels of adaptation of first-graders in school education.*

Keywords: *school, first grade, student, adaptation levels*

Organizationally, it is advisable to establish the work of two teachers - the main teacher and his assistant (assistant) during the adaptation period or throughout the entire first grade. This serves to effectively organize the process of adaptation of first-graders to school and ensure an individual approach.

In successful adaptation to school, the child's characteristic features, knowledge and skills formed in previous stages of development are also of particular importance. It is necessary for a 1st grader to communicate with others, acquire the necessary communication skills, and clearly define his place in interpersonal relationships when entering the school environment. Because educational activities and the socio-pedagogical environment at school are of a collective nature.

Insufficient development of the necessary skills usually leads to problems with communication. In such situations, the student may be rejected or ignored by his classmates. In both cases, the 1st grader faces psychological difficulties, which negatively affects his adaptation.

The first grade of school is one of the most important and difficult periods in the lives of many children. Entering school is a stressful situation for them. Because, on the one hand, the child's usual lifestyle and everyday stereotypes

change, and on the other hand, the psycho-emotional load increases. How the adaptation process proceeds in the first year of education largely determines the child's work and academic success in subsequent years.

In ensuring the adaptation of a first-grader to school, researchers pay special attention to identifying its factors. In most studies, factors of adaptation to school and “adaptation criteria” are not distinguished. Because in most cases, the adaptation of a first-grader to school is interpreted as both a process and a result.

If adaptation is considered as a process, then it becomes possible to think about its factors, that is, the conditions and circumstances that determine the result. When analyzing the final results of the adaptation of first-graders to school, criteria and indicators are considered, that is, tools for assessing the effectiveness of the adaptation process.

Among the factors of adaptation, psychologists indicate the causes, driving forces of the pedagogical process and influencing factors that determine its characteristics. They are divided into objective and subjective factors. Objective factors are associated with the external environment, and subjective factors are associated with the individual characteristics of the adapting person. A group of experts interpret the objective factor as the external conditions of psychological adaptation .

In the studies of Ya.L. Kolominsky and E.A. Panko, the following factors play a special role in the successful adaptation of a first-grader to school:

1) the presence of a favorable psychological environment, free from family conflicts;

2) the use of correct, purposeful methods of upbringing in family education;

3) the organization of a productive, meaningful communication process with the child and the interest of parents in the student's preparation for school;

4) the establishment of close cooperation between parents and teachers;

5) the child's compliance with the rules and regulations of the school routine

The adaptation of first-graders to school can be expressed at several levels. A group of children with almost identical criteria is allocated for each level. Ya.L. Kolominsky and E.A. Panko Based on the research of G.M. Chutkina, the levels of adaptation are described as follows:

1. High level of adaptation

A student with such adaptation opportunities has a positive attitude towards school and adequately perceives the requirements placed on him. Such students easily master the educational material, deeply and fully master the content of the program, and successfully complete even complex tasks. He is diligent, listens attentively to the teacher, completes tasks without external control, shows great interest in independent educational activities, and thoroughly prepares for all lessons. He willingly and responsibly fulfills social tasks and takes a positive position in the class team.

2. Medium level of adaptation

Such a student also has a positive attitude towards school, and attending school does not cause him negative experiences. The student learns the material well when the teacher explains it in detail and in a demonstrative manner. He/she masters the main content of the curriculum and can independently solve typical problems. He/she is attentive and attentive when completing assignments, but in this process he/she needs the supervision of adults, that is, teachers and parents. He/she is especially active and attentive when engaged in activities that interest him/her. He/she usually prepares for lessons, does his/her homework in most cases. He/she approaches social tasks responsibly and establishes friendly relations with many classmates.

3. Low level of adaptation

Such a student has a negative or indifferent attitude towards school. He/she often complains about his/her health, has a depressed mood, and is

observed to be indisciplined. He/she learns the material explained by the teacher in parts, and has difficulties working independently with the textbook. Does not show interest in completing independent tasks and does not prepare for lessons regularly.

In conclusion, when first-graders adapt to the educational environment at school, educators need to take an individual approach to students. It is advisable to determine at which stage of adaptation the child is lagging behind and work on those indicators.

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IMPROVING VOCATIONAL TRAINING THROUGH DUAL EDUCATION

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Abstract. *The article theoretically substantiates the pedagogical foundations for improving vocational training through dual education. To transform cooperation between an educational institution and an employer into an integrated learning process, a coherent sequence of occupational standards, curriculum content, authentic workplace tasks, mentoring, monitoring, and integrated assessment is proposed. The approach is shown to reduce the gap between theory and practice and to foster learners' vocational autonomy, responsibility, and adaptation to the workplace.*

Keywords: *dual education, vocational training, work-based learning, workplace task, mentoring, monitoring, integrated assessment.*

INTRODUCTION

The rapid renewal of technological processes in the labour market is changing the requirements imposed on vocational training outcomes. In addition to possessing theoretical knowledge, today's graduate must be able to perform authentic work tasks independently, comply with workplace procedures, make decisions in problem situations, and demonstrate vocational responsibility. Consequently, limiting vocational training to classroom instruction or short-term practical placements does not fully eliminate the gap between educational outcomes and employers' requirements.

The legal and organisational foundations for implementing dual education in Uzbekistan were established by Resolution No. 163 of the Cabinet of Ministers dated 29 March 2021. The resolution provides for the development of a coordinated curriculum and educational process schedule through cooperation

between an educational institution and an organisation, the alignment of learners' studies at the educational institution with their practical activities at an enterprise, and the appointment of a mentor for the workplace-based component of training [1]. This regulatory framework creates opportunities for implementing dual education; however, its pedagogical effectiveness depends on the content assigned to such cooperation, the design of learning tasks, and the procedures used to assess outcomes.

The aim of this article is to identify the pedagogical relationships that contribute to improving vocational training through dual education and to substantiate them as a single coherent process. The principal research question is as follows: under what conditions can the two distinct activity environments of an educational institution and an enterprise contribute to the learner's holistic vocational development?

MAIN BODY

Research methodology. The study employed theoretical and comparative analysis, a systemic-structural approach, content-based synthesis of scholarly sources, and pedagogical modelling. International studies on dual education and apprenticeship systems, methodological guidelines on work-based learning, and the current regulatory document of Uzbekistan were examined. The relationships among the aims of vocational training, curriculum content, workplace tasks, mentoring, monitoring, and assessment were adopted as the units of analysis.

The content of vocational education is directed towards preparing individuals for a particular type of activity, developing their vocational capacities, and relating these capacities to the needs of society [2]. From this perspective, the essence of dual education cannot be reduced merely to a learner spending several days of the week at an educational institution and the remaining days at an enterprise. Unless the two environments share common aims, content, tasks, and assessment procedures, workplace activity may serve immediate production needs rather than educational outcomes.

Cedefop studies indicate that, although the organisational models of apprenticeship vary across countries, their common features include employers' responsibility for training, meaningful learning in the workplace, and the linkage of outcomes to a formally recognised qualification [5]. OECD analyses further emphasise that high-quality work-based learning should ensure a balance between the interests of learners and employers, a clearly defined duration, qualified mentors, and tasks possessing genuine learning value [6]. These findings confirm that the effectiveness of dual education is determined not by the allocation of time, but by pedagogically designed activity.

The theoretical analysis substantiated the following coherent pedagogical sequence for improving vocational training: occupational standard → curriculum content → authentic workplace task → mentoring and pedagogical support → monitoring → integrated assessment.

Occupational standard and expected learning outcomes. These define the specific scope of the knowledge, practical actions, work culture, and responsibility that learners are expected to acquire. Unless vocational outcomes are specified in advance, coherence cannot be established between the topics taught at the educational institution and the tasks performed at the enterprise.

Alignment of curriculum content with authentic vocational activity. In this process, the topics of a subject or module are compared and coordinated with technological processes, work operations, and occupational safety requirements at the enterprise. Theoretical knowledge should become a means of understanding, planning, and justifying a workplace task. Such an approach enables the learner to progress from the question "What do I know?" to "In which task, and for what purpose, can I apply what I know?"

Transformation of an authentic workplace task into a pedagogical assignment. Not every task performed at an enterprise automatically constitutes a learning task. A pedagogically designed task must specify its purpose, conditions of performance, technological sequence, safety criteria, expected

quality of the product or service, and assessment indicators. Assigning learners only auxiliary duties does not develop vocational autonomy; therefore, tasks should be structured progressively, moving from simple operations towards more complex and independent activity.

Mentoring and pedagogical support. A workplace mentor should not be limited to demonstrating a practical operation; the mentor should explain the purpose of the task, analyse the learner's errors, supervise safe performance, and gradually increase the learner's level of independence. The European Training Foundation defines work-based learning as a process of acquiring knowledge and competences in an authentic working environment and emphasises that its structured organisation creates shared benefits for learners, enterprises, and the labour market [7]. Therefore, the workplace mentor's activity must also be supported by a pedagogical purpose, appropriate methods, and systematic feedback.

Continuous monitoring. Monitoring is not merely the verification of attendance or the collection of a final report; rather, it is a process of documenting the tasks completed by the learner, the degree of independence demonstrated, errors made, outcomes achieved, and the dynamics of development. A practical training diary, task sheet, work sample, photographic or electronic evidence, the mentor's conclusion, and the learner's self-analysis may be consolidated in a single portfolio. In monitoring work-based learning, it is recommended that input resources, processes, immediate outputs, and long-term outcomes be interconnected [8].

Integrated assessment. Assessing vocational training solely through a theoretical test or the workplace mentor's general judgement is insufficient. Assessment should integrate the educational institution teacher's evaluation of knowledge and understanding, the workplace mentor's assessment of the quality of practical performance, portfolio evidence, and the learner's result in completing an authentic vocational task. Such assessment provides a holistic

representation of the learner's knowledge, practical performance, independence, work discipline, and vocational responsibility. When assessment results are used through feedback to refine curriculum content and subsequent tasks, dual education becomes a continuously improving pedagogical process.

The proposed sequence does not mechanically combine the two environments of dual education; rather, it creates a pedagogical bridge between them. The educational institution provides theoretical preparation and methodological guidance; the enterprise supplies an authentic activity environment and vocational requirements; the mentor ensures practical support; and the learner undertakes active performance, reflection, and responsibility. In this way, cooperation advances from the level of a formal agreement to that of a pedagogical process based on a shared goal, distributed responsibilities, and joint outcome-based assessment.

CONCLUSION

Improving vocational training through dual education is not limited to organising the activities of an educational institution and an enterprise in parallel. Its pedagogical effectiveness is based on the coherent interconnection of the occupational standard, curriculum content, authentic workplace tasks, mentoring and pedagogical support, monitoring, and integrated assessment. This interconnection transforms theoretical knowledge into a means of authentic activity, organises workplace practice as a task with genuine educational value, and enables outcomes to be assessed on the basis of explicit evidence.

As the theoretical outcome of the study, the proposed coherent pedagogical sequence helps distinguish dual education from conventional industrial practice, clarify the responsibilities of cooperating stakeholders, and guide learners' vocational development. The practical application of this approach through tasks adapted to the occupational profiles of technical schools, portfolio-based monitoring, and unified assessment criteria expands

opportunities to develop vocational autonomy, work discipline, responsibility, and competences aligned with employers' requirements.

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O'ZBEKISTON TA'LIM TIZIMIDA TEXNIK-TEXNOLOGIK BAZANI MODERNIZATSIYALASHNING INVESTITSION MEXANIZMLARI VA ULARNING TA'LIM SIFATIGA TA'SIRI

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Annotatsiya. *Mazkur maqolada O'zbekiston ta'lim tizimida texnik-texnologik bazani modernizatsiyalashning investitsion mexanizmlari hamda ularning ta'lim sifati ko'rsatkichlariga ta'siri tahlil qilingan. Ta'lim muassasalarini zamonaviy texnika va raqamli texnologiyalar bilan ta'minlashning moliyalashtirish manbalari, investitsion jarayonlarning amaliy holati hamda ularning samaradorligini baholash mezonlari o'rganilgan. Shuningdek, UNESCO, Jahon banki, UNICEF va OECD tavsiyalari asosida texnologik investitsiyalarning ta'lim sifatiga ta'sir etish mexanizmlari yoritilgan. Tadqiqot natijasida texnologik investitsiyalarni faqat moddiy-texnik bazani yangilash vositasi sifatida emas, balki ta'lim sifati va inson kapitalini rivojlantirishning strategik omili sifatida baholash zarurligi asoslab berilgan.*

Kalit so'zlar: *investitsiya, ta'lim sifati, texnik-texnologik baza, raqamli ta'lim, modernizatsiya, inson kapitali, LMS, moliyalashtirish.*

Аннотация. *В статье проанализированы инвестиционные механизмы модернизации технической и технологической базы системы образования Узбекистана и их влияние на качество образования. Исследованы источники финансирования цифровой инфраструктуры образовательных учреждений, современное состояние инвестиционных процессов и критерии оценки их эффективности. На основе рекомендаций UNESCO, Всемирного банка, UNICEF и OECD раскрыты механизмы влияния технологических инвестиций на повышение качества образования. Сделан вывод о необходимости рассматривать инвестиции в техническую модернизацию не только как обновление материально-технической базы, но и как стратегический фактор развития человеческого капитала.*

Ключевые слова: *инвестиции, качество образования, цифровые технологии, модернизация, финансирование, человеческий капитал, цифровая инфраструктура.*

Abstract. *Article analyzes the investment mechanisms for modernizing the technical and technological infrastructure of Uzbekistan's education system and their impact on educational quality. The study examines the financing sources for digital educational infrastructure, the current state of investment processes, and the criteria for evaluating their effectiveness. Based on the recommendations of UNESCO, the World Bank, UNICEF, and OECD, the paper highlights the mechanisms through which technological investments improve educational quality. The findings demonstrate that investments in educational technologies should be considered not only as modernization of physical infrastructure but also as a strategic factor in developing human capital and ensuring sustainable educational development.*

Keywords: *investment, education quality, technological infrastructure, digital education, modernization, human capital, financing, LMS.*

KIRISH

So'nggi yillarda O'zbekistonda ta'lim tizimini modernizatsiya qilish davlat siyosatining ustuvor yo'nalishlaridan biriga aylandi. Globallashuv, raqamli iqtisodiyotning jadal rivojlanishi hamda mehnat bozorida yuqori malakali mutaxassislarga bo'lgan ehtiyojning ortishi ta'lim tizimiga qo'yilayotgan talablarni tubdan o'zgartirmoqda. Bunday sharoitda ta'lim muassasalarining texnik-texnologik bazasini rivojlantirish, zamonaviy axborot-kommunikatsiya texnologiyalarini joriy etish va ularni samarali moliyalashtirish ta'lim sifatini oshirishning muhim omiliga aylanmoqda. Bugungi kunda ta'lim sifati nafaqat o'quv dasturlari yoki pedagoglarning malakasi, balki zamonaviy laboratoriyalar, raqamli ta'lim platformalari, elektron kutubxonalar, internet infratuzilmasi va avtomatlashtirilgan boshqaruv tizimlarining rivojlanganlik darajasi bilan ham belgilanadi. Shu sababli texnik-texnologik bazaga yo'naltirilayotgan investitsiyalarni kompleks tarzda baholash va ularning natijadorligini tahlil qilish dolzarb ilmiy masala hisoblanadi. Mazkur maqolaning maqsadi O'zbekiston ta'lim tizimida texnik-texnologik bazani modernizatsiyalashga

yo'naltirilayotgan investitsion jarayonlarni tahlil qilish hamda ularning ta'lim sifati ko'rsatkichlariga ta'sirini baholashdan iborat.

Tadqiqot natijalari O'zbekiston ta'lim tizimida texnik-texnologik bazani modernizatsiya qilish davlat siyosatining ustuvor yo'nalishlaridan biri ekanligini ko'rsatdi. So'nggi yillarda ta'lim muassasalarining moddiy-texnik bazasini mustahkamlash, raqamli infratuzilmani rivojlantirish hamda zamonaviy axborot-kommunikatsiya texnologiyalarini joriy etishga qaratilgan investitsiyalar hajmi sezilarli darajada oshdi. Ushbu investitsiyalar ta'lim sifati ko'rsatkichlarini yaxshilash, o'quv jarayonini raqamlashtirish va boshqaruv samaradorligini oshirishga xizmat qilmoqda. Tahlillar shuni ko'rsatadiki, texnik-texnologik ta'minot faqat kompyuter va boshqa texnik vositalar bilan cheklanmaydi. U internet infratuzilmasi, elektron ta'lim platformalari (LMS), virtual laboratoriyalar, elektron kutubxonalar, raqamli baholash tizimlari hamda axborot xavfsizligi elementlarini ham o'z ichiga oladi. Mazkur komponentlarning uyg'un rivojlanishi ta'lim jarayonining uzluksizligi va sifatini ta'minlovchi muhim omil hisoblanadi. Davlat budjeti mablag'lari texnik-texnologik bazani rivojlantirishning asosiy moliyaviy manbasi bo'lib qolmoqda. 2025-yilgi davlat budjeti parametrlariga ko'ra, ijtimoiy sohani moliyalashtirish uchun ajratilgan mablag'larning salmoqli qismi ta'lim tizimini rivojlantirishga yo'naltirilgan. Bu esa ta'lim muassasalarida zamonaviy texnik vositalar, laboratoriyalar va raqamli platformalarni joriy etish imkoniyatlarini kengaytiradi. Biroq o'tkazilgan tahlillar investitsiyalar samaradorligi faqat ajratilgan mablag'lar miqdori bilan belgilanmasligini ko'rsatdi. Eng muhim omil investitsiyalarning ta'lim jarayonida amaliy natija berish darajasidir. Agar xarid qilingan texnik vositalardan muntazam foydalanilmasa, pedagoglarning raqamli kompetensiyasi yetarli bo'lmasa yoki elektron ta'lim resurslari ishlab chiqilmasa, investitsiyalar kutilgan samarani bermaydi.

Shu nuqtai nazardan texnik-texnologik bazani baholash uchun quyidagi indikatorlar muhim ahamiyat kasb etadi (1-jadval).

1-jadval. **Texnik-texnologik ta'minot samaradorligini baholash indikatorlari**

Ko'rsatkich	**Baholash mezoni**	**Ta'lim sifatiga ta'siri**
Internet infratuzilmasi	Tezlik, uzluksizlik, qamrov	Elektron ta'lim resurslaridan foydalanish imkoniyatini oshiradi
Kompyuter ta'minoti	Bir kompyuterga to'g'ri keladigan talabalar soni	Raqamli kompetensiyalar rivojlanadi
LMS platformalaridan foydalanish	Faol foydalanuvchilar soni, elektron topshiriqlar	O'quv jarayonini boshqarish sifati oshadi
Laboratoriya jihozlari	Jihozlardan foydalanish darajasi	Amaliy ko'nikmalar shakllanadi
Pedagoglarning AKT kompetensiyasi	Malaka oshirish va sertifikatlar	Raqamli texnologiyalardan samarali foydalanish ta'minlanadi
Elektron ta'lim resurslari	Elektron darsliklar va videodarslar soni	Mustaqil ta'lim samaradorligi oshadi
Axborot xavfsizligi	Ma'lumotlarni himoyalash tizimi	Raqamli ta'lim muhitining ishonchliligi ta'minlanadi

Manba: muallif tomonidan dissertatsiya tadqiqotlari asosida tuzilgan.

Tahlillar natijasida texnologik investitsiyalarning ta'lim sifatiga ta'siri ko'p bosqichli mexanizm orqali amalga oshishi aniqlandi (1-rasm).

Investitsiya → Texnologik infratuzilma → Pedagogik samaradorlik → Ta'lim sifati → Inson kapitali rivojlanishi

Mazkur model investitsiyalarning yakuniy natijasi sifatida faqat texnik vositalar sonining ko'payishi emas, balki ta'lim natijalari yaxshilanishi, bitiruvchilarning kasbiy kompetensiyalari rivojlanishi va inson kapitalining o'sishi kuzatilishini ifodalaydi.

UNICEF tomonidan O'zbekistonda amalga oshirilgan Giga tashabbusi hamda Eduten pilot loyihasi natijalari texnologik infratuzilmaning ta'lim sifatiga sezilarli ijobiy ta'sir ko'rsatishini tasdiqlaydi. Ayniqsa, internet sifati, raqamli

platformalardan foydalanish va o'qituvchilarning AKT bo'yicha tayyorgarligi o'quvchilarning o'zlashtirish ko'rsatkichlariga bevosita ta'sir etishi aniqlangan. Xalqaro tajriba ham shuni ko'rsatadiki, rivojlangan mamlakatlarda investitsiyalar asosan uchta yo'nalishda jamlanadi: zamonaviy infratuzilmani yaratish, pedagoglarning raqamli kompetensiyalarini rivojlantirish va ta'limni boshqarishning axborot tizimlarini takomillashtirish. Aynan ushbu uch omil investitsiyalarning yuqori samaradorligini ta'minlaydi. Olib borilgan tahlillar asosida O'zbekiston ta'lim tizimida texnik-texnologik bazani rivojlantirishning ustuvor yo'nalishlari sifatida internet infratuzilmasini yanada takomillashtirish, barcha ta'lim muassasalarida zamonaviy LMS platformalarini joriy etish, elektron ta'lim resurslarini ko'paytirish, pedagoglarning raqamli kompetensiyalarini muntazam oshirib borish hamda investitsiya samaradorligini KPI ko'rsatkichlari asosida baholash zarurligi asoslandi. Mazkur natijalar texnik-texnologik modernizatsiyani ta'lim sifatini oshirishning muhim omili sifatida e'tirof etish imkonini beradi. Shu bilan birga, investitsiyalarni rejalashtirishda ularning iqtisodiy samaradorligi bilan bir qatorda pedagogik natijadorligi va uzoq muddatli ijtimoiy ta'sirini ham hisobga olish maqsadga muvofiqdir.

Yuqoridagi fikrlardan xulosa qiladigan bo’lsak, tadqiqot natijalari shuni ko'rsatdiki, O'zbekiston ta'lim tizimida texnik-texnologik bazani modernizatsiyalash ta'lim sifatini oshirishning muhim strategik omillaridan biri hisoblanadi. Zamonaviy axborot-kommunikatsiya texnologiyalarini ta'lim jarayoniga joriy etish, raqamli infratuzilmani rivojlantirish va moddiy-texnik bazani mustahkamlash o'quv jarayonining samaradorligini oshirish, ta'lim xizmatlari sifatini yaxshilash hamda raqobatbardosh kadrlar tayyorlash uchun zarur shart-sharoitlarni yaratadi. Tahlillar shuni ko'rsatdiki, texnik-texnologik modernizatsiyaga yo'naltirilayotgan investitsiyalarning samaradorligi faqat ajratilgan mablag'lar hajmi bilan emas, balki ularning maqsadli va natijador foydalanilishi bilan belgilanadi. Zamonaviy kompyuter texnikasi, internet infratuzilmasi, elektron ta'lim platformalari, laboratoriya jihozlari va raqamli

ta'lim resurslarining mavjudligi pedagoglarning raqamli kompetensiyasi hamda ularni amaliyotda samarali qo'llash darajasi bilan uyg'unlashgandagina kutilgan natijaga erishish mumkin. Xalqaro tashkilotlar, jumladan UNESCO, Jahon banki, OECD va UNICEF tajribasi texnologik investitsiyalarni ta'lim tizimini kompleks rivojlantirish vositasi sifatida ko'rib chiqish zarurligini tasdiqlaydi. Rivojlangan mamlakatlar tajribasi asosida investitsiyalarni rejalashtirishda raqamli infratuzilmani takomillashtirish, pedagog kadrlarning kasbiy salohiyatini oshirish, ta'limni boshqarishning axborot tizimlarini rivojlantirish hamda natijadorlikni KPI ko'rsatkichlari orqali baholash muhim ahamiyat kasb etishi aniqlandi.

Tadqiqot natijalari asosida quyidagi takliflar ishlab chiqildi:

- ta'lim muassasalarining texnik-texnologik rivojlanishiga yo'naltiriladigan investitsiyalarni natijadorlik ko'rsatkichlari asosida rejalashtirish;
- barcha ta'lim muassasalarida yuqori tezlikdagi internet va zamonaviy LMS platformalaridan foydalanish darajasini oshirish;
- pedagoglarning raqamli kompetensiyalarini muntazam rivojlantirish va ularni zamonaviy ta'lim texnologiyalaridan foydalanishga rag'batlantirish;
- elektron ta'lim resurslari, virtual laboratoriyalar va raqamli kutubxonalarni kengaytirish orqali mustaqil ta'lim imkoniyatlarini rivojlantirish;
- texnologik investitsiyalarning samaradorligini monitoring qilish uchun yagona baholash tizimi va KPI indikatorlarini joriy etish.

Umuman olganda, texnik-texnologik bazani modernizatsiyalashga yo'naltirilgan investitsiyalarni ilmiy asosda rejalashtirish va samarali boshqarish O'zbekiston ta'lim tizimining raqobatbardoshligini oshirish, ta'lim sifatini xalqaro standartlar darajasiga olib chiqish hamda inson kapitalini rivojlantirishning muhim omili bo'lib xizmat qiladi.

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BOSHLANG‘ICH SINF MATEMATIKA DARSLARIDA INTERAKTIV RAQAMLI O’YINLARDAN FOYDALANISH METODIKASI

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Annotatsiya: *interaktiv raqamli o‘yinlardan foydalanishning pedagogik ahamiyati,va metodik asoslari hamda buni dars jarayoniga samarali integratsiya qilish yo‘llari yoritiladi. Raqamli o‘yinlar bilan o‘quvchilarning bilish faolligini oshirish, mustaqil fikrlashini rivojlantirish hamda matematik tushunchalarni oson o‘zlashtirishiga erishish masalalari tahlil qilinadi.*

Abstract: *This article examines the pedagogical significance and methodological foundations of using interactive digital games in primary school mathematics education. It also discusses effective approaches to integrating digital games into the teaching and learning process. Particular attention is given to the role of interactive digital games in enhancing students' cognitive activity, fostering independent thinking, increasing learning motivation, and facilitating the effective acquisition of mathematical concepts.*

Kalit so‘zlar*: interaktiv o‘yinlar, raqamli texnologiyalar, boshlang‘ich ta’lim, matematika darslari, bilish faoliyatini rivojlantirish, motivatsiya, innovatsion metodlar.*

Keywords*: interactive digital games, digital technologies, primary education, mathematics education, cognitive activity, independent thinking, learning motivation, innovative teaching methods*

KIRISH

Boshlang‘ich ta’lim jarayoni o‘quvchilarning asosiy bilim, ko‘nikma va malakalari shakllanadigan muhim bir davri hisoblanadi. Ayniqsa, hozirgi paytda matematika fanini o‘qitishda o‘quvchilarning qiziqishini oshirish bilan birgalikda ularni faol ishtirok etishga undash dolzarb masalalardan biri bo’lib kelmoqda. An’anaviy dars usullari ba’zi vaqtlarda o‘quvchilarda zerikish bilan passivlikni keltirib chiqarishi mumkin. Shu sababdan ham hozirgi zamonaviy

ta’limda interaktiv raqamli o‘yinlardan foydalanish muhim ahamiyat kasb etadi.[89] Interaktiv raqamli o‘yinlar bu – axborot-kommunikatsiya texnologiyalariga asoslangan bo‘lib, o‘quvchilarning faol ishtiroketishini ta’minlaydigan hamda o‘yin elementlari orqali bilim berishga xizmat qiluvchi vositalardir. Bularning hammasi o‘quvchilarni faollashtiradi, diqqatini jamlaydi va murakkab matematik tushunchalarni sodda shakl da tushunishga yordam beradi.[90] Interaktiv raqamli o‘yinlar haqiqatan o‘quv jarayonini o‘zgartiruvchi didaktik vosita hisoblanadi. Uning asosiy mohiyati shundaki, o‘quvchi bilimni tayyor holda qabul qilmaydi, biroq o‘yin jarayonida faol harakat qilib, qaror qabul qilib, xatolar orqali o‘rganadi. Ya’ni bu yerda o‘qitish passiv eshitishdan yuqoriga ya’ni faol ishtirokga o‘tadi. Shu jihatdan ham interaktiv o‘yinlar konstruktiv yondashuvga yaqin hisoblanadi, bilim o‘quvchining shaxsiy tajribasi orqali shakllanib boradi.Bunga o’xshash o‘yinlarda diqqatni jalb qiluvchi asosiy omil – aynan o‘yin mexanizmi hisoblanadi. Ball to‘plash, bosqichdan o‘tish,so’rovnoma o’tkazish, tezkor javob berish, raqobat yokida o‘z natijasini yaxshilash kabi elementlar o’yinlar o‘quvchilarda ichki motivatsiyani shakllantiradi. Oddiy mashq sifatida berilgan topshiriq ham o‘quvchilarga zerikarli tuyilishi mumkin, biroq xuddi shu topshiriq o‘yin shaklida taqdim etilganda u qiziqarli faoliyatga turiga aylanadi. Natijada esao‘quvchi ko‘proq mashq bajaradi, bu esa bilimning mustahkam bo’lishiga olib keladi.Interaktivlik tushunchasi ham ushbu jarayonda muhim o‘rin egallaydi. O‘quvchi har bir harakati uchun shu zahoti natijaga erishadi: to‘g‘ri javob bersa rag‘batlantirish, noto‘g‘ri javob bersa tuzatish imkoniyati beriladi. Aynan orqali tezkor teskari aloqa yuzaga keladi. An’anaviy darslarda o‘quvchilar xatosini kechroq bilishi mumkin, raqamli o‘yinlarda esa xato shuzahoti aniqlanishi bilan o’sha paytni o’zida to‘g‘rilanadi. Bu jarayon esa o’quvchilarda o‘rganish samaradorligini oshirishga xizmat qiladi.

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Matematika faniga nisbatan qaraydigan bo‘lsak, interaktiv o‘yinlar mavhum tushunchalarni aniqlashtirishga yordam beradi. Misol uchun, sonlar ustida amallarni bajarish jarayonida oddiy belgilardan emas, balki harakat, rang, shakl va vizual tasvirlar hayotiy misollar orqali beriladi. Ushbu ayniqsa boshlang‘ich sinf o‘quvchilari uchun muhimdir, chunki ularning tafakkuri ko‘proq ko‘rgazmali-obrazli vizual xarakterga ega. O‘yin orqali berilgan matematik vazifalar o‘quvchi uchun tushunarliroq shu bilan bir qatorda esda qolarliroq bo‘ladi.Bundan tashqari, interaktiv raqamli o‘yinlar differensial yondashuvni ham ta’minlab beradi. Har bitta o‘quvchi o‘zining tezligida ishlaydi,va ular o’zining darajasiga mos topshiriqlarni bajarishlari mumkin. Bilim jihatidan kuchli bo’lgan o‘quvchilar murakkabroq bosqichlarga o‘tadilar, qiyinlayotgan o’zlashtirishi sust bo’lgan o‘quvchilar esa sodda darajadagi mashqni davom ettiradi. Bu bosqich esa sinfdagi barcha o‘quvchilarni qamrab olish ular bilan shug’ullanish uchun imkon yaratadi.Yana bir muhim jihatidan biri shundan iboratki, interaktiv o‘yinlar metodlar o‘quvchilarda nafaqat bilimni emas, balki ularda mantiqiy fikrlash, muammolarni yechish, ularga noodatiy yondashish, tezkor qarorlar qabul qilish, xulosa chiqarish kabi ko‘nikmalarni ham rivojlantiradi.Interaktiv metodlar va o‘yin davomida o‘quvchilar vaziyatni tahlil qiladilar, variantlarni bir-biri bilan solishtiradilar va eng to‘g‘ri bo’lgan yechimni tanlashga harakat qiladilar. Bu jarayon esa o’quvchilarning tafakkurini kengaytiradi, shu bilan birgalikda faollashtiradi.Shu bilan qatorda, interaktiv raqamli o‘yinlar va metodlardan samarali foydalanish har bir o‘qituvchining metodik mahoratiga va dars o’tish uslubiga bog‘liq. Agar o‘yin metodlaridan faqatgina ko‘ngilochar vosita sifatida qo‘llanilsa, u kutilgan natijani bermaydi. O‘yin metodlari aniq didaktik maqsadga yo’naltirilgan bo’lishi, dars mazmuni bilan uzviy bog‘langan bo‘lishi kerak. Faqat shundagina o’yin metodlari haqiqiy pedagogik samaradorlikka ega bo‘ladi.Umumiy qilib olganda, interaktiv raqamli o‘yinlar va metodlar o‘quvchini markazga qo‘ygan, faol, qiziqarliroq

va samarador o‘qitish muhitini yaratadi. Bu o’yinlar orqali o‘quvchilar nafaqat bilim olishadi, balki o‘rganish jarayonining faol ishtirokchisiga aylanadilar.

ASOSIY QISM

Boshlang‘ich sinf matematika darslarida raqamli interaktiv metodlar, usullar va o‘yinlardan foydalanishning bir qancha metodik afzalliklari mavjud. Birinchidan, bunga o’xshash metodlar, o‘yinlar o‘quvchilarning motivatsiyasini oshirishga xizmat qiladi. O‘yin shaklida berilgan topshiriqlar bolalarda qiziqish uyg‘otadi. Natijada o’quvchilar dars jarayonida faol ishtirok etishga intiladilar. Ikkinchidan, interaktiv o‘yinlar individual yondashuvni ta’minlaydi. Har bitta o‘quvchi o‘zining darajasiga mos topshiriqlarni bajarishi mumkin. Uchinchidan, tezkor teskari aloqa mavjud bo‘lib, o‘quvchi o‘z xatosini darhol bilib, uni tuzatish imkoniyatiga ega bo‘ladi.Metodik jihatdan interaktiv raqamli o‘yinlardan foydalanishda o‘qituvchi quyidagi ketma -ketliklarga amal qilishi lozim. Birinchi bosqich bu – maqsadni aniqlab olish. O‘yin darsning qaysi qismida va qanday didaktik maqsadga xizmat qilishini aniq belgilashi kerak. Ikkinchi bosqich – mos o‘yinni tanlab olish. Tanlangan o‘yin va usullar o‘quvchilarning yosh va individual xususiyatlariga, bilim darajasiga va mavzu bilan bog’liq bo‘lishi zarur. Uchinchi bosqich – dars jarayoniga integratsiya qilish ya’ni bir necha fanlarni bir dars doirasida bog’lab o’qitish. O‘yin va metodlar darsning kirish, asosiy yoki bo’lmasa yakuniy qismida qo‘llanishi mumkindir . To‘rtinchi bosqich – natijalarni tahlil qilish. O‘yin va metodlar orqali erishilgan natijalar baholanadi shu bilan xulosalar chiqariladi. Masalan, sonlarni qo‘shish va ayirish mavzusida “To‘g‘ri javobni top” tipidagi interaktiv o‘yinlardan foydalanish mumkin. Geometrik shakllarni o‘rganishda esa vizual elementlarga boy o‘yinlar samarali natijalarni beradi. Bunday o‘yinlar o‘quvchilarning nafaqat matematik bilimini emas, balki mantiqiy fikrlashini ham rivojlantiradi. Boshlang‘ich sinf matematika darslarida raqamli o‘yinlardan foydalanish o‘quvchilarning bilish faoliyatini yuqori darajada oshiradi. O‘yin shaklida tashkil etilgan topshiriqlar o‘quvchilarda ijobiy emotsional holatni

yuzaga keltiradi va ularni faol ishtirok etishga rag‘batlantiradi [91] Shu bilan bir qatorda , interaktiv raqamli o‘yinlar individual yondashuvni ta’minlab, har bir o‘quvchining o‘z imkoniyatiga mos ravishda bilim olishini qo‘llab-quvvatlaydi beradi.Metodik jihatdan interaktiv raqamli o‘yinlardan foydalanish bir necha bosqichda amalga oshiriladi. Avvalo, o‘qituvchi darsning maqsadini aniq belgilab olishi kerak. Shundan keyin mazkur maqsadga mos interaktiv o‘yinlar va metodlar tanlanadi. O‘yin darsning kirish, asosiy yoki mustahkamlash bosqichlarida qo‘llanishi mumkin. Eng muhim jihatlardan biri – o‘yin natijalarini tahlil qilish va o‘quvchilarning xatolari ustida ishlashdir.[92]

.Masalan, boshlang‘ich sinflarda arifmetik amallarni o‘rgatishda “Tezkor javob” yoki “To‘g‘ri tanla” kabi raqamli o‘yinlardan foydalanish samarali hisoblanadi. Geometrik shakllarni o‘rganishda esa vizual interaktiv platformalar o‘quvchilarning tasavvurini kengaytiradi va mavzuni yaxshiroq o‘zlashtirishiga yordam beradi [93].Shuningdek , interaktiv raqamli o‘yinlardan foydalanishda ayrim muammolar ham uchrab turadi.Shu jumladan, axborot kommunikatsiya texnologiyalari va vositalarining yetishmasligi, o‘qituvchilarning raqamli kompetensiyasining pastligi yoki vaqtni noto‘g‘ri taqsimlash kabi holatlar dars samaradorligiga ham salbiy ta’sir ko‘rsatishi mumkin.[94] Shu sababdan ham, o‘qituvchi doimiy ravishda o‘z ustida ishlashi, zamonaviy texnologiyalarni o‘rganishi ularni samarali qo’llay olishi va ulardan to‘g‘ri foydalanishni bilishi zarur. Bugungi kunda boshlang‘ich ta’limda raqamli texnologiyalardan foydalanish o‘quvchilarning darsga bo‘lgan qiziqishini oshirishda muhim omillardan biri hisoblanadi. Ayniqsa, matematika darslarida interaktiv raqamli o‘yinlardan foydalanish o‘quvchilarning faolligini kuchaytiradi, ularning mustaqil fikrlash va mantiqiy xulosa chiqarish ko‘nikmalarini rivojlantiradi. O‘yin jarayonida o‘quvchilar topshiriqlarni bajarishga qiziqish bilan

[91] G’aniyev B. Boshlangich ta’lim metodikasi.- Toshkent: Ilm ziyo, 2021.-112-118-betlar

[92]

[93]

yondashadilar, xatolarini tezda anglaydilar va ularni tuzatishga harakat qiladilar. Bu esa bilimlarni yanada puxta o‘zlashtirishga yordam beradi. Interaktiv raqamli o‘yinlardan foydalanishda o‘qituvchi o‘quvchilarning yosh xususiyatlari, bilim darajasi va darsning maqsadini hisobga olishi zarur. Har bir o‘yin o‘quv materialini mustahkamlash, yangi mavzuni tushuntirish yoki o‘quvchilarning bilimini nazorat qilishga xizmat qilishi kerak. Shuningdek, o‘yinlardan foydalanishda vaqtni to‘g‘ri taqsimlash ham muhim hisoblanadi. O‘yin darsning asosiy maqsadini chetga surmasligi, aksincha, ta’lim samaradorligini oshirishga xizmat qilishi lozim. Zamonaviy raqamli platformalar, jumladan Wordwall, LearningApps, Quizizz va Kahoot kabi dasturlar matematika darslarini yanada qiziqarli tashkil etish imkonini beradi. Ushbu platformalar orqali o‘quvchilar individual yoki guruh bo‘lib ishlashlari, o‘z bilimlarini sinab ko‘rishlari va natijalarini darhol bilishlari mumkin. Natijada o‘quvchilarda o‘ziga bo‘lgan ishonch ortadi, darsda faol ishtirok etish istagi kuchayadi va ta’lim sifati yaxshilanadi.

XULOSA

Xulosa qilib aytadigan bo’lsak, boshlang‘ich sinf matematika darslarida interaktiv raqamli o‘yinlardan foydalanish ta’lim samaradorligini oshiruvchi muhim vositalardan biri hisoblanadi. U o‘quvchilarning nafaqat bilim olish jarayonini qiziqarli va samarali tashkil etishga yordam beradi. To‘g‘ri metodik yondashuv asosida qo‘llanilgan interaktiv o‘yinlar o‘quvchilarning bilish faoliyatini rivojlantiradi balki ularning mustahkam bilim olishiga ham xizmat qiladi.. Bunday o‘yinlar o‘quvchilarning bilishga bo‘lgan qiziqishini oshirib, ularning mantiqiy fikrlashi, mustaqil ishlashi va muammoli vaziyatlarga yechim topish ko‘nikmalarini rivojlantiradi. O‘qituvchi raqamli o‘yinlarni darsning maqsadiga mos ravishda tanlab, ulardan samarali foydalansa, ta’lim jarayoni yanada mazmunli va samarali tashkil etiladi. Kelgusida raqamli ta’lim vositalaridan oqilona foydalanish boshlang‘ich ta’lim sifatini oshirish va

o‘quvchilarning matematik savodxonligini rivojlantirishda muhim ahamiyat kasb etadi.

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O‘QUVCHILARDA IQTISODIY VA IJTIMOIY RIVOJLANISH KO‘RSATKICHLARIGA OID KO‘NIKMALARNI SHAKLLANTIRISH IMKONIYATLARI

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Annotatsiya. *Maqolada umumiy o‘rta ta’limda geografiya fanini o‘qitish jarayonida o‘quvchilarda iqtisodiy va ijtimoiy rivojlanish ko‘rsatkichlariga oid amaliy ko‘nikmalarni shakllantirish imkoniyatlari yoritilgan. Iqtisodiy va ijtimoiy ko‘rsatkichlar hududlarning rivojlanish darajasi, aholi joylashuvi, mehnat resurslari, ishlab chiqarish tarmoqlari, transport, xizmat ko‘rsatish hamda turmush sifati kabi jarayonlarni tushunishda muhim o‘quv materiali bo‘lib xizmat qiladi. Maqolada statistik ma’lumotlar bilan ishlash, xarita va diagrammalarni tahlil qilish, hududiy taqqoslash, muammoli savollar, loyiha ishlari va mahalliy materiallardan foydalanish orqali geografik kompetensiyalarni rivojlantirish yo‘llari asoslangan.*

Kalit so‘zlar: *geografiya ta’limi, iqtisodiy ko‘rsatkichlar, ijtimoiy ko‘rsatkichlar, ko‘nikma, geografik kompetensiya, statistik savodxonlik, hududiy tahlil, o‘quvchi faolligi.*

Abstract. *This article explores the opportunities for developing students’ practical skills related to economic and social development indicators in the process of teaching geography in general secondary education. Economic and social indicators serve as essential educational tools for understanding the level of regional development, population distribution, labor resources, production sectors, transportation, service industries, and quality of life. The article substantiates effective approaches to enhancing students’ geographical competencies through the analysis of statistical data, interpretation of maps and diagrams, regional comparisons, problem-based questions, project-based learning, and the use of local materials.*

Keywords: *geography education, economic indicators, social indicators, practical skills, geographical competence, statistical literacy, regional analysis, student engagement.*

KIRISH

Zamonaviy ta’lim jarayonida o‘quvchilarga tayyor bilim berish bilan cheklanib qolmasdan, ularda real hayotiy jarayonlarni tahlil qilish, ma’lumotlarni saralash, raqamlar asosida xulosa chiqarish va hududiy tafovutlarni anglash ko‘nikmalarini shakllantirish muhim ahamiyat kasb etmoqda. Ayniqsa, geografiya fani bu borada katta imkoniyatlarga ega. Chunki geografiya tabiat, aholi va xo‘jalik faoliyati o‘rtasidagi o‘zaro aloqadorlikni hududiy jihatdan o‘rganadi.

Iqtisodiy va ijtimoiy rivojlanish ko‘rsatkichlari geografiya darslarida o‘quvchilarni faol fikrlashga undaydigan muhim manba hisoblanadi. Aholi soni va zichligi, urbanizatsiya darajasi, bandlik tarkibi, sanoat va qishloq xo‘jaligi rivoji, transport tarmoqlari, ta’lim va sog‘liqni saqlash infratuzilmasi, xizmat ko‘rsatish sohasi hamda turmush sifati kabi ko‘rsatkichlar hududlarning rivojlanish darajasini tushunishga yordam beradi.Mazkur mavzuning dolzarbligi shundaki, iqtisodiy va ijtimoiy ko‘rsatkichlar bilan ishlash o‘quvchilarda nafaqat geografik bilimlarni, balki statistik savodxonlik, tanqidiy fikrlash, taqqoslash, mantiqiy xulosa chiqarish va amaliy qaror qabul qilish ko‘nikmalarini ham rivojlantiradi. Bunday yondashuv geografiya ta’limining hayot bilan bog‘liqligini kuchaytiradi.

ASOSIY QISM

Geografiya darslarida iqtisodiy va ijtimoiy rivojlanish ko‘rsatkichlaridan foydalanish, avvalo, o‘quvchilarda hududiy fikrlashni shakllantirishga xizmat qiladi. O‘quvchi biror mamlakat, viloyat yoki tuman haqida ma’lumot olganda uni faqat nom, joylashuv yoki tabiiy sharoit bilan emas, balki aholisi, xo‘jalik tarmoqlari, infratuzilmasi va ijtimoiy imkoniyatlari bilan birgalikda tasavvur qilishi zarur. Bu esa kompleks geografik yondashuvning muhim shartidir.

Iqtisodiy ko‘rsatkichlar o‘quvchilarga hududlarning xo‘jalik ixtisoslashuvini tushuntirishda keng imkoniyat yaratadi. Ijtimoiy ko‘rsatkichlar esa aholining yashash sharoiti, demografik vaziyat va ijtimoiy infratuzilmani o‘rganishda muhim ahamiyatga ega. Aholi soni, zichligi, tabiiy o‘sish,

migratsiya, urbanizatsiya, ta’lim muassasalari, tibbiy xizmat, uy-joy bilan ta’minlanish va bandlik darajasi kabi ko‘rsatkichlar o‘quvchilarga hududlar o‘rtasidagi ijtimoiy tafovutlarni anglashga yordam beradi. Natijada o‘quvchilar bir hududning rivojlanishi faqat tabiiy boyliklarga emas, balki inson kapitali, infratuzilma va boshqaruv imkoniyatlariga ham bog‘liq ekanligini tushunadi.

Mazkur ko‘rsatkichlar bilan ishlashda o‘qituvchi faqat tayyor raqamlarni aytib berishi yetarli emas. Asosiy maqsad o‘quvchilarga raqamlar mazmunini tushuntirish, ulardan xulosa chiqarish va hududiy jarayonlarni izohlashni o‘rgatishdir. Masalan, aholi zichligi yuqori bo‘lgan hududlarda mehnat resurslari salohiyati kuchli bo‘lishi mumkin, biroq uy-joy, transport, ekologik yuklama va bandlik bilan bog‘liq muammolar ham yuzaga kelishi ehtimoli bor.

Iqtisodiy va ijtimoiy ko‘rsatkichlarga oid ko‘nikmalarni shakllantirishda birinchi navbatda statistik ma’lumotlar bilan ishlash metodikasiga e’tibor qaratish lozim. O‘quvchilar jadvaldagi raqamlarni o‘qish, ko‘rsatkichlarni taqqoslash, foiz hisoblash, dinamikani aniqlash, hududlarni reytinglash va diagramma tuzish kabi amaliy mashqlar orqali statistik savodxonlikni egallaydi. Bu jarayon geografik bilimlarni matematik tahlil bilan bog‘laydi.

Ikkinchi muhim yo‘nalish — xarita bilan ishlashdir. Iqtisodiy va ijtimoiy ko‘rsatkichlar xaritada aks ettirilganda o‘quvchilar hududiy tafovutlarni aniqroq ko‘radi. Masalan, aholi zichligi xaritasi, urbanizatsiya darajasi, sanoat markazlari, transport yo‘llari, qishloq xo‘jaligi tarmoqlari yoki xizmat ko‘rsatish obyektlarining joylashuvi xaritalari o‘quvchilarda fazoviy tasavvurni rivojlantiradi.

Uchinchi yo‘nalish — taqqoslash va guruhlash metodidir. O‘quvchilarga ikki yoki undan ortiq hududni tanlab, ularni aholi soni, iqtisodiy ixtisoslashuv, ijtimoiy infratuzilma va transport imkoniyatlari bo‘yicha solishtirish topshirig‘i berilishi mumkin. Bunday mashqlar o‘quvchilarda o‘xshashlik va farqlarni ajratish, asosiy omillarni aniqlash hamda mustaqil xulosa chiqarish ko‘nikmalarini rivojlantiradi.

To‘rtinchi yo‘nalish — muammoli ta’limdan foydalanishdir. Masalan, “Nima uchun ayrim tumanlarda aholi zichligi yuqori?”, “Qaysi sabablar migratsiyani kuchaytiradi?”, “Ish o‘rinlari sonining ortishi hudud rivojiga qanday ta’sir qiladi?”, “Shaharlar kengayishi qishloq xo‘jaligi yerlariga qanday ta’sir ko‘rsatadi?” kabi savollar o‘quvchilarni faollashtiradi. Bunday savollar tayyor javobni emas, tahliliy fikrni talab qiladi.

Beshinchi yo‘nalish — loyiha va kichik tadqiqot ishlarini tashkil etishdir. O‘quvchilar “Mening tumanimning ijtimoiy-iqtisodiy rivojlanishi”, “Mahallamizda xizmat ko‘rsatish sohasi”, “Aholi bandligi va kasblar tarkibi”, “Transportning hudud rivojidagi o‘rni” kabi mavzularda kichik loyiha tayyorlashi mumkin. Bu usul o‘quvchilarni mustaqil ma’lumot izlash, suhbat o‘tkazish, kuzatish, natijani jadval yoki diagramma shaklida ifodalashga o‘rgatadi.

1-jadval.

Iqtisodiy va ijtimoiy ko‘rsatkichlar asosida ko‘nikmalarni shakllantirish yo‘nalishlari

Ko‘rsatkichlar guruhi	O‘quv materiali	Shakllanadigan ko‘nikma	Metodik usul
Demografik ko‘rsatkichlar	Aholi soni, zichligi, tabiiy o‘sish, migratsiya	Aholi joylashuvini tahlil qilish	Xarita va jadval asosida taqqoslash
Iqtisodiy ko‘rsatkichlar	Sanoat, qishloq xo‘jaligi, xizmatlar, investitsiya	Hudud xo‘jalik ixtisoslashuvini aniqlash	Diagramma, guruhlash va izohlash
Ijtimoiy ko‘rsatkichlar	Ta’lim, sog‘liqni saqlash, bandlik, turmush sifati	Ijtimoiy tafovutlarni tushunish	Muammoli savol va munozara
Transport ko‘rsatkichlari	Yo‘l tarmoqlari, logistika, qatnov imkoniyati	Hududiy bog‘liqlikni baholash	Sxema va xarita bilan ishlash

Mahalliy ko‘rsatkichlar	Tuman yoki mahalla statistikasi, kuzatish natijalari	Nazariy bilimni amaliyotga tatbiq etish	Loyiha va kichik tadqiqot

O‘quvchilarda iqtisodiy va ijtimoiy rivojlanish ko‘rsatkichlariga oid ko‘nikmalarni shakllantirish uchun amaliy topshiriqlar tizimli tashkil etilishi zarur. Bunda oddiydan murakkabga tamoyili muhimdir. Avvalo o‘quvchilar ko‘rsatkich nomini, uning mazmunini va o‘lchov birligini tushunishi kerak. Keyingi bosqichda ular jadval va diagrammalarni o‘qiydi, so‘ngra ko‘rsatkichlar o‘rtasidagi bog‘liqlikni izohlaydi. Masalan, o‘qituvchi o‘quvchilarga ikki viloyatning aholi zichligi, urbanizatsiya darajasi va sanoat ishlab chiqarishi bo‘yicha shartli jadval berishi mumkin. O‘quvchilar ushbu ma’lumotlar asosida qaysi hududda iqtisodiy faollik yuqori ekanligini, qaysi hududda qishloq xo‘jaligi salohiyati kuchli bo‘lishi mumkinligini va ijtimoiy infratuzilma rivojiga qanday ehtiyoj mavjudligini aniqlaydi.

Shuningdek, o‘quvchilarni mahalliy materiallar asosida ishlashga yo‘naltirish samarali natija beradi. Masalan, ular o‘z yashash hududida mavjud maktablar, tibbiyot muassasalari, savdo obyektlari, transport bekatlari, ishlab chiqarish korxonalari yoki xizmat ko‘rsatish shoxobchalari haqida ma’lumot to‘plashi mumkin. Bu ma’lumotlar asosida oddiy xarita-sxema, jadval yoki taqdimot tayyorlanadi. Amaliy topshiriqlar o‘quvchilarni dars jarayonining faol ishtirokchisiga aylantiradi. Ular geografik ma’lumotni tayyor holda qabul qilmaydi, balki uni izlaydi, qayta ishlaydi, tahlil qiladi va o‘z xulosasini himoya qiladi. Shu orqali o‘quvchilarda kommunikativ, axborot bilan ishlash, tanqidiy fikrlash va tadqiqotchilik ko‘nikmalari rivojlanadi. Iqtisodiy va ijtimoiy ko‘rsatkichlar asosida tashkil etilgan geografiya darslari o‘quvchilarda bir necha muhim kompetensiyalarni shakllantiradi. Birinchidan, ular hududiy tafakkurga ega bo‘ladi, ya’ni har bir jarayonning ma’lum makonda sodir bo‘lishini va bu makonning tabiiy, demografik hamda iqtisodiy xususiyatlari bilan bog‘liqligini tushunadi.

Ikkinchidan, statistik savodxonlik rivojlanadi. O‘quvchilar raqamlarni mexanik yodlashdan ko‘ra, ularning mazmunini anglashga, ko‘rsatkichlarni solishtirishga va ulardan xulosa chiqarishga o‘rganadi. Bu ko‘nikma nafaqat geografiya, balki iqtisodiyot, tarix, matematika va jamiyatshunoslik fanlari uchun ham muhimdir.

Uchinchidan, o‘quvchilarda ijtimoiy mas’uliyat hissi shakllanadi. Hududdagi bandlik, ta’lim, sog‘liqni saqlash, ekologik yuklama, transport va xizmat ko‘rsatish muammolari bilan tanishgan o‘quvchi jamiyat taraqqiyotiga befarq bo‘lmaydi. U o‘z hududidagi muammolarni tushunishga va ularni hal etish bo‘yicha takliflar bildirishga intiladi.

To‘rtinchidan, bunday yondashuv fanlararo integratsiyani kuchaytiradi. Masalan, aholi o‘sishi mavzusi matematika bilan, sanoat rivoji iqtisodiyot bilan, urbanizatsiya ekologiya bilan, transport tarmoqlari esa texnologiya va tarix bilan bog‘liq holda o‘rganiladi. Natijada o‘quvchilar bilimlarni alohida-alohida emas, balki yaxlit tizim sifatida qabul qiladi.

XULOSA

Xulosa qilib aytganda, o‘quvchilarda iqtisodiy va ijtimoiy rivojlanish ko‘rsatkichlariga oid ko‘nikmalarni shakllantirish geografiya ta’limining muhim metodik yo‘nalishlaridan biridir. Bu jarayon o‘quvchilarga hududlarning rivojlanish darajasini tushunish, iqtisodiy va ijtimoiy tafovutlarni izohlash, statistik ma’lumotlar asosida xulosa chiqarish hamda amaliy geografik fikrlashni rivojlantirish imkonini beradi. Geografiya darslarida statistik jadvallar, xaritalar, diagrammalar, mahalliy materiallar, muammoli savollar va loyiha ishlaridan foydalanish o‘quvchilarning bilimini hayotiy jarayonlar bilan bog‘laydi. Natijada ular nafaqat nazariy bilimga, balki amaliy tahlil qilish, hududiy fikrlash va ijtimoiy mas’uliyatga ega bo‘lgan shaxs sifatida shakllanadi.

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BOSHLANG‘ICH SINF O‘QITUVCHILARINI TAYYORLASHDA ZAMONAVIY YONDASHUVLAR

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Annotatsiya: *Mazkur maqolada boshlang‘ich sinf o‘qituvchilarini tayyorlash tizimida qo‘llanilayotgan zamonaviy yondashuvlar, ularning pedagogik ta’lim sifatini oshirishdagi ahamiyati hamda xalqaro tajribalar tahlil qilinadi. Raqamli texnologiyalar, kompetensiyaviy yondashuv, amaliyotga yo‘naltirilgan ta’lim, refleksiv pedagogika va innovatsion metodlarning bo‘lajak pedagoglarni kasbiy faoliyatga tayyorlashdagi o‘rni ilmiy-nazariy jihatdan yoritiladi. Shuningdek, ta’lim sifatini oshirishga qaratilgan islohotlar va statistik ma’lumotlar asosida boshlang‘ich ta’lim o‘qituvchilarini tayyorlashning ustuvor yo‘nalishlari aniqlanadi. Tadqiqot natijalari pedagog kadrlar tayyorlash jarayonini takomillashtirish bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqishga xizmat qiladi.*

Kalit so‘zlar: *boshlang‘ich ta’lim, pedagog kadrlar, kompetensiyaviy yondashuv, raqamli pedagogika, innovatsion ta’lim, refleksiv faoliyat, kasbiy kompetensiya, amaliyotga yo‘naltirilgan ta’lim, pedagogik texnologiyalar, ta’lim sifati.*

Abstract: *This article analyzes modern approaches used in the training system for primary school teachers, their significance in enhancing the quality of pedagogical education, and relevant international experiences. It examines, from a scientific-theoretical perspective, the roles of digital technologies, the competency-based approach, practice-oriented education, reflective pedagogy, and innovative methods in preparing future educators for professional practice. Furthermore, priority directions for primary teacher training are identified based on reforms aimed at improving educational quality and on statistical data. The research findings serve as a basis for developing scientific and practical recommendations to improve the process of training pedagogical personnel.*

Keywords: *primary education, pedagogical personnel, competency-based approach, digital pedagogy, innovative education, reflective practice, professional competence, practice-oriented education, pedagogical technologies, quality of education.*

KIRISH

Globallashuv, raqamlashtirish va bilimlar iqtisodiyotining jadal rivojlanishi ta’lim tizimi oldiga mutlaqo yangi talablarni qo‘ymoqda. Endilikda maktab o‘quvchisiga tayyor bilimlarni yetkazish emas, balki unda mustaqil fikrlash, muammoni hal qilish, muloqot qilish va hayot davomida o‘qib-o‘rganishga bo‘lgan ehtiyojni shakllantirish ustuvor vazifaga aylanmoqda. Mazkur jarayonning muvaffaqiyati esa, avvalo, boshlang‘ich ta’lim bosqichida faoliyat yuritadigan o‘qituvchining kasbiy tayyorgarligi, pedagogik mahorati va zamonaviy ta’lim texnologiyalaridan foydalanish kompetensiyalariga bog‘liq. Chunki insonning keyingi ta’lim yo‘li aynan boshlang‘ich sinflarda shakllanadigan bilim, ko‘nikma va qadriyatlarga tayanadi.

So‘nggi yillarda xalqaro miqyosda o‘qituvchi omili ta’lim sifatining eng muhim ko‘rsatkichlaridan biri sifatida e’tirof etilmoqda. UNESCOning 2024-yilda e’lon qilingan ma’lumotlariga ko‘ra, dunyo bo‘yicha sifatli ta’limni ta’minlash uchun 2030-yilgacha 44 milliondan ortiq yangi o‘qituvchiga ehtiyoj mavjud. Mazkur raqam pedagog kadrlarni tayyorlash masalasi nafaqat milliy, balki global miqyosdagi strategik vazifa ekanligini ko‘rsatadi. Ayniqsa, boshlang‘ich ta’lim sohasida malakali pedagoglar yetishmovchiligi ko‘plab mamlakatlarda ta’lim sifati va o‘quvchilar natijalariga bevosita ta’sir ko‘rsatmoqda.

Xalqaro baholash dasturlari natijalari ham o‘qituvchi tayyorgarligi va o‘quvchilar muvaffaqiyati o‘rtasida uzviy bog‘liqlik mavjudligini tasdiqlaydi. Masalan, PIRLS va TIMSS tadqiqotlarida yuqori natijalarni qayd etayotgan mamlakatlar tajribasi shuni ko‘rsatadiki, pedagoglarni saralash, tayyorlash va kasbiy rivojlantirish tizimi qanchalik puxta yo‘lga qo‘yilgan bo‘lsa, ta’lim sifati ham shunchalik yuqori bo‘ladi. Finlyandiya, Singapur va Janubiy Koreya kabi davlatlarda o‘qituvchilik kasbining nufuzi yuqori bo‘lishi bilan bir qatorda, pedagoglarni tayyorlash dasturlarining ilmiylik, amaliyot va innovatsiyalar

uyg‘unligiga asoslanishi ushbu muvaffaqiyatning asosiy omillaridan biri hisoblanadi.

O‘zbekistonda ham ta’lim tizimini modernizatsiya qilish jarayonida pedagog kadrlar tayyorlash masalasiga alohida e’tibor qaratilmoqda. So‘nggi yillarda oliy pedagogik ta’lim mazmunini yangilash, kredit-modul tizimini joriy etish, raqamli ta’lim muhitini kengaytirish va xalqaro standartlarga mos kompetensiyalarni shakllantirish bo‘yicha qator islohotlar amalga oshirilmoqda. Biroq zamonaviy maktab ehtiyojlari bilan pedagoglarni tayyorlash tizimi o‘rtasida ayrim tafovutlarning saqlanib qolayotgani ushbu masalani ilmiy jihatdan chuqur o‘rganishni taqozo etadi. Xususan, nazariy bilimlarning amaliy faoliyat bilan integratsiyasi, bo‘lajak o‘qituvchilarning raqamli kompetensiyalari hamda innovatsion fikrlash ko‘nikmalarini rivojlantirish dolzarb vazifalardan biri bo‘lib qolmoqda.

1.N.A. Muslimov

Kasbiy kompetensiyalar va pedagogik tayyorgarlik

N.A.Muslimovning pedagogik ta’lim nazariyasiga oid tadqiqotlarida bo‘lajak o‘qituvchilarning kasbiy kompetensiyalarini shakllantirish pedagogik ta’limning asosiy maqsadi sifatida talqin qilinadi. Olim o‘qituvchining nazariy bilimlari amaliy faoliyat bilan integratsiyalashgan holda rivojlantirilmasa, ta’lim sifati kutilgan natijani bermasligini ta’kidlaydi. Uning fikricha, zamonaviy pedagogni tayyorlashda refleksiv faoliyat, mustaqil izlanish va innovatsion yondashuvlar muhim ahamiyatga ega.[95]

[95] N.A. Muslimov. Kasb ta’limi o‘qituvchilarini kasbiy shakllantirishning nazariy-metodik asoslari. Toshkent: Fan, 2007.
[2] R.H. Jo‘rayev, S.T. Turg‘unov. Ta’lim menejmenti. Toshkent: Voris-Nashriyot, 2012.

[3]O.A. Hasanboyeva va boshqalar. Pedagogika. Toshkent: Fan va texnologiya, 2010.

2.R.H. Jo‘rayev va S.T. Turg‘unov

Ta’lim menejmenti va sifat monitoringi

R.H. Jo‘rayev va S.T. Turg‘unov tomonidan olib borilgan tadqiqotlarda pedagog kadrlar tayyorlash sifatini boshqarish va monitoring qilish mexanizmlari tahlil qilingan. Mualliflar ta’lim muassasalari faoliyatida innovatsion boshqaruv usullarini qo‘llash o‘qituvchi tayyorgarligining samaradorligini oshirishini qayd etadilar. Tadqiqot natijalariga ko‘ra, pedagogik amaliyot va metodik tayyorgarlik o‘rtasidagi uzviy bog‘liqlik o‘qituvchining kasbiy muvaffaqiyatini belgilovchi muhim omillardan biridir. [96]

3.O.A. Hasanboyeva va hamkorlar

Pedagogik texnologiyalar va interaktiv metodlar

O.A. Hasanboyeva va hamkorlarining ishlarida pedagogik texnologiyalarni ta’lim jarayoniga tatbiq etish masalalari yoritilgan. Mualliflar interaktiv metodlar, muammoli ta’lim, loyihaviy faoliyat va axborot-kommunikatsion texnologiyalar bo‘lajak boshlang‘ich sinf o‘qituvchilarining metodik kompetensiyasini rivojlantirishga xizmat qilishini ilmiy jihatdan asoslaydilar.[97]

4.N.N. Azizxo‘jayeva

Pedagogik mahorat va ijodkorlik

N.N. Azizxo‘jayeva pedagogik mahoratni o‘qituvchining kasbiy tayyorgarligini belgilovchi integrativ sifat sifatida baholaydi. Uning tadqiqotlarida pedagogik muloqot, ijodkorlik va refleksiya bo‘lajak o‘qituvchilarning kasbiy rivojlanishida markaziy o‘rin tutishi ko‘rsatib berilgan.[98]

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[98] N.N. Azizxo‘jayeva. Pedagogik mahorat va pedagogik texnologiyalar. Toshkent: O‘qituvchi, 2006.

METODOLOGIYA

Mazkur tadqiqotda boshlang‘ich sinf o‘qituvchilarini tayyorlashda zamonaviy yondashuvlarning samaradorligini aniqlash maqsadida kompleks metodologik yondashuv qo‘llanildi. Tadqiqot quyidagi ilmiy metodlarga tayandi:

Nazariy tahlil

O‘zbekiston olimlari va xalqaro tadqiqotchilar tomonidan yaratilgan ilmiy adabiyotlar, monografiyalar, dissertatsiyalar hamda normativ-huquqiy hujjatlar o‘rganildi. Ushbu bosqichda pedagog kadrlar tayyorlashning zamonaviy tendensiyalari, kompetensiyaviy yondashuv va raqamli pedagogika masalalari tizimli ravishda tahlil qilindi.

Statistik ma’lumotlarni tahlil qilish

Ta’lim sifati, pedagog kadrlar tayyorlash ko‘rsatkichlari hamda raqamli ta’limdan foydalanish darajasiga oid rasmiy statistik ma’lumotlar umumlashtirildi. Statistik tahlil zamonaviy yondashuvlarning amaliy ahamiyatini aniqlash imkonini berdi.

Qiyosiy tahlil

O‘zbekiston tajribasi Finlyandiya, Singapur va Janubiy Koreya kabi mamlakatlarning pedagog kadrlar tayyorlash modeli bilan qiyoslandi. Bu usul milliy tizimning kuchli va zaif jihatlarini aniqlashga yordam berdi.

Mantiqiy umumlashtirish

Olingan natijalar asosida boshlang‘ich sinf o‘qituvchilarini tayyorlashning ustuvor yo‘nalishlari, samarali pedagogik mexanizmlari va takomillashtirish imkoniyatlari yuzasidan xulosalar ishlab chiqildi.

Tadqiqotning metodologik asosi sifatida kompetensiyaviy yondashuv, tizimli yondashuv va amaliyotga yo‘naltirilgan ta’lim konsepsiyalari tanlandi. Ushbu yondashuvlar bo‘lajak o‘qituvchining kasbiy faoliyatga tayyorgarligini ko‘p qirrali tarzda baholash imkonini beradi.

Tadqiqot natijalari

Tadqiqot natijalari boshlang‘ich sinf o‘qituvchilarini tayyorlashda kompetensiyaviy yondashuv, raqamli texnologiyalar va amaliyotga yo‘naltirilgan ta’limni joriy etish bo‘lajak pedagoglarning kasbiy tayyorgarligini sezilarli darajada oshirishini ko‘rsatdi. An’anaviy ta’lim modelidan farqli ravishda, zamonaviy tizim nazariy bilim bilan bir qatorda kasbiy kompetensiyalarni shakllantirishga ustuvor ahamiyat bermoqda. Natijada talabalar pedagogik vaziyatlarda mustaqil qaror qabul qilish, innovatsion metodlardan foydalanish va samarali muloqot o‘rnatish ko‘nikmalarini rivojlantirmoqda.

Adabiyotlar tahlili N.A. Muslimov, N.N. Azizxo‘jayeva va O.A. Hasanboyeva tomonidan ilgari surilgan nazariy yondashuvlarning amaliyotda o‘z tasdig‘ini topayotganini ko‘rsatdi. Shuningdek, elektron ta’lim platformalari va sun’iy intellekt elementlaridan foydalanish talabalarning axborot-kommunikatsion kompetensiyalarini rivojlantirishga xizmat qilmoqda.

Tadqiqot pedagogik amaliyot va kredit-modul tizimi kasbiy tayyorgarlikni kuchaytirishini ham tasdiqladi. Amaliy mashg‘ulotlar metodik bilimlar, refleksiya va kasbiy moslashuvni rivojlantirsa, kredit-modul tizimi mustaqil ta’lim va individual ta’lim trayektoriyasini qo‘llab-quvvatlaydi.

Xalqaro ma’lumotlarga ko‘ra, UNESCO prognoziga asosan, 2030-yilgacha dunyoda 44 million nafar qo‘shimcha boshlang‘ich va o‘rta ta’lim o‘qituvchilariga ehtiyoj mavjud. Bu esa pedagog kadrlarni zamonaviy kompetensiyalar va raqamli texnologiyalar asosida tayyorlash dolzarb vazifa ekanligini yana bir bor tasdiqlaydi.

Boshlang‘ich sinf o‘qituvchilarini tayyorlashning zamonaviy yondashuvlarini joriy etish zaruratini ko‘rsatuvchi ayrim statistik ko‘rsatkichlar

№	Ko‘rsatkich	Miqdori	Ahamiyati
1	2030-yilgacha dunyo miqyosida zarur bo‘ladigan qo‘shimcha o‘qituvchilar soni	44 million nafar	Pedagog kadrlar tayyorlash sifatini oshirish zaruratini ko‘rsatadi
2	O‘qituvchilar tanqisligini bartaraf etish uchun har yili talab etiladigan mablag‘	120 mlrd AQSH dollari	O‘qituvchilar tayyorlash global muammo ekanligini tasdiqlaydi
3	Yevropa va Shimoliy Amerikada boshlang‘ich sinf o‘qituvchilarining boshqa mutaxassislarga nisbatan kamroq maosh oladigan davlatlari ulushi	70 %	O‘qituvchi kasbining jozibadorligini oshirish zarurligini ko‘rsatadi
4	Afrikada bir nafar malakali boshlang‘ich sinf o‘qituvchisiga to‘g‘ri keladigan o‘quvchilar soni	56 nafar	Ta’lim sifati va pedagoglar yetishmovchiligi o‘rtasidagi bog‘liqlikni aks ettiradi
5	O‘zbekistondagi oliy ta’lim muassasalari soni (2017/2018 o‘quv yili)	72 ta	Pedagog kadrlar tayyorlash imkoniyatlarining boshlang‘ich holati
6	O‘zbekistondagi oliy ta’lim muassasalari soni (2023/2024 o‘quv yili)	219ta	Pedagoglarni tayyorlash infratuzilmasining kengayganligini ko‘rsatadi
7	2017–2024-yillarda OTMlar sonining o‘sishi	304%	Oliy ta’lim qamrovi va kadrlar tayyorlash

			salohiyati oshganligini bildiradi
8	2024-yilda zamonaviy texnologiyalar bilan jihozlangan kompyuter sinflari soni	13500 dan ortiq	Raqamli pedagogikani rivojlantirish uchun yaratilgan sharoit

Manba: UNESCO Global Report on Teachers (2024); O‘zbekiston Respublikasi Vazirlar Mahkamasi huzuridagi Makroiqtisodiy va hududiy tadqiqotlar instituti ma’lumotlari; O‘zbekiston ta’lim tizimini raqamlashtirish bo‘yicha rasmiy hisobotlar. (ЮНЕСКО)

Jadval bo‘yicha ilmiy tahlil

Jadval ma’lumotlari boshlang‘ich sinf o‘qituvchilarini tayyorlash tizimini modernizatsiya qilish nafaqat milliy, balki global miqyosdagi dolzarb vazifa ekanligini ko‘rsatadi. Xususan, UNESCO tomonidan keltirilgan 44 million nafar o‘qituvchi tanqisligi haqidagi prognoz pedagogik ta’lim dasturlarini kompetensiyaviy va innovatsion asosda qayta ko‘rib chiqishni talab etadi. Shu bilan birga, O‘zbekistonda 2017–2024-yillar davomida oliy ta’lim muassasalari sonining 72 tadan 219 taga yetgani pedagog kadrlar tayyorlash imkoniyatlari sezilarli darajada kengayganini ko‘rsatadi. Biroq son jihatidan o‘sish bilan bir qatorda tayyorlanayotgan mutaxassislarning sifati, raqamli kompetensiyasi va amaliy tayyorgarligi masalalari ham ustuvor ahamiyat kasb etadi. (UzDaily.uz)

XULOSA

Tadqiqot natijalari boshlang‘ich sinf o‘qituvchilarini tayyorlash tizimi bugungi kunda nafaqat pedagogik ta’limning alohida yo‘nalishi, balki mamlakatning intellektual salohiyatini belgilovchi strategik omillardan biri ekanligini ko‘rsatdi. Chunki o‘quvchining keyingi ta’lim bosqichlaridagi muvaffaqiyati ko‘p jihatdan aynan boshlang‘ich ta’lim davrida shakllangan bilim, ko‘nikma va qadriyatlarga bog‘liq bo‘ladi. Shu sababli bo‘lajak o‘qituvchilarni tayyorlash masalasiga faqat oliy ta’lim muassasalari

faoliyatining tarkibiy qismi sifatida emas, balki ta’lim sifatini uzoq muddatli rivojlantirish mexanizmi sifatida yondashish zarur.

Mening nazarimda, kelajakdagi boshlang‘ich sinf o‘qituvchisi bilim beruvchi emas, balki o‘quvchini izlanishga undovchi, uning individual imkoniyatlarini kashf etuvchi va ta’lim jarayonini boshqaruvchi mentor sifatida shakllanishi lozim. Bunday natijaga erishish esa pedagoglarni tayyorlash jarayonida innovatsion metodlar, refleksiv faoliyat, amaliy mashg‘ulotlar va raqamli pedagogika elementlaridan tizimli foydalanishni talab qiladi.

Shunday qilib, boshlang‘ich sinf o‘qituvchilarini tayyorlashda zamonaviy yondashuvlarni keng joriy etish pedagogik ta’lim sifatini oshirish, xalqaro standartlarga mos raqobatbardosh mutaxassislarni shakllantirish va ta’lim tizimining barqaror rivojlanishini ta’minlashning eng muhim shartlaridan biridir. Mazkur tadqiqot natijalari pedagog kadrlar tayyorlashning mazmuni va metodlarini takomillashtirish bo‘yicha keyingi ilmiy izlanishlar uchun nazariy hamda amaliy asos bo‘lib xizmat qilishi mumkin.

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ARTIFICIAL INTELLIGENCE-FOSTERED ENGLISH LANGUAGE INSTRUCTION: AN OUTLINE FOR ESTABLISHING COMMUNICATIVE AS WELL AS SOCIOLINGUISTIC COMPETENCE IN HIGHER EDUCATION

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Abstract: *AI has advanced as a transformative potency within higher education, essentially within English language teaching, by empowering adjustable learning, intellectual teaching, computerized assessment, and genuine language communication. While prior studies have mainly emphasized AI's role in enhancing linguistic accuracy and learner independence, insufficient attention has been paid to its influence on the development of interactive and sociolinguistic competence. This research offers an AI-fostered pedagogical outline which combines procreative AI, familiar chatbots, and speech-acknowledgement technologies, as well as adjustable learning systems, into communicative language instruction. The suggested model places AI as an educational partner compared to an auxiliary to teachers, suggesting practical assistance for curriculum originators, instructors, besides higher education organizations searching for improving English language teaching.*

Keywords: *AI, ELT, higher education, Communicative competence, Sociolinguistic competence, AI-mediated learning, Digital teaching.*

INTRODUCTION

AI is robustly reforming instructional practices around the world, suggesting ground-breaking chances to enhance instruction efficiency as well as learning results.

In ELT, AI technologies, including intellectual teaching schemes, great language frames, adjustable learning stages, and speech recognition software, offer students individualized teaching, instant feedback, and actual interaction chances. Such modernizations have altered language teaching from teacher-centered teaching to learner-centered, technology-improved atmospheres.

Even though such modernizations, many previous study has focused on vocabulary acquisition, grammar accuracy, writing assistance, as well as pronunciation practice. Reasonably, no focus has been provided to the role of AI in enhancing interactive competence as well as sociolinguistic competence – two vital elements of successful language usage within actual social settings. Communicative competence expands beyond grammatical input to entail the capability to utilize language efficiently in authentic communications. Sociolinguistic competence, in the meantime, allows students to choose language suitable to cultural normative, social rapports, as well as communicative circumstances. Such competencies are progressively vital significant within a globalized world portrayed by intercultural interaction as well as digital communication.

This study claims that AI could subsidize the establishment of both interactive and sociolinguistic competence while combined in wide-ranging educational ideologies. It offers an all-inclusive AI-improved teaching outline for higher teaching organizations.

MAIN SECTION

The suggested framework is based on three additional theoretical perceptions which collectively interpret the way AI can ease language learning. The initial theoretical basis is Communicative Language Teaching (CLT), that focuses evocative interaction as the main objective of language teaching. Compared to memorizing secluded grammatical rules, students establish communicative competence via actual communication, cooperation of connotation, cooperative studying, as well as contextualized language implementation. AI-generated familiar representatives maintain these values by producing authentic interaction surroundings in which learners can drill language progressively with no fear of making errors.

The subsequent conceptual basis is sociocultural concept; that deems learning as a socially assisted procedure happening via communication

corresponded with more experienced citizens as well as compassionate learning surroundings. In my opinion, AI operates as an adjustable educational scaffold which supports students based on their existing proficiency level when progressively inspiring self-determining language production. Intelligent teaching frames offer personalized assistance, helpful feedback, as well as circumstantial interpretations which thoroughly bring to mind scaffolded learning understandings conventionally simplified by instructors.

Ultimately, conceptual perception affects sociolinguistic competence, that focuses on students' capability to explain as well as make language matching to various social situations. Such competence entails comprehension politeness bonds, cultural standards, register disparity, discourse association, and pragmatic connotation. AI technologies can produce actual interactions across numerous communicative circumstances empower students to expose distinct linguistic conditions which are frequently challenging to regenerate dependably in traditional classrooms.

The given below pedagogical framework encompasses five unified elements produced to assist all-inclusive language establishment. The initial aspect entails individualized learning, whereby AI systems investigate student performance as well as inevitably adjust educational resources based on personal proficiency levels. Such adjustable teaching guarantees that learners get applicably difficult tasks while dealing with particular learning challenges.

The next elements emphasize communicative drills via AI-mediated dialogue systems. Students within replicated interactions entailing academic debates, professional conversations, travel circumstances, business discussions, customer service communications, as well as intercultural interaction scripts. Such actual communications endorse fluency growth when rising student confidence via infinite practice chances.

The third element deals with sociolinguistic competence by involving students to culturally proper language across formal and informal interaction

settings. AI systems interpret gaps between polite and casual phrases, showcase culturally fitting answers, investigate pragmatic mistakes, as well as offer contextual interpretations related to language selection. This feedback loop empowers students to catch meanings of what phrases are grammatical error-free and when, where, and with whom certain phrases ought to be implemented.

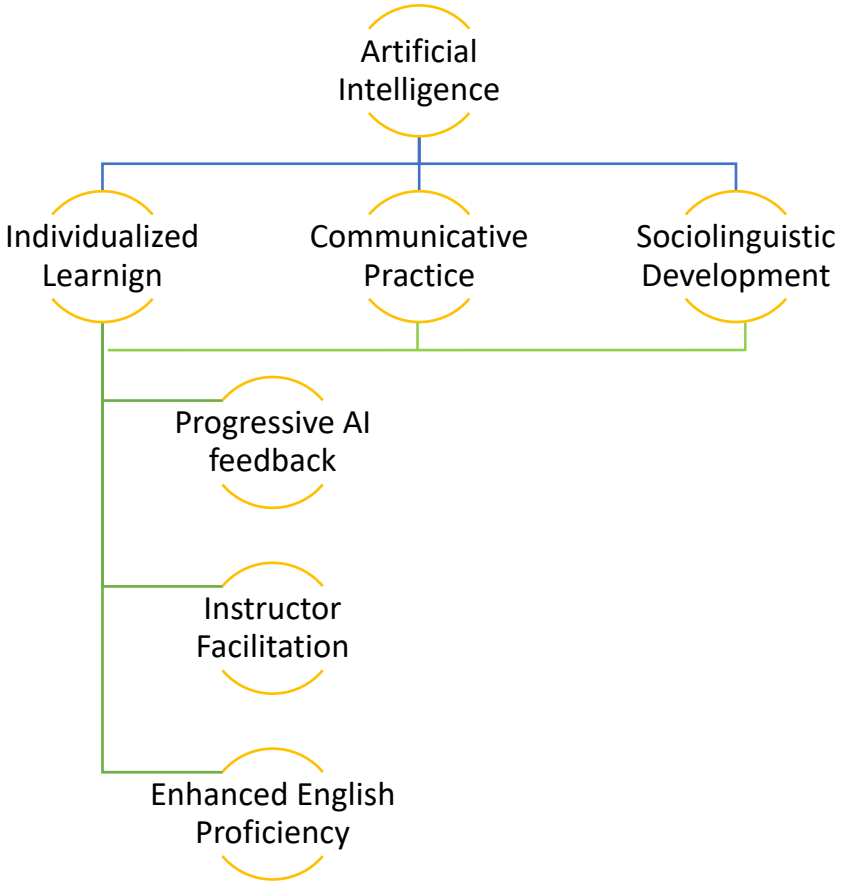

Figure 1. AI-Fostered Pedagogical Framework

The fourth one focuses on progressive formative assessment. AI technologies control student progress, analyze repetitive mistakes, produce personalized feedback reports, as well as suggest individualized learning tasks, instant feedback enables students to be aware of their weaknesses immediately when mediating self-monitored learning as well as uninterrupted enhancement.

The final element underscores the developing role of instructors in AI-assisted classrooms. Compared to altering teachers, AI computerizes tontine educational activates, enabling instructors to focus on higher-order teaching

duties, such as facilitating collaborative learning, stimulating critical thinking, tackling with necessities, as well as helping ethical AI usage.

The combination of Artificial Intelligence into English language education portrays an important change from technology-mediated teaching to intelligent learning surroundings accomplished in assisting personalized instructional exposures. AI technologies produce chances for wide-ranging interactive drill which conventional classrooms frequently cannot offer due to time limitations, class size, as well as inadequate chances for personalized communication. Students might practice interactions progressively, get instant feedback, as well as steadily enhance interactive confidence via pertained communication together with intelligent systems.

AI also gives a significant contribution to the establishment of sociolinguistic competence by experiencing learners to actual cultural settings as well as pragmatic language usage. Contrasting traditional textbooks which existed consistent dialogues, AI makes dynamic interactions illustrating various communicative circumstances as well as social connections. As aa result, students gain profounder comprehension of contextual suitability, intercultural interaction, as well as pragmatic language usage when at the same time enhancing linguistic competence.

Nonetheless, positive AI application needs thoroughly pedagogical practice. Abundant reliance on AI-generated answers might decrease learners' critical thinking skills, creativity, as well as self-governing problem-solving skills. Moreover, ethical issues concerning data privacy, algorithmic favoritism, misrepresentation, and academic integrity requires in-depth organizational policies operating accountable AI usage. Instructors thus stay obligatory facilitators who assess AI-made content, design meaningful learning experiences, as well as nurture students' critical digital knowledge.

CONCLUSION

Artificial Intelligence has turned a significant aspect of modern English language teaching and learning by extending chances for individualized learning, real-life interaction, adjustable evaluation, and progressive learner assistance. The AI-mediated pedagogical outline offered in this study demonstrates the way intelligent technologies could analytically improve communicative competence as well as sociolinguistic competence in higher education when supplementing compared to substituting instructors. By implementing AI together with developed pedagogical theories, including Communicative Language Teaching as well as sociocultural learning, higher education institutions can produce more involving, inclusive, and efficient language surroundings. In the future, empirical study ought to assess the efficiency of this outline across various instructional settings, explore students' prolonged communicative establishment, as well as investigate best practices for ethical AI application into language education. Such study will subsidize to developing evidence-grounded rules for the accountable and pedagogically comprehensive usage of AI within ELT.

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AVTOMOBILLARNING ELEKTR TIZIMLARI FANINI RAQAMLI TEXNOLOGIYALAR ASOSIDA O‘QITISH METODIKASINING PEDAGOGIK SAMARADORLIGI

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Annotatsiya: *Mazkur maqolada avtomobillarning elektr tizimlari fanini raqamli texnologiyalar asosida o‘qitish metodikasining samaradorligi pedagogik tajriba natijalari asosida tahlil qilinadi. Tadqiqot uchta oliy ta’lim muassasasida 416 nafar talaba ishtirokida olib borildi. Virtual laboratoriyalar, elektron baholash, diagnostik simulyatorlar va loyiha asosida o‘qitish metodlarining ta’lim sifati hamda kasbiy kompetensiyalarga ta’siri o‘rganildi. Natijalar eksperimental guruhda nazariy bilim va amaliy ko‘nikmalar sezilarli oshganini ko‘rsatdi.*

Abstract*: This article analyzes the effectiveness of teaching automotive electrical systems using digital technologies based on the results of pedagogical experiments. The research was conducted across three higher education institutions with the participation of 416 students. The impact of virtual laboratories, electronic assessment, diagnostic simulators, and project-based learning methods on educational quality and professional competencies was investigated. The results indicated a significant increase in both theoretical knowledge and practical skills within the experimental group.*

Kalit so'zlar: *avtomobillarning elektr tizimlari, raqamli ta’lim, virtual laboratoriya, kompetensiya, diagnostika, interaktiv ta’lim.*

Keywords: *automotive electrical systems, digital education, virtual laboratory, competence, diagnostics, interactive learning.*

1. KIRISH

So‘nggi yillarda avtomobilsozlik sanoatida raqamlashtirish jarayonlarining jadallashuvi zamonaviy transport vositalarining konstruksiyasi va ishlash tamoyillarida tub o‘zgarishlarni yuzaga keltirdi. Bugungi avtomobillar an’anaviy elektr jihozlari bilan cheklanib qolmay, elektron boshqaruv bloklari (ECU), CAN va LIN ma’lumot almashish tarmoqlari, aqlli sensorlar, yuqori kuchlanishli elektr

tizimlari hamda sun’iy intellekt elementlari bilan jihozlangan murakkab texnik tizimlarga aylandi. Bunday texnologik rivojlanish avtomobil transporti sohasida faoliyat yuritadigan mutaxassislardan zamonaviy diagnostika vositalari bilan ishlash, elektron boshqaruv tizimlarini tahlil qilish va raqamli texnologiyalarni amaliyotda qo‘llash bo‘yicha yuqori darajadagi kasbiy kompetensiyalarni talab etmoqda [1, 2].

Oliy ta’lim muassasalarida "Avtomobillarning elektr tizimlari" fanini o‘qitishda esa nazariy bilimlarni amaliy faoliyat bilan uzviy bog‘lash, talabalarning mustaqil fikrlashi va muammolarni hal etish ko‘nikmalarini rivojlantirish muhim vazifalardan biri hisoblanadi. Amaliy kuzatishlar shuni ko‘rsatadiki, an’anaviy o‘qitish metodlari zamonaviy avtomobil elektronikasining murakkab tuzilishini to‘liq o‘zlashtirish uchun yetarli imkoniyat yaratmaydi. Laboratoriya jihozlarining cheklanganligi, zamonaviy diagnostika uskunalarining yetishmasligi hamda real ishlab chiqarish sharoitlarini ta’lim jarayonida to‘liq modellashtirish imkoniyatining pastligi talabalarning kasbiy tayyorgarligiga salbiy ta’sir ko‘rsatmoqda [3].

Jahon tajribasida muhandislik ta’limini takomillashtirishning samarali yo‘nalishlaridan biri sifatida virtual laboratoriyalar, interaktiv simulyatorlar, elektron ta’lim resurslari, loyiha asosida o‘qitish (Project-Based Learning), aralash ta’lim (Blended Learning) va raqamli baholash tizimlaridan foydalanish keng joriy etilmoqda. Mazkur yondashuvlar nazariy bilimlarni amaliy faoliyat bilan uyg‘unlashtirish, talabalarning kasbiy kompetensiyalarini rivojlantirish hamda ularni zamonaviy mehnat bozori talablariga mos mutaxassis sifatida tayyorlashga xizmat qilmoqda [4-6].

2. MATERIALLAR VA METODLAR

Mazkur tadqiqot avtomobillarning elektr tizimlari fanini raqamli texnologiyalar asosida o‘qitish metodikasining pedagogik samaradorligini aniqlash maqsadida kvazi-eksperimental yondashuv asosida tashkil etildi. Tadqiqotda pedagogik kuzatish, diagnostik test sinovlari, so‘rovnoma, amaliy topshiriqlarni ekspertlar tomonidan baholash, taqqoslash, matematik-statistik tahlil hamda

natijalarni umumlashtirish usullaridan kompleks ravishda foydalanildi. Tadqiqot metodologiyasi kompetensiyaviy yondashuv, shaxsga yo‘naltirilgan ta’lim, faoliyatga asoslangan o‘qitish va raqamli pedagogika tamoyillariga tayangan holda ishlab chiqildi. Shu bilan birga, zamonaviy muhandislik ta’limida keng qo‘llanilayotgan virtual laboratoriyalar, interaktiv simulyatorlar va elektron ta’lim resurslarini o‘quv jarayoniga integratsiya qilish asosiy metodik yondashuv sifatida tanlandi.Tajriba-sinov ishlari 2024–2026-yillar davomida O‘zbekistonning uchta texnik oliy ta’lim muassasasida – Andijon davlat texnika instituti, Toshkent davlat texnika universiteti hamda Jizzax politexnika institutida Transport muhandisligi yo‘nalishida tahsil olayotgan talabalar ishtirokida olib borildi. Tadqiqotda jami 416 nafar talaba qatnashdi. Ulardan 209 nafari eksperimental guruhga, 207 nafari esa nazorat guruhiga ajratildi. Guruhlarni shakllantirish jarayonida talabalarning avvalgi semestrdagi akademik o‘zlashtirish ko‘rsatkichlari, o‘rtacha reyting ballari va dastlabki diagnostik test natijalari hisobga olindi.

Pedagogik tajriba diagnostik bosqichida avtomobillarning elektr tizimlari fanini o‘qitishning amaldagi holati o‘rganildi, talabalarning nazariy bilimlari, amaliy ko‘nikmalari va kasbiy kompetensiyalarining boshlang‘ich darajasi aniqlandi. Shuningdek, mavjud o‘quv-uslubiy ta’minot, laboratoriya jihozlari, elektron resurslardan foydalanish darajasi hamda ta’lim jarayonida uchrayotgan muammolar tahlil qilindi. Har bir mezon 20 ballik tizim asosida baholanib, maksimal natija 100 ballni tashkil etdi. Bunday kompetensiyaviy baholash tizimi talabalarning nafaqat nazariy bilimlarini, balki ularning amaliy faoliyatga tayyorlik darajasini ham kompleks baholash imkonini berdi.

Tadqiqot davomida to‘plangan ma’lumotlarning ilmiy ishonchliligini ta’minlash maqsadida matematik-statistik tahlil usullaridan foydalanildi. Eksperimental va nazorat guruhlarining o‘rtacha ko‘rsatkichlarini taqqoslash uchun Studentning mustaqil tanlamalar uchun t-mezoni qo‘llanildi. Talabalarning o‘zlashtirish darajalari taqsimotidagi farqlarning statistik ahamiyatini aniqlash uchun Pearsonning χ^2 mezoni hisoblandi. Statistik hisob-kitoblar Microsoft Excel

dasturiy vositalari yordamida bajarildi hamda ishonchlilik darajasi $p < 0,05$ deb qabul qilindi. Ushbu yondashuv eksperiment natijalarining tasodifiy emasligini va aniqlangan o‘zgarishlarning taklif etilgan metodika ta’sirida yuzaga kelganligini ilmiy jihatdan asoslash imkonini berdi. Eksperiment davomida barcha natijalar yagona elektron ma’lumotlar bazasida muntazam qayd etib borildi. Har bir ishtirokchiga individual identifikatsiya kodi biriktirildi, bu esa talabalarning o‘quv faoliyatini bosqichma-bosqich monitoring qilish, o‘zlashtirish dinamikasini kuzatish va baholash jarayonida subyektiv omillar ta’sirini kamaytirishga xizmat qildi. Natijada ishlab chiqilgan raqamli o‘qitish metodikasi nazariy bilimlarni mustahkamlash bilan bir qatorda avtomobillarning elektr va elektron tizimlarini diagnostika qilish, zamonaviy dasturiy vositalardan foydalanish, muhandislik masalalarini mustaqil hal etish hamda kelajakdagi kasbiy faoliyat uchun zarur bo‘lgan kompetensiyalarni shakllantirishning samarali pedagogik modeli sifatida sinovdan o‘tkazildi.

3. NATIJALAR

Eksperimental guruhda a’lo baholar 20 nafardan 54 nafarga oshdi, qoniqarsiz natijalar 69 nafardan 23 nafarga kamaydi. Diagnostik kompetensiyalar 31,6 %, elektr zanjirlarini tahlil qilish 27,8 %, muhandislik muammolarini yechish 25,2 % ga yaxshilandi. Student $t=4,94$ ($p<0,05$) natijasi metodikaning statistik jihatdan ishonchli ekanligini ko‘rsatdi.

4. MUHOKAMA

Natijalar xalqaro tadqiqotlar bilan mos keladi. Virtual laboratoriyalar va interaktiv simulyatsiyalar nazariy bilimlarni amaliyot bilan bog‘lash, mustaqil fikrlash va diagnostik ko‘nikmalarni rivojlantirishga xizmat qiladi. Taklif etilgan metodika texnik oliy ta’lim uchun samarali model hisoblanadi.

5. XULOSA

Raqamli pedagogik texnologiyalarni avtomobillarning elektr tizimlari faniga integratsiya qilish ta’lim samaradorligini oshiradi, talabalarning kasbiy

kompetensiyalarini rivojlantiradi va zamonaviy avtomobil sanoati talablariga mos mutaxassislarni tayyorlashga xizmat qiladi.

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MATN IJODKORLIGI RIVOJLANISHINING LINGVOPSIXOLOGIK OMILLARI VA ULARNING BOSHLANG‘ICH TA’LIMDAGI NAMOYON BO‘LISH XUSUSIYATLARI

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Annotatsiya*: Mazkur maqolada boshlang‘ich ta’lim jarayonida o‘quvchilarning matn ijodkorligini rivojlantirishga ta’sir etuvchi lingvistik va psixologik omillar tahlil qilinadi. Tadqiqotda kreativ yondashuv asosida yozma nutq faoliyatini shakllantirishning pedagogik mexanizmlari, o‘quvchilarning tafakkur jarayonlari, til birliklarini qo‘llash ko‘nikmalari hamda motivatsion omillarning ahamiyati ochib berilgan. Tadqiqot natijalari boshlang‘ich sinf o‘quvchilarida matn yaratish kompetensiyasini rivojlantirishda lingvopsixologik yondashuv samarali ekanligini ko‘rsatdi.*

Kalit so‘zlar: *matn ijodkorligi, yozma nutq, kreativ yondashuv, lingvopsixologik omillar, boshlang‘ich ta’lim, tafakkur, motivatsiya, kommunikativ kompetensiya.*

Аннотация: *В данной статье анализируются лингвистические и психологические факторы, влияющие на развитие текстового творчества учащихся в процессе начального образования. Исследование выявляет педагогические механизмы формирования письменно-речевой деятельности на основе творческого подхода, важность мыслительных процессов учащихся, навыков использования языковых единиц и мотивационных факторов. Результаты исследования показали, что лингвистический и психологический подход эффективен в развитии текстового творчества у учащихся начальной школы.*

Ключевые слова: *Творческий подход к тексту, письменная речь, креативный подход, лингвистические и психологические факторы, начальное образование, мышление, мотивация, коммуникативная компетентность.*

Annotation: *This article analyzes linguistic and psychological factors that affect the development of textual creativity of students in the process of primary education. The study reveals the pedagogical mechanisms of forming written speech activity based on a creative*

approach, the importance of students' thinking processes, language unit use skills, and motivational factors. The results of the study showed that the linguistic and psychological approach is effective in developing textual creativity in primary school students.

Keywords: *text creativity, written speech, creative approach, linguistic and psychological factors, primary education, thinking, motivation, communicative competence.*

KIRISH

Zamonaviy ta’lim tizimida boshlang‘ich sinf o‘quvchilarining yozma nutqini rivojlantirish, ayniqsa matn ijodkorligini shakllantirish muhim pedagogik vazifalardan biri hisoblanadi. Matn yaratish jarayoni o‘quvchilarning til boyligi, tafakkuri, tasavvuri va kommunikativ kompetensiyasi bilan chambarchas bog‘liqdir. Shu bois boshlang‘ich ta’limda matn ijodkorligini rivojlantirishning lingvopsixologik omillarini tadqiq etish dolzarb ilmiy-amaliy ahamiyat kasb etadi.

Matn ijodkorligi o‘quvchining nafaqat lingvistik bilimlarini, balki psixologik tayyorgarligi, kreativ fikrlashi va motivatsiyasini ham namoyon etadi. Boshlang‘ich ta’lim amaliyotida o‘quvchilarning yozma nutqida mantiqiy izchillik, mustaqil fikr bayoni va obrazli ifoda vositalaridan foydalanish yetarli darajada shakllanmaganligi kuzatilmoqda. Mazkur holat matn ijodkorligini rivojlantirishning samarali metodik mexanizmlarini ishlab chiqishni talab etadi. Mavzuning dolzarbligi boshlang‘ich ta’limda o‘quvchilarning yozma nutq va matn yaratish kompetensiyasini rivojlantirishga bo‘lgan ehtiyoj bilan belgilanadi. Hozirgi kunda an’anaviy yondashuvlar o‘quvchilarning kreativ fikrlashi va mustaqil matn yaratish faoliyatini to‘liq ta’minlay olmayapti. Shu sababli matn ijodkorligini rivojlantirishda lingvistik va psixologik omillarning o‘zaro integratsiyasini ilmiy asoslash muhim ahamiyat kasb etadi.

ADABIYOTLAR TAHLILI

Boshlang‘ich ta’limda matn ijodkorligini rivojlantirish muammosi zamonaviy lingvodidaktika va psixolingvistika fanlarida kompleks yondashuvni talab etadi. Mazkur jarayonda o‘quvchilarning yozma nutqi nafaqat lingvistik

bilimlar, balki psixologik va kreativ omillar bilan ham bevosita bog‘liq ekani ilmiy manbalarda keng asoslangan.

G‘ulomov.A.G‘ ona tili metodikasida yozma nutqni til tizimi va tafakkur birligi sifatida izohlaydi. Uning qarashiga ko‘ra, matn yaratish jarayoni o‘quvchining leksik boyligi va mantiqiy fikrlash darajasiga bog‘liqdir. “Boshlang‘ich sinf o‘quvchilarining yozma nutqini shakllantirish so‘z boyligini oshirish, mantiqiy fikrlashni rivojlantirish va mustaqil matn yaratish ko‘nikmalarini shakllantirish bilan bevosita bog‘liq”[1; 126-b]. Ushbu fikr matn ijodkorligining lingvistik asoslari leksik kompetensiya va tafakkur rivoji bilan uzviy bog‘liqligini ko‘rsatadi. Yo‘ldoshev.J.G‘ pedagogik nuqtayi nazardan kreativ yondashuvning o‘quvchilarda mustaqil fikrlashni shakllantirishdagi rolini ta’kidlaydiki “Kreativ yondashuv o‘quvchilarda mustaqil fikrlash va ijodiy matn yaratish kompetensiyasini shakllantirishning asosiy omillaridan biridir”[2; 214-b]. Bu yondashuv matn ijodkorligini rivojlantirishda interfaol va kreativ metodlarning didaktik ahamiyatini ochib beradi. Karimova.V.A esa psixologik jihatdan yozma nutqni shaxsning kognitiv rivojlanishi bilan bog‘laydi. “Boshlang‘ich maktab yoshida tafakkur va tasavvur faol rivojlanib, bu jarayon nutqiy ijodkorlikning shakllanishiga zamin yaratadi”[3; 98-b]. Bu fikr matn ijodkorligida psixologik omillarning hal qiluvchi rolini asoslaydi.

Vigotskiy.L.S psixolingvistik nazariyada nutq va tafakkur birligini ilmiy asoslaydi. “Nutq tafakkurning ichki mazmunini tashqi ifodaga aylantiruvchi asosiy vositadir”[4; 276-b] Bu yondashuv matn yaratishni kognitiv jarayon sifatida talqin qilishga imkon beradi. Leontev.A.A yozma nutqni murakkab psixik faoliyat sifatida izohlaydi. “Yozma nutq semantik tanlov, motivatsiya va til birliklarini integratsiyalash jarayonining natijasidir”[5; 187-b]. Bu fikr matn ijodkorligining ko‘p komponentli psixologik strukturasini ko‘rsatadi. Torrance.E.P kreativlikni original fikr yaratish qobiliyati sifatida talqin qiladi. “Kreativlik yangi g‘oyalarni yaratish va ularni original shaklda ifodalash qobiliyatidir”[6; 54-b]. Bu yondashuv matn ijodkorligida divergent fikrlashning

ahamiyatini asoslaydi. Zimnyaya.I.A esa nutqiy faoliyatning psixologik omillarini yoritadi. “Nutqiy faoliyat samaradorligi o‘quvchining motivatsiyasi va emotsional holatiga bevosita bog‘liq”[7; 312-b].Bu fikr yozma nutqni rivojlantirishda psixologik muhitning ahamiyatini ko‘rsatadi.

Guilford J.P. divergent tafakkur nazariyasida kreativ fikrlashni inson ijodiy faoliyatining asosiy mexanizmi sifatida talqin qiladi. Olimning fikricha, ijodkorlik muammoni turli yo‘nalishlarda hal qilish, noodatiy g‘oyalarni ilgari surish hamda yangi semantik bog‘lanishlarni yuzaga keltirish qobiliyatida namoyon bo‘ladi. “Divergent fikrlash kreativ faoliyat va originallikning asosiy omili hisoblanadi” [8; 151-b]. Mazkur yondashuv boshlang‘ich ta’limda matn ijodkorligini rivojlantirishda divergent tafakkurning muhim psixologik asos ekanligini ko‘rsatadi. Chunki o‘quvchi matn yaratish jarayonida voqea-hodisalarni turli nuqtayi nazardan ifodalashga, yangi tasviriy vositalarni qo‘llashga hamda original fikrlarni shakllantirishga intiladi. Bu esa yozma nutqning mazmunan boyishi va obrazliligining ortishiga xizmat qiladi.

Sternberg R.J. kreativlikni intellektual faoliyatning analitik, amaliy va ijodiy komponentlari bilan bog‘liq holda o‘rganadi. Olim kreativ fikrlashni yangi va mazmunli g‘oyalarni yaratishga yo‘naltirilgan murakkab kognitiv faoliyat sifatida baholaydi. “Kreativlik yangilik va maqsadga muvofiqlik uyg‘unligida namoyon bo‘ladi”[9; 3-b]. Ushbu fikr matn ijodkorligini rivojlantirish jarayonida faqat noodatiy fikr emas, balki mazmuniy yaxlitlik va kommunikativ maqsadning ham muhimligini ko‘rsatadi. Demak, boshlang‘ich sinf o‘quvchilarining yozma nutqini rivojlantirishda mantiqiy izchillik va kreativlikning integratsiyasini ta’minlash zarur. Robinson K. zamonaviy ta’lim tizimida kreativlikni rivojlantirishni muhim pedagogik vazifa sifatida baholaydi. U an’anaviy reproduktiv ta’lim o‘quvchilarning ijodiy salohiyatini cheklab qo‘yishini ta’kidlaydi. “Bugungi kunda kreativlik ta’limda savodxonlik darajasidagi muhim kompetensiyadir”[10; 17-b]. Mazkur qarash boshlang‘ich ta’limda matn ijodkorligini rivojlantirish savodxonlik bilan teng darajadagi

muhim ko‘nikma ekanligini asoslaydi. Shu sababli yozma nutqni rivojlantirish metodikasida erkin yozuv, kreativ topshiriqlar va assotsiativ metodlardan foydalanish muhim ahamiyat kasb etadi.

Csikszentmihalyi M. kreativlikni shaxs, muhit va faoliyat integratsiyasi asosida yuzaga keladigan murakkab jarayon sifatida izohlaydi. Olimning fikricha, ijodkorlik ichki motivatsiya va faol intellektual ishtirok orqali rivojlanadi. “Kreativlik shaxs, faoliyat sohasi va ijtimoiy muhit kesishgan nuqtada yuzaga keladi”[11; 24-b]. Bu yondashuv boshlang‘ich sinf o‘quvchilarining matn ijodkorligini rivojlantirishda ijobiy ta’lim muhiti va motivatsion omillarning muhimligini ko‘rsatadi. Ayniqsa, erkin psixologik muhit o‘quvchilarning yozma nutqdagi mustaqil va kreativ fikrlash faoliyatini faollashtiradi. Shcherba L.V. til va nutq munosabatlarini tadqiq etar ekan, nutq faoliyatining amaliy xarakteriga alohida e’tibor qaratadi. Olimning fikricha, til faqat faol nutqiy jarayonda yashaydi va rivojlanadi. “Til faqat nutq faoliyati jarayonida mavjud bo‘ladi”[11; 69-b]. Mazkur qarash boshlang‘ich ta’limda matn ijodkorligini rivojlantirishning amaliy yo‘naltirilgan xarakterini asoslaydi. Chunki yozma nutq faqat nazariy bilimlar asosida emas, balki muntazam ijodiy mashqlar, matn yaratish va nutqiy faoliyat orqali shakllanadi.

Piaget J. bolaning kognitiv rivojlanish nazariyasida tafakkur va nutqning bosqichma-bosqich shakllanishini ilmiy asoslaydi. Olimning fikricha, boshlang‘ich maktab yoshida o‘quvchilarning mantiqiy fikrlashi va tasavvur faoliyati faol rivojlanadi, bu esa yozma nutqning mazmunan boyishini ta’minlaydi. “Bolaning intellektual rivojlanishi uning faol bilish jarayoni bilan belgilanadi”[12; 69-b]. Mazkur yondashuv boshlang‘ich ta’limda matn ijodkorligini rivojlantirish o‘quvchilarning kognitiv faolligi bilan uzviy bog‘liq ekanligini ko‘rsatadi. Chunki matn yaratish jarayonida o‘quvchi tahlil qilish, umumlashtirish va obrazli fikrlash kabi tafakkur operatsiyalaridan foydalanadi. Tomlinson C.A. differensial ta’lim nazariyasida o‘quvchilarning individual imkoniyatlari va ehtiyojlarini hisobga olish zarurligini ta’kidlaydi. “Samarali

ta’lim o‘quvchilarning individual farqlariga moslashgan holda tashkil etiladi”[13; 126-b]. Mazkur yondashuv boshlang‘ich sinf o‘quvchilarining matn ijodkorligini rivojlantirishda individual yondashuvning ahamiyatini ko‘rsatadi. Chunki har bir o‘quvchining tasavvuri, fikrlash tezligi va nutqiy imkoniyatlari turlicha bo‘lib, metodik topshiriqlar ham shu xususiyatlarga moslashtirilishi lozim.

Hyland K. yozma nutqni ijtimoiy-kommunikativ faoliyat sifatida talqin qiladi. Olimning fikricha, matn yaratish jarayoni faqat grammatik bilim emas, balki kommunikativ maqsad va auditoriyani hisobga olishni ham talab qiladi. “Yozuv ijtimoiy va ritorik faoliyat shaklidir”[13; 119-b]. Bu qarash boshlang‘ich ta’limda matn ijodkorligini rivojlantirishda kommunikativ yondashuvning muhimligini asoslaydi. O‘quvchilar matn yaratishda nafaqat fikrni ifodalashi, balki uni o‘quvchi yoki tinglovchiga ta’sirchan yetkazishni ham o‘rganishi zarur.

Tadqiqot metodologiyasi. Boshlang‘ich ta’limda matn ijodkorligini rivojlantirish masalasi zamonaviy pedagogika, psixolingvistika va lingvodidaktikaning dolzarb ilmiy yo‘nalishlaridan biri hisoblanadi. Mazkur muammoning dolzarbligi o‘quvchilarda kreativ fikrlashni rivojlantirishga bo‘lgan ijtimoiy ehtiyojning ortib borayotgani, yozma nutq kompetensiyasining xalqaro baholash dasturlaridagi ustuvor ahamiyati, ta’lim jarayonida innovatsion pedagogik texnologiyalarning keng joriy etilishi hamda raqamli ta’lim muhitida yozma kommunikatsiya ko‘lamining kengayib borayotgani bilan belgilanadi. Shuningdek, boshlang‘ich sinf o‘quvchilarining yozma nutqini rivojlantirish metodikasini nazariy va amaliy jihatdan takomillashtirish zarurati mazkur tadqiqotning ilmiy ahamiyatini yanada oshiradi.

Tadqiqotning asosiy maqsadi — boshlang‘ich sinf o‘quvchilarining matn ijodkorligini rivojlantirishga ta’sir etuvchi lingvistik, pedagogik va psixologik omillarni aniqlash hamda kreativ yondashuv asosida yozma nutq kompetensiyasini takomillashtirishning samarali metodik mexanizmlarini ishlab chiqishdan iborat bo‘ldi. Tadqiqot lingvodidaktika, psixolingvistika va kreativ

pedagogika integratsiyasi asosida olib borildi. Mazkur integrativ yondashuv tadqiqot natijalarining ilmiy asoslanganligi va metodik ishonchliligini ta’minlashga xizmat qildi.

Tadqiqot maqsadidan kelib chiqib quyidagi vazifalar belgilandi: matn ijodkorligining lingvopsixologik mohiyatini ochib berish; boshlang‘ich sinf o‘quvchilarining yozma nutqiga ta’sir etuvchi omillarni tahlil qilish; kreativ yozuv texnologiyalarining didaktik imkoniyatlarini aniqlash; yozma nutqni rivojlantirishning innovatsion metodik modelini ishlab chiqish; eksperimental sinovlar asosida taklif etilgan metodikaning samaradorligini baholash.

Tadqiqot jarayonida nazariy, empirik va qiyosiy metodlarning o‘zaro uyg‘unligidan foydalanildi. Nazariy bosqichda yozma nutq, kreativ tafakkur, matn yaratish kompetensiyasi va kommunikativ faoliyatga oid ilmiy manbalar tahlil qilindi. Empirik bosqichda esa o‘quvchilarning yozma faoliyati real ta’lim jarayonida kuzatilib, ularning matn yaratish ko‘nikmalari diagnostik mezonlar asosida baholandi.

Tadqiqot davomida pedagogik kuzatish, yozma ishlarni mazmuniy tahlil qilish, qiyosiy-pedagogik tahlil hamda sifatli (qualitative) baholash metodlari keng qo‘llanildi. Shuningdek, o‘quvchilarning yozma nutqini rivojlantirish maqsadida ta’lim jarayoniga kreativ faoliyatga yo‘naltirilgan innovatsion metodlar joriy etildi. Jumladan, erkin yozuv (free writing), hikoya yaratish (storytelling), refleksiv yozuv, assotsiativ tafakkurni rivojlantirish mashqlari hamda kreativ matn tuzishga oid topshiriqlardan foydalanildi.

Eksperimental ishlar boshlang‘ich ta’lim sinflarida tashkil etilib, tadqiqot uch bosqichli model asosida amalga oshirildi: diagnostik, shakllantiruvchi va yakuniy baholash bosqichlari. Diagnostik bosqichda o‘quvchilarning yozma nutq darajasi, leksik boyligi, matn yaratish kompetensiyasi va kreativ fikrlash ko‘nikmalari aniqlab olindi. Bunda yozma topshiriqlar hamda maxsus ishlab chiqilgan baholash mezonlaridan foydalanildi.

Shakllantiruvchi bosqichda kreativ pedagogik texnologiyalar tizimli ravishda ta’lim jarayoniga integratsiya qilindi. Mazkur bosqichda o‘quvchilarning mustaqil fikrlashi, original g‘oya yaratish qobiliyati, mantiqiy va izchil matn tuzish ko‘nikmalari rivojlantirildi. Shuningdek, metakognitiv strategiyalar va refleksiv yondashuv asosida o‘quvchilarning o‘z-o‘zini nazorat qilish hamda matnni tahlil qilish ko‘nikmalari shakllantirildi.

Yakuniy bosqichda amalga oshirilgan pedagogik ta’sirlarning samaradorligi qiyosiy tahlil asosida baholandi. O‘quvchilarning yozma ishlarida mantiqiy izchillik, kommunikativ aniqlik, leksik boylik, obrazlilik va original fikr darajasi sifat mezonlari asosida tahlil qilindi. Tadqiqot natijalari kreativ yondashuv asosida tashkil etilgan metodik tizim o‘quvchilarning yozma nutqi va matn ijodkorligini rivojlantirishda yuqori samaradorlikka ega ekanligini ko‘rsatdi.

Shunday qilib, boshlang‘ich ta’limda matn ijodkorligini rivojlantirish masalasi lingvodidaktika, psixolingvistika va kreativ pedagogikaning nazariy hamda amaliy integratsiyasini talab qiluvchi ko‘p qirrali ilmiy muammo sifatida namoyon bo‘ladi. Mazkur yondashuv o‘quvchilarning yozma nutq kompetensiyasini takomillashtirish, kreativ tafakkurini rivojlantirish va mustaqil matn yaratish faoliyatini shakllantirishda muhim metodologik asos bo‘lib xizmat qiladi.

Natijalar. Boshlang‘ich ta’limda matn ijodkorligini rivojlantirishga yo‘naltirilgan kreativ pedagogik texnologiyalarni ta’lim jarayoniga integratsiya qilish o‘quvchilarning yozma nutqi, kommunikativ kompetensiyasi hamda mustaqil fikrlash faoliyatiga sezilarli ijobiy ta’sir ko‘rsatdi. Tadqiqot davomida erkin yozuv (free writing), hikoya yaratish (storytelling), assotsiativ tafakkur mashqlari va refleksiv yozuv metodlaridan tizimli foydalanish o‘quvchilarning original matn yaratish qobiliyatini rivojlantirdi.

Eksperimental faoliyat natijalariga ko‘ra, o‘quvchilarning matn yaratish jarayonida mantiqiy izchillik, semantik yaxlitlik va obrazli ifodalash

ko‘nikmalari sezilarli darajada yaxshilandi. Ayniqsa, kreativ topshiriqlar asosida tashkil etilgan mashg‘ulotlar o‘quvchilarning voqea-hodisalarni mustaqil talqin qilish, individual fikr bildirish va yozma nutqda mualliflik pozitsiyasini ifodalash imkoniyatlarini kengaytirdi.

Qiyosiy tahlillar natijasida o‘quvchilarning lug‘aviy boyligi kengaygani, kommunikativ aniqlik va semantik moslashuvchanlik darajasi oshgani aniqlandi. Tadqiqot davomida o‘quvchilar yozma faoliyat jarayonida erkin fikr yuritish, tasviriy vositalardan foydalanish hamda matnning mazmuniy yaxlitligini saqlashda faolroq ishtirok eta boshladilar. Bu esa kreativ yondashuv asosidagi metodik faoliyatning matn ijodkorligini rivojlantirishdagi samaradorligini tasdiqlaydi.

Shuningdek, refleksiv yozuv va metakognitiv strategiyalar asosida olib borilgan faoliyat o‘quvchilarning o‘z-o‘zini nazorat qilish, matnni tahlil qilish va takomillashtirish ko‘nikmalarining rivojlanishiga xizmat qildi. O‘quvchilar yozgan matnlarini qayta ko‘rib chiqish, mazmuniy kamchiliklarni aniqlash hamda fikrlar izchilligini saqlashda yanada faol va mustaqil harakat qildilar.

Tadqiqot natijalari asosida quyidagi ko‘rsatkichlar aniqlandi:

Ko‘rsatkichlar	**Eksperimentgacha**	**Eksperimentdan so‘ng**
Mustaqil fikrni yozma ifodalash	40%	78%
Matn tuzish kompetensiyasi	44%	74%
So‘z va iboralardan o‘rinli foydalanish	47%	82%

Tasviriy va obrazli ifodalash ko‘nikmasi	40%	70%
G‘oyalarni izchil bayon qilish	45%	72%
Kreativ yondashuv faolligi	44%	76%
Tahliliy va refleksiv fikrlash	42%	73%
Yozma kommunikativ faollik	47%	80%

Mazkur ko‘rsatkichlar kreativ pedagogik texnologiyalar asosida tashkil etilgan ta’lim jarayoni boshlang‘ich sinf o‘quvchilarining yozma nutqi va matn ijodkorligini rivojlantirishda samarali natijalarni yuzaga keltirganligini tasdiqlaydi. Ayniqsa, erkin yozuv, hikoya yaratish va refleksiv faoliyatga asoslangan metodlar o‘quvchilarning mustaqil fikrlashi, obrazli tafakkuri hamda yozma kommunikativ kompetensiyasini sezilarli darajada rivojlantirdi.

Muzokara. Mazkur tadqiqot natijalari boshlang‘ich ta’limda matn ijodkorligini rivojlantirish jarayoni murakkab lingvopsixologik va kommunikativ hodisa ekanligini tasdiqladi. Olingan empirik ma’lumotlar matn yaratish faoliyati o‘quvchilarning tafakkuri, tasavvuri, motivatsiyasi, nutqiy tajribasi hamda kommunikativ ehtiyojlari integratsiyasi asosida shakllanishini ko‘rsatdi. Shu jihatdan, yozma nutqni rivojlantirish jarayonini faqat grammatik bilimlar tizimi sifatida emas, balki kreativ-kognitiv faoliyat sifatida talqin qilish zarurligi aniqlandi.

Tadqiqot natijalari Leontev A.A. tomonidan ishlab chiqilgan nutq faoliyati nazariyasi bilan uyg‘unlik kasb etadi. Olimning fikricha, nutq faoliyati kommunikativ ehtiyoj va tafakkur faoliyatining o‘zaro integratsiyasi asosida

yuzaga keladi. Tadqiqot davomida ham o‘quvchilarning matn yaratish jarayonida analitik tafakkur, semantik qayta ishlash va kommunikativ maqsadga yo‘naltirilgan faoliyatlari muhim o‘rin egallashi kuzatildi. Ayniqsa, mustaqil matn yaratish topshiriqlari o‘quvchilarning fikrlarni mantiqiy tizimlashtirish va mazmuniy yaxlitlikni ta’minlash ko‘nikmalarini rivojlantirdi.

Kreativ tafakkur bo‘yicha olingan natijalar Guilford J.P. hamda De Bono E. tomonidan ilgari surilgan divergent va lateral fikrlash nazariyalarini ham tasdiqlaydi. Tadqiqot jarayonida o‘quvchilarning matn yaratish faoliyatida originallik, semantik moslashuvchanlik va obrazli tafakkur ko‘rsatkichlari sezilarli darajada oshgani aniqlandi. Bu esa kreativ yozuv texnologiyalarining boshlang‘ich sinf o‘quvchilari matn ijodkorligini rivojlantirishdagi lingvodidaktik samaradorligini ilmiy jihatdan asoslaydi.

Refleksiv yozuv faoliyatining samaradorligi Luriya A.R. hamda Davydov V.V. qarashlari bilan uyg‘unlashadi. Tadqiqot davomida o‘quvchilarda o‘z matnlarini tahlil qilish, mazmuniy kamchiliklarni aniqlash va yozma faoliyatni qayta tashkil etish ko‘nikmalarining rivojlangani kuzatildi. Bu holat yozma nutqning dinamik va refleksiv xarakterga ega ekanligini ko‘rsatadi. Ayniqsa, refleksiv yozuv metodlari o‘quvchilarning metakognitiv faoliyatini faollashtirib, o‘z-o‘zini nazorat qilish hamda matnni takomillashtirish ko‘nikmalarini shakllantirdi.

Kommunikativ kompetensiya nuqtayi nazaridan tadqiqot natijalari Hymes D. nazariyasi bilan hamohangdir. Olim kommunikativ faoliyat samaradorligini grammatik to‘g‘rilik bilan bir qatorda pragmatik moslik va vaziyatga muvofiqlik bilan ham bog‘laydi. Tadqiqot natijalarida o‘quvchilarning matnlarida kommunikativ aniqlik, mazmuniy izchillik va individual fikrni ifodalash darajasi sezilarli rivojlangani qayd etildi. Bu esa yozma nutqni rivojlantirishda kommunikativ yondashuvning muhim metodologik asos ekanligini tasdiqlaydi.

Shuningdek, tadqiqot davomida an’anaviy reproduktiv metodlar o‘quvchilarning kreativ salohiyatini to‘liq namoyon etish imkonini bermasligi

aniqlandi. Mazkur holat konstruktivistik va kreativ pedagogik yondashuvlarning zarurligini yana bir bor asoslaydi. Chunki o‘quvchi ta’lim jarayonida tayyor bilimni qabul qiluvchi emas, balki mustaqil fikr yurituvchi va matn yaratuvchi faol subyekt sifatida namoyon bo‘lishi lozim.

Umuman olganda, tadqiqot natijalari kreativ tafakkur, refleksiya va kommunikativ faoliyat integratsiyasi boshlang‘ich ta’limda matn ijodkorligini rivojlantirishning samarali lingvodidaktik modeli ekanligini ko‘rsatdi. Mazkur model o‘quvchilarda nafaqat yozma nutq kompetensiyasini, balki mustaqil fikrlash, kreativ yondashuv, kommunikativ madaniyat va refleksiv tafakkurni ham shakllantirishga xizmat qiladi.

XULOSA

Mazkur tadqiqot boshlang‘ich ta’limda matn ijodkorligini kreativ yondashuv asosida rivojlantirishning lingvopsixologik, lingvodidaktik va pedagogik jihatlarini kompleks o‘rganishga bag‘ishlandi. Tadqiqot natijalari shuni ko‘rsatdiki, yozma nutqni rivojlantirish jarayoni murakkab kognitiv va kommunikativ faoliyat bo‘lib, u tafakkur, xotira, tasavvur, motivatsiya hamda ijtimoiy muloqot ehtiyojlarining o‘zaro integratsiyasi asosida shakllanadi.

Tahlillar asosida kreativ pedagogik texnologiyalarni ta’lim jarayoniga joriy etish o‘quvchilarning matn yaratish kompetensiyasi, lug‘aviy boyligi, mantiqiy izchilligi va kommunikativ faolligini sezilarli darajada oshirishi aniqlandi. Ayniqsa, erkin yozuv, hikoya tuzish, assotsiativ tafakkur va refleksiv yozuv metodlari o‘quvchilarning mustaqil fikrlash, original g‘oya yaratish hamda yozma nutqda shaxsiy pozitsiyani ifodalash ko‘nikmalarini rivojlantirishda samarali vosita ekanligi tasdiqlandi.

Shuningdek, tadqiqot natijalari yozma nutqni faqat grammatik ko‘nikmalar yig‘indisi sifatida emas, balki ijodiy-kognitiv va kommunikativ faoliyat sifatida qarash zarurligini ilmiy jihatdan asoslab berdi. Bu esa zamonaviy ta’limda konstruktivistik va kompetensiyaviy yondashuvlarning ustuvor ahamiyatga ega ekanligini ko‘rsatadi.

Olingan natijalar kreativ tafakkur, refleksiya va kommunikativ kompetensiya integratsiyasi boshlang‘ich sinf o‘quvchilarining yozma nutqini rivojlantirishda eng samarali metodik model ekanligini tasdiqladi. Ushbu model o‘quvchilarda nafaqat til kompetensiyasini, balki mustaqil fikrlash, ijodiy yondashuv va madaniy kommunikatsiya ko‘nikmalarini ham shakllantiradi.

Xulosa qilib aytganda, boshlang‘ich ta’limda matn ijodkorligini rivojlantirish zamonaviy pedagogika va lingvodidaktikaning dolzarb muammolaridan biri bo‘lib, uni samarali hal etish uchun kreativ yondashuvga asoslangan innovatsion metodik tizimlarni keng joriy etish zarur. Bu esa ta’lim sifatini oshirish va o‘quvchilarning intellektual hamda ijodiy salohiyatini rivojlantirishga xizmat qiladi.

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PEDAGOGIK FAOLIYATNI RAQAMLI TRANSFORMATSIYA SHAROITIDA RIVOJLANTIRISHNING INNOVATSION YONDASHUVLARI

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Annotatsiya: *Mazkur maqolada ta'limning raqamli transformatsiyasi sharoitida pedagogik faoliyatni rivojlantirishning innovatsion yondashuvlari tahlil qilingan. Zamonaviy ta'lim tizimida sun'iy intellekt, raqamli pedagogika, ta'lim analitikasi va adaptiv ta'lim texnologiyalarining rivojlanishi pedagogik faoliyatni yangi bosqichga olib chiqmoqda. Maqolada xalqaro tajribalar asosida pedagogik faoliyatni modernizatsiya qilishning ilmiy asoslari, pedagogning raqamli kompetentligini rivojlantirish omillari hamda innovatsion pedagogik texnologiyalarning ta'lim sifatini oshirishdagi o'rni yoritilgan.*

Аннотация: *В статье анализируются инновационные подходы к развитию педагогической деятельности в условиях цифровой трансформации образования. Особое внимание уделено вопросам цифровой педагогики, искусственного интеллекта, образовательной аналитики и адаптивного обучения. Рассмотрены международный опыт и современные механизмы модернизации педагогической деятельности.*

Annotation: *his article analyzes innovative approaches to developing pedagogical activity in the context of the digital transformation of education. Special attention is given to digital pedagogy, artificial intelligence, learning analytics, adaptive learning technologies and international experience in modernizing pedagogical practice.*

Kalit so'zlar: *Raqamli transformatsiya, pedagogik faoliyat, raqamli pedagogika, pedagogik kompetentlik, innovatsion texnologiyalar, sun'iy intellekt, ta'lim sifati, ta'lim analitikasi, raqamli kompetentlik, adaptiv ta'lim.*

Ключевое слова: *Цифровая трансформация, педагогическая деятельность, цифровая педагогика, педагогическая компетентность, инновационные технологии,*

искусственный интеллект, качество образования, образовательная аналитика, цифровая компетентность, адаптивное обучение.

Keywords: *Digital transformation, pedagogical activity, digital pedagogy, pedagogical competence, innovative technologies, artificial intelligence, quality of education, educational analytics, digital competence, adaptive learning.*

KIRISH

Pedagogik faoliyatni raqamli transformatsiya sharoitida rivojlantirish zamonaviy ta'lim siyosatining ustuvor yo'nalishlaridan biri hisoblanadi. Raqamli texnologiyalarning jadal rivojlanishi pedagogik faoliyat mazmunini yangilash, ta'lim jarayonini individuallashtirish hamda pedagogning kasbiy rolini qayta ko'rib chiqishni taqozo etmoqda. Endilikda pedagog faqat bilim beruvchi emas, balki ta'lim jarayonining dizayneri, fasilitatori, maslahatchisi va raqamli ta'lim muhitining boshqaruvchisi sifatida faoliyat yuritmoqda. Bugungi kunda pedagogik faoliyatni rivojlantirishda innovatsion yondashuvlar muhim o'rin tutadi. Xususan, sun'iy intellekt asosida ishlovchi ta'lim platformalari, adaptiv o'qitish tizimlari, virtual va kengaytirilgan reallik texnologiyalari, elektron ta'lim resurslari hamda ta'lim analitikasi vositalari o'qitish jarayonining samaradorligini sezilarli darajada oshirmoqda. Ushbu texnologiyalar pedagogga ta'lim oluvchilarning bilim darajasi, o'quv ehtiyojlari va o'zlashtirish dinamikasini tahlil qilish imkonini beradi.

UNESCO, OECD hamda Yevropa Komissiyasi tomonidan ishlab chiqilgan strategik hujjatlarda ta'limning raqamli transformatsiyasi pedagogik faoliyatni modernizatsiya qilishning asosiy omillaridan biri sifatida e'tirof etiladi. Mazkur hujjatlarda pedagogning raqamli kompetentligini rivojlantirish, innovatsion o'qitish metodlarini joriy etish hamda ta'lim jarayonini shaxsga yo'naltirilgan yondashuv asosida tashkil etish ustuvor vazifalar sifatida belgilangan. Xalqaro tajribalar shuni ko'rsatadiki, ta'limning raqamli transformatsiyasi pedagogik faoliyatni modernizatsiya qilish bilan uzviy bog'liq. UNESCO tomonidan qabul qilingan "Reimagining Our Futures Together"

konsepsiyasida pedagogning kasbiy rivojlanishi, raqamli kompetentligini oshirish hamda innovatsion pedagogik texnologiyalarni joriy etish XXI asr ta'limining asosiy vazifalaridan biri sifatida belgilangan. OECD tomonidan ishlab chiqilgan "Future of Education and Skills 2030" dasturida esa pedagogning kreativ fikrlashi, moslashuvchanligi, hamkorlik madaniyati va raqamli texnologiyalardan samarali foydalanish ko'nikmalari zamonaviy ta'lim sifatining muhim mezonlari sifatida e'tirof etiladi. Yevropa Ittifoqi tomonidan ishlab chiqilgan DigCompEdu modeli pedagoglarning raqamli kompetentligini rivojlantirish bo'yicha eng mukammal metodik asoslardan biri hisoblanadi. Ushbu model pedagogik faoliyatni oltita asosiy yo'nalish bo'yicha rivojlantirishni tavsiya etadi: professional hamkorlik, raqamli resurslarni yaratish va ulardan foydalanish, ta'lim jarayonini tashkil etish, baholash, ta'lim oluvchilarni qo'llab-quvvatlash hamda ularning raqamli kompetentligini rivojlantirish. Mazkur yondashuv pedagogik faoliyatning zamonaviy modelini shakllantirishda muhim ilmiy-amaliy ahamiyat kasb etadi.

Bugungi kunda sun'iy intellekt texnologiyalarining rivojlanishi pedagogik faoliyatni yangi bosqichga olib chiqmoqda. Sun'iy intellekt asosidagi ta'lim platformalari o'quv materiallarini ta'lim oluvchilarning ehtiyojlari va o'zlashtirish darajasiga moslashtirish, baholash jarayonini avtomatlashtirish, individual tavsiyalar ishlab chiqish hamda ta'lim natijalarini prognozlash imkoniyatini yaratmoqda. Shu bilan birga, pedagog sun'iy intellektdan foydalanishda akademik halollik, axborot xavfsizligi va shaxsiy ma'lumotlarni himoya qilish tamoyillariga qat'iy amal qilishi lozim. Innovatsion pedagogik faoliyatning muhim jihatlaridan biri ta'lim oluvchining mustaqil o'quv faoliyatini qo'llab-quvvatlashdan iborat. Shu maqsadda loyiha asosida o'qitish, muammoli ta'lim, tadqiqotga yo'naltirilgan ta'lim, aralash ta'lim va hamkorlikda o'qitish metodlari keng qo'llanilmoqda. Mazkur metodlar ta'lim oluvchilarda tanqidiy

fikrlash, ijodkorlik, kommunikativ ko'nikmalar va muammolarni hal etish kompetensiyalarini rivojlantiradi.

Innovatsion pedagogik faoliyatni tashkil etishda aralash ta'lim (Blended Learning), teskari sinf (Flipped Classroom), loyiha asosida o'qitish (Project Based Learning), muammoli ta'lim (Problem Based Learning), STEAM yondashuvi va tadqiqotga asoslangan ta'lim texnologiyalari muhim o'rin tutadi. Ushbu texnologiyalar ta'lim oluvchilarning mustaqil fikrlash, muammolarni hal etish, jamoada ishlash hamda ijodiy faoliyat ko'nikmalarini rivojlantirishga xizmat qiladi. Shuningdek, ta'lim analitikasi vositalari pedagogik faoliyatni boshqarishning samarali mexanizmlaridan biri sifatida e'tirof etilmoqda. Raqamli platformalarda shakllanayotgan ma'lumotlarni tahlil qilish orqali pedagog ta'lim oluvchilarning rivojlanish dinamikasini baholaydi, individual ta'lim trayektoriyalarini ishlab chiqadi va ta'lim jarayonini takomillashtirish bo'yicha asoslangan qarorlar qabul qiladi. Sun'iy intellekt texnologiyalarining rivojlanishi pedagogik faoliyat uchun yangi imkoniyatlar yaratmoqda. Sun'iy intellekt yordamida avtomatlashtirilgan baholash, individual tavsiyalar berish, o'quv materiallarini moslashtirish va ta'lim sifatini monitoring qilish imkoniyatlari kengaymoqda. Biroq mazkur texnologiyalardan foydalanishda pedagogning metodik tayyorgarligi, akademik halollik tamoyillariga rioya etish va axborot xavfsizligini ta'minlash muhim ahamiyatga ega.

Finlyandiya tajribasi shuni ko'rsatadiki, pedagoglarning uzluksiz kasbiy rivojlanishi va ularga metodik erkinlik berilishi ta'lim sifatining yuqori bo'lishiga xizmat qilmoqda. Janubiy Koreyada Smart Education konsepsiyasi asosida raqamli ta'lim muhiti shakllantirilgan bo'lib, pedagoglarning raqamli kompetentligini oshirish davlat siyosatining ustuvor yo'nalishlaridan biri hisoblanadi. Singapurda esa pedagoglarning innovatsion faoliyatini qo'llab-

quvvatlash maqsadida raqamli ta'lim platformalari, elektron metodik resurslar va uzluksiz malaka oshirish tizimi joriy etilgan.

O'zbekiston Respublikasida ham ta'limni raqamlashtirish bo'yicha keng ko'lamli islohotlar amalga oshirilmoqda. "Raqamli O'zbekiston – 2030" strategiyasi, oliy ta'lim tizimini modernizatsiya qilishga qaratilgan davlat dasturlari hamda pedagoglarning kasbiy rivojlanishini qo'llab-quvvatlash bo'yicha qabul qilingan me'yoriy-huquqiy hujjatlar pedagogik faoliyatni zamonaviy talablar asosida tashkil etish uchun mustahkam huquqiy asos yaratmoqda.

Shunga qaramasdan, pedagogik faoliyatni raqamli transformatsiya sharoitida rivojlantirish jarayonida ayrim muammolar ham mavjud. Jumladan, ayrim pedagoglarning raqamli kompetentligi yetarli darajada shakllanmaganligi, zamonaviy texnik vositalardan foydalanish imkoniyatlarining hududlar kesimida bir xil emasligi, elektron ta'lim resurslari sifatini oshirish zarurati hamda sun'iy intellekt texnologiyalaridan foydalanish bo'yicha metodik tavsiyalarning yetarli emasligi ushbu yo'nalishdagi dolzarb masalalar hisoblanadi. Mazkur muammolarni bartaraf etish uchun pedagoglarning uzluksiz kasbiy rivojlanish tizimini takomillashtirish, xalqaro tajribalarni milliy ta'lim tizimiga moslashtirish, raqamli pedagogika bo'yicha maxsus o'quv dasturlarini ishlab chiqish hamda ta'lim jarayonida sun'iy intellekt va ta'lim analitikasi vositalaridan foydalanish bo'yicha metodik ta'minotni kuchaytirish maqsadga muvofiqdir.

Olib borilgan ilmiy tahlillar shuni ko'rsatdiki, ta'limning raqamli transformatsiyasi pedagogik faoliyatning mazmuni, metodlari, vositalari va tashkiliy mexanizmlarini tubdan yangilashni talab etmoqda. Raqamli texnologiyalarning ta'lim jarayoniga keng joriy etilishi pedagogning kasbiy faoliyatini an'anaviy bilim beruvchi modeldan innovatsion ta'lim jarayonini boshqaruvchi, maslahatchi va fasilitator modeliga o'tkazmoqda. Tahlillar natijasida pedagogik faoliyatni rivojlantirishning ustuvor yo'nalishlari sifatida pedagoglarning raqamli kompetentligini oshirish, sun'iy intellekt va ta'lim

analitikasi vositalaridan samarali foydalanish, innovatsion pedagogik texnologiyalarni keng joriy etish hamda uzluksiz kasbiy rivojlanish tizimini takomillashtirish zarurligi aniqlandi. Xalqaro tajribalar shuni ko'rsatmoqdaki, pedagogik faoliyatni muvaffaqiyatli modernizatsiya qilish uchun quyidagi omillar muhim hisoblanadi:

- pedagoglarning uzluksiz kasbiy rivojlanishini ta'minlash;
- zamonaviy raqamli ta'lim muhitini yaratish;
- innovatsion pedagogik texnologiyalarni o'quv jarayoniga integratsiya qilish;
- ta'lim jarayonida sun'iy intellekt va ta'lim analitikasi imkoniyatlaridan oqilona foydalanish;
- xalqaro tajribalarni milliy ta'lim tizimi xususiyatlariga moslashtirish.

O'zbekiston ta'lim tizimida amalga oshirilayotgan islohotlar pedagogik faoliyatni raqamli transformatsiya sharoitida rivojlantirish uchun mustahkam asos yaratmoqda. Shu bilan birga, pedagoglarning raqamli kompetentligini rivojlantirish, elektron ta'lim resurslari sifatini oshirish, sun'iy intellekt texnologiyalaridan foydalanish metodikasini takomillashtirish hamda ta'limni boshqarishning raqamli mexanizmlarini yanada rivojlantirish dolzarb vazifalar bo'lib qolmoqda.

Shunday qilib, pedagogik faoliyatni rivojlantirishning innovatsion strategiyalarini amaliyotga joriy etish ta'lim sifatini oshirish, pedagoglarning kasbiy salohiyatini rivojlantirish hamda raqobatbardosh mutaxassislarni tayyorlashning muhim omili hisoblanadi.

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MILLIY QADRIYATLAR ASOSIDA TARBIYANING O‘RNI VA AHAMIYATI

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Annotatsiya: *Ushbu maqolada milliy qadriyatlar asosida tarbiya berishning yosh avlodning ma’naviy-axloqiy kamolotidagi o‘rni va ahamiyati yoritilgan. Oila, ta’lim muassasalari, mahalla hamda ommaviy axborot vositalarining milliy qadriyatlarni yoshlar ongiga singdirishdagi roli tahlil qilingan. Shuningdek, globallashuv sharoitida milliy o‘zlikni anglash, milliy qadriyatlarni asrab-avaylash va ularni zamonaviy ta’lim jarayoniga integratsiya qilish masalalari ko‘rib chiqilgan.*

Kalit so‘zlar: *milliy qadriyat, tarbiya, ma’naviyat, yoshlar, oila, ta’lim, milliy o‘zlik, vatanparvarlik, odob-axloq, globallashuv.*

Abstract: *This article examines the role and significance of education based on national values in the spiritual and moral development of the younger generation. It analyzes the contribution of the family, educational institutions, the mahalla community, and the mass media to fostering national values among young people. The paper also discusses the issues of developing national identity in the context of globalization, preserving national values, and integrating them into the modern educational process.*

Keywords: *national values, education, spirituality, youth, family, educational institutions, national identity, patriotism, moral education, globalization.*

KIRISH

Har bir xalqning taraqqiyoti uning ma’naviy qadriyatlari va yosh avlod tarbiyasiga bo‘lgan munosabati bilan belgilanadi. Milliy qadriyatlar xalqning ko‘p asrlik tarixiy tajribasi, urf-odatlari, an’analari, madaniyati va ma’naviy merosini o‘zida mujassam etgan bebaho boylik hisoblanadi. Ushbu qadriyatlarni yosh avlod ongiga singdirish orqali barkamol, vatanparvar, ma’naviy yetuk va mas’uliyatli shaxslarni voyaga yetkazish mumkin.

Bugungi globallashuv jarayonida turli madaniyatlarning o‘zaro ta’siri kuchayib borayotgan bir sharoitda milliy qadriyatlarni asrab-avaylash va ularni yoshlar tarbiyasiga singdirish dolzarb vazifalardan biridir. Zero, milliy qadriyatlar jamiyatning ma’naviy barqarorligi va milliy o‘zligini saqlab qolishning asosiy omillaridan sanaladi.

ASOSIY QISM

Milliy qadriyatlar asosida tarbiya berish shaxsning ma’naviy dunyosini boyitadi, unda Vatanga muhabbat, ota-onaga hurmat, mehnatsevarlik, halollik, insonparvarlik, bag‘rikenglik va adolat kabi fazilatlarni shakllantiradi. Bunday tarbiya insonning hayotiy qarashlarini to‘g‘ri yo‘naltirish, jamiyatda o‘z o‘rnini topishi va ijtimoiy mas’uliyatini his etishida muhim omil hisoblanadi.

Milliy tarbiyaning birlamchi va eng muhim maskani oiladir. Bola dastlab oilada milliy urf-odatlar, odob-axloq me’yorlari va an’analar bilan tanishadi. Ota-onalar tomonidan farzandlarga kattalarni hurmat qilish, kichiklarga mehr ko‘rsatish, mehnatni qadrlash, saxovat, halollik va vatanparvarlik kabi fazilatlarning singdirilishi ularning kelajakdagi shaxsiy kamolotiga mustahkam zamin yaratadi.

Ta’lim tizimi ham milliy qadriyatlarni shakllantirishning muhim institutlaridan biridir. Maktabgacha ta’limdan boshlab oliy ta’limgacha bo‘lgan barcha bosqichlarda milliy qadriyatlarni o‘quv dasturlariga integratsiya qilish zarur. Tarix, adabiyot, ona tili, san’at va tarbiya fanlari orqali yoshlar milliy merosimiz, buyuk ajdodlarimizning hayoti va faoliyati bilan yaqindan tanishadilar. O‘qituvchilar esa nafaqat bilim beruvchi, balki yoshlarning ma’naviy kamolotiga yo‘l ko‘rsatuvchi murabbiy sifatida muhim o‘rin egallaydi.

Mahalla institutining tarbiyaviy imkoniyatlari ham alohida ahamiyatga ega. Mahallada o‘tkaziladigan ma’naviy-ma’rifiy tadbirlar, urf-odatlar va milliy bayramlar yoshlarning milliy qadriyatlarga hurmatini yanada kuchaytiradi. Oqsoqollar va nuroniylarning hayotiy tajribasi yosh avlod uchun muhim tarbiya maktabi hisoblanadi.

Badiiy adabiyot, teatr, kino, musiqa va xalq og‘zaki ijodi ham milliy tarbiyaning samarali vositalaridandir. Buyuk mutafakkirlar va adiblar merosi orqali yoshlarda vatanparvarlik, insonparvarlik, fidoyilik, ilmga intilish va ezgulik kabi yuksak fazilatlar shakllanadi.

Bugungi kunda internet va ijtimoiy tarmoqlarning yoshlar hayotidagi o‘rni tobora ortib bormoqda. Shu sababli milliy qadriyatlarni zamonaviy axborot texnologiyalari orqali targ‘ib qilish dolzarb vazifaga aylandi. Elektron kutubxonalar, raqamli ta’lim platformalari, videodarslar va ijtimoiy tarmoqlardagi ma’rifiy loyihalar milliy qadriyatlarni keng ommalashtirish imkonini bermoqda.

Globallashuv jarayonida ayrim salbiy madaniy ta’sirlar yoshlar ongiga ham ta’sir ko‘rsatishi mumkin. Bunday sharoitda milliy qadriyatlar yoshlarni zararli g‘oyalar, ma’naviy tahdidlar va yot mafkuralardan himoya qiluvchi muhim omil bo‘lib xizmat qiladi. Milliy o‘zlikni anglagan, tarixini va madaniyatini qadrlaydigan yoshlar jamiyat taraqqiyotining faol ishtirokchilariga aylanadi.

Davlat tomonidan milliy qadriyatlarni asrash va rivojlantirishga qaratilgan islohotlar ham ushbu yo‘nalishdagi ishlarning samaradorligini oshirmoqda. Ta’lim tizimida ma’naviy-ma’rifiy ishlarni kuchaytirish, madaniy merosni asrash, milliy bayram va an’analarni qo‘llab-quvvatlash bo‘yicha amalga oshirilayotgan chora-tadbirlar yoshlar tarbiyasida muhim ahamiyat kasb etmoqda.

Xulosa qilib aytganda, milliy qadriyatlar asosida tarbiya berish jamiyatning ma’naviy taraqqiyoti va barqaror rivojlanishining muhim omilidir. Oila, ta’lim muassasalari, mahalla, davlat va fuqarolik jamiyati institutlarining hamkorligi natijasida yosh avlodni milliy ruhda tarbiyalash mumkin. Milliy qadriyatlar yoshlarni Vatanga sadoqatli, ma’naviy yetuk, halol, mehnatsevar va mas’uliyatli insonlar etib voyaga yetkazishda muhim ahamiyat kasb etadi. Shu bois milliy qadriyatlarni zamonaviy ta’lim va tarbiya tizimiga yanada chuqurroq

integratsiya qilish, ularni amaliy hayotga keng tatbiq etish bugungi kunning ustuvor vazifalaridan biri hisoblanadi.

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ДВИГАТЕЛЬНО-РИТМИЧЕСКОЕ ВЗАИМОДЕЙСТВИЕ КАК ПЕДАГОГИЧЕСКОЕ УСЛОВИЕ ФОРМИРОВАНИЯ СОЦИАЛЬНОГО КОНТАКТА У ДЕТЕЙ С АУТИЗМОМ

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Аннотация: *В тезисе рассматривается значение двигательно-ритмического взаимодействия в хореографической деятельности как педагогического условия формирования социального контакта у детей с аутизмом. Обосновано, что движение, ритм, подражание, телесная осознанность и эмоциональное сонастраивание могут выступать доступными средствами развития невербальной коммуникации, совместного внимания и социальной инициативы. Особое внимание уделяется педагогическим условиям организации хореографических занятий: безопасности среды, постепенности заданий, учёту сенсорных особенностей ребёнка и поддержке его индивидуального темпа. Сделан вывод о том, что хореографическая деятельность может использоваться как часть комплексной коррекционно-развивающей работы, направленной на расширение коммуникативного опыта детей с аутизмом.*

Ключевые слова: *аутизм, дети с особыми образовательными потребностями, двигательно-ритмическое взаимодействие, хореография, телесная осознанность, невербальная коммуникация, социальный контакт, инклюзивное образование.*

Abstract: *The thesis examines the importance of motor-rhythmic interaction in choreographic activity as a pedagogical condition for the formation of social contact in children with autism. It is proved that movement, rhythm, imitation, bodily awareness and emotional attunement can act as accessible means of developing non-verbal communication, joint attention and social initiative. Special attention is paid to the pedagogical conditions of the organization of choreographic classes: the safety of the environment, the gradualness of tasks, taking into account the sensory characteristics of the child and supporting his individual pace. It is concluded that choreographic activity can be used as part of a comprehensive*

correctional and developmental work aimed at expanding the communicative experience of children with autism.

Keywords: *autism, children with special educational needs, motor-rhythmic interaction, choreography, body awareness, nonverbal communication, social contact, inclusive education.*

АКТУАЛЬНОСТЬ

Современная педагогика всё чаще обращается к междисциплинарным средствам поддержки детей с особыми образовательными потребностями. Особое место в этой системе занимают дети с аутизмом, для которых характерны трудности в установлении контакта, поддержании совместного внимания, понимании невербальных сигналов, эмоциональном отклике и включении в групповое взаимодействие. Коммуникация для таких детей не всегда начинается со слова: нередко первым доступным способом выражения становится движение, взгляд, жест, поза, ритмическая реакция или подражание действию другого человека. Поэтому развитие коммуникативных навыков у детей с аутизмом требует не только речевых и когнитивных методов, но и телесно-ориентированных, художественных и эмоционально безопасных форм педагогической работы. [1, 2]

Актуальность рассматриваемой проблемы связана с тем, что традиционные формы обучения и коррекции не всегда в полной мере учитывают особенности сенсорного восприятия, двигательной организации и эмоционального реагирования ребёнка с аутизмом. В ряде случаев прямое вербальное обращение, инструкция или требование вступить в диалог могут вызывать напряжение, тревожность, избегание контакта. Хореографически организованное движение, напротив, создаёт более мягкие условия для включения ребёнка во взаимодействие. Через ритм, повтор, подражание, совместное движение и импровизацию ребёнок

получает возможность постепенно осваивать социальные действия без избыточного давления со стороны взрослого.

Двигательно-ритмическое взаимодействие можно рассматривать как один из ключевых механизмов формирования социального контакта у детей с аутизмом. Оно объединяет несколько важных компонентов: телесную осознанность, эмоциональную выразительность, способность к подражанию, ориентацию на партнёра, согласование собственных действий с действиями других участников. В условиях хореографического занятия ребёнок учится воспринимать не только своё тело, но и тело другого человека как источник информации. Он начинает замечать направление движения, темп, паузу, дистанцию, эмоциональную окраску жеста. Всё это имеет прямое отношение к развитию невербальной коммуникации, которая является основой последующего речевого и социального взаимодействия. [3, 4]

Для системы инклюзивного образования данная проблема имеет особое значение. В образовательной среде ребёнку с аутизмом важно не только усваивать знания, но и приобретать опыт совместного присутствия, совместного действия и эмоционального обмена. Хореографическая деятельность в этом контексте может выполнять не только эстетическую, но и коррекционно-развивающую функцию. Она позволяет организовать пространство, где ребёнок не обязан сразу говорить, но может быть услышан через движение. Это особенно важно для детей, испытывающих трудности в вербальном общении, поскольку движение становится для них доступным каналом самовыражения и взаимодействия.

Таким образом, обращение к двигательно-ритмическому взаимодействию как педагогическому условию развития социального контакта у детей с аутизмом является актуальным как для теории коррекционной педагогики, так и для практики инклюзивного образования, арт-терапевтических студий, центров психолого-

педагогической поддержки и хореографических коллективов, работающих с детьми с особыми образовательными потребностями.

ЦЕЛЬ:

Цель тезисов — теоретически обосновать значение двигательно-ритмического взаимодействия в хореографической деятельности как педагогического условия формирования социального контакта и развития коммуникативных навыков у детей с аутизмом.

Для достижения цели были определены следующие задачи: раскрыть особенности коммуникативного развития детей с аутизмом; определить педагогический потенциал хореографически организованного движения; выделить условия, при которых двигательно-ритмическое взаимодействие способствует развитию невербальной коммуникации; охарактеризовать возможные результаты применения хореографической деятельности в коррекционно-развивающей практике.

МАТЕРИАЛЫ И МЕТОДЫ:

Материалом для подготовки тезисов послужили научные исследования в области коррекционной педагогики, психологии развития, танцевально-двигательной терапии, арт-педагогики и инклюзивного образования. Особое внимание было уделено работам, в которых движение рассматривается как способ невербального общения, эмоциональной регуляции и формирования межличностного контакта у детей с аутизмом. [3, 5]

Методологическую основу составили телесно-ориентированный, личностно-ориентированный, деятельностный и инклюзивный подходы. Телесно-ориентированный подход позволяет рассматривать тело ребёнка не только как объект двигательного развития, но и как активный инструмент коммуникации. Личностно-ориентированный подход предполагает уважение к индивидуальному темпу ребёнка, его сенсорным

особенностям, эмоциональному состоянию и способу включения в деятельность. Деятельностный подход акцентирует внимание на том, что коммуникативные навыки формируются не изолированно, а в процессе совместного действия. Инклюзивный подход подчёркивает необходимость создания доступной, безопасной и принимающей среды.

В качестве основных методов использовались теоретический анализ научной литературы, обобщение педагогического опыта, сравнительно-сопоставительный анализ подходов к применению хореографии и танцевально-двигательной терапии, моделирование педагогических условий, а также педагогическое наблюдение как возможный метод фиксации изменений в поведении детей во время двигательно-ритмических занятий.

В структуре хореографической деятельности были выделены следующие методические компоненты: ритмическая разминка, упражнения на телесную осознанность, упражнения на подражание, зеркальное движение, парные и групповые задания, двигательная импровизация, упражнения на выражение эмоций через жест и позу, завершение занятия через ритуал спокойного движения. Такая структура позволяет выстраивать занятие от простого к сложному: от индивидуального ощущения собственного тела к совместному действию с партнёром и группой.

Особое значение придаётся принципу постепенности. Для ребёнка с аутизмом резкая смена деятельности, высокая интенсивность движений, громкая музыка или необходимость немедленного контакта могут стать источником тревоги. Поэтому хореографическое занятие должно строиться с учётом предсказуемости, повторяемости и эмоциональной безопасности. Повторяющийся ритуал начала и завершения занятия помогает ребёнку ориентироваться в ситуации, а знакомые музыкально-ритмические элементы создают чувство устойчивости.

Важным методом является зеркальное движение, при котором педагог или партнёр мягко отражает движение ребёнка либо предлагает ребёнку повторить простое движение взрослого. В отличие от механического копирования, педагогическое зеркалирование предполагает эмоциональное сонастраивание. Ребёнок получает опыт того, что его движение замечено, принято и может стать частью общего взаимодействия. Это усиливает чувство значимости собственного действия и постепенно формирует готовность к ответной реакции. [6, 10]

Также применяются упражнения на совместный ритм: хлопки, шаги, покачивания, повороты, простые танцевальные комбинации. Ритм выполняет организующую функцию: он помогает ребёнку удерживать внимание, регулировать темп действия, прогнозировать следующий элемент и соотносить своё движение с движением других участников. Через ритм ребёнок включается в общую структуру занятия, даже если пока не использует речь. [4, 8]

РЕЗУЛЬТАТЫ:

Теоретический анализ и обобщение педагогического опыта позволяют выделить несколько направлений положительного влияния двигательно-ритмического взаимодействия на развитие социального контакта у детей с аутизмом.

Первое направление связано с развитием телесной осознанности. Многие дети с аутизмом испытывают трудности в ощущении границ собственного тела, координации движений, регуляции мышечного напряжения и ориентации в пространстве. Хореографические упражнения помогают ребёнку лучше понимать положение тела, направление движения, силу и амплитуду действия. Это создаёт основу для более уверенного поведения в пространстве и снижает уровень двигательной хаотичности.

Второе направление связано с эмоциональной регуляцией. Музыка, ритм и повторяющиеся движения могут способствовать снижению тревожности, упорядочиванию эмоционального состояния и формированию чувства безопасности. Через движение ребёнок получает возможность выразить напряжение, радость, интерес, усталость или сопротивление без необходимости немедленно обозначать эти состояния словами. Для педагога такие проявления становятся важным диагностическим материалом, позволяющим лучше понять эмоциональное состояние ребёнка. [4, 5]

Третье направление заключается в развитии невербальной коммуникации. В процессе хореографического занятия ребёнок постепенно осваивает взгляд, жест, мимику, позу, дистанцию, направление движения как средства общения. Например, поворот к партнёру, протягивание руки, совместный шаг, остановка по сигналу, повторение движения педагога становятся элементарными формами коммуникативного поведения. Эти действия могут рассматриваться как предпосылки более сложных социальных навыков.

Четвёртое направление связано с формированием совместного внимания. Для ребёнка с аутизмом бывает сложно одновременно удерживать внимание на предмете, действии и другом человеке. В хореографической деятельности эта задача решается через движение: ребёнок следит за педагогом, реагирует на музыку, замечает партнёра, выполняет действие в общем ритме. Постепенно формируется способность быть включённым в общую ситуацию и соотносить собственное действие с действиями окружающих.

Пятое направление проявляется в развитии подражания. Подражание является важной основой обучения и коммуникации. Через простые хореографические элементы ребёнок учится повторять движение взрослого, затем сверстника, а позднее — предлагать собственное

движение для повторения другими участниками. Такая смена ролей особенно значима, поскольку ребёнок переходит от пассивного выполнения инструкции к активной коммуникативной инициативе.

Шестое направление связано с развитием социальной инициативы. В благоприятных условиях ребёнок начинает не только повторять предложенные действия, но и самостоятельно вступать во взаимодействие: выбирать движение, подходить к партнёру, ждать очереди, реагировать на изменение музыки, выражать согласие или несогласие телесным способом. Даже минимальная инициатива — взгляд, шаг навстречу, улыбка, движение рукой — может рассматриваться как важный показатель положительной динамики.

На основании анализа можно выделить три взаимосвязанных блока хореографического воздействия на коммуникативное развитие детей с аутизмом.

Первый блок — сенсорно-регулятивный. Он направлен на снижение тревожности, развитие чувства телесной устойчивости, ориентацию в пространстве, принятие ритма и темпа занятия. В этот блок входят дыхательные упражнения, мягкие покачивания, упражнения на равновесие, ходьба под музыку, простые повторяющиеся движения.

Второй блок — эмоционально-выразительный. Он направлен на формирование способности выражать настроение и эмоциональное состояние через движение. Сюда относятся упражнения «радостное движение», «спокойное движение», «сильное движение», «лёгкое движение», двигательные этюды с использованием образов природы, животных, сказочных персонажей, а также импровизация под музыку разного характера.

Третий блок — коммуникативно-социальный. Он направлен на развитие взаимодействия с педагогом, партнёром и группой. В него входят зеркальные упражнения, парные движения, круговые танцевальные

формы, упражнения на ожидание очереди, передачу движения по кругу, совместное завершение танцевальной фразы.

Практическое значение такой модели состоит в том, что она позволяет педагогу не ограничиваться обучением танцевальным движениям, а рассматривать каждое движение как средство развития коммуникации. В этом случае качество занятия оценивается не только по точности исполнения, но и по степени включённости ребёнка, его эмоциональному отклику, готовности к контакту, способности замечать других участников и реагировать на них.

Важным результатом является также уточнение педагогических условий эффективности хореографической деятельности. К ним относятся: создание безопасной и доброжелательной атмосферы; индивидуальный подбор музыкального материала; использование предсказуемой структуры занятия; постепенное усложнение заданий; уважение к сенсорным особенностям ребёнка; сочетание индивидуальной, парной и групповой работы; поддержка инициативы ребёнка; отсутствие принуждения к немедленному вербальному ответу; сотрудничество педагога с родителями и специалистами сопровождения.

Следует подчеркнуть, что хореографическая деятельность не должна рассматриваться как замена медицинской, психологической или логопедической помощи. Её значение заключается в другом: она создаёт дополнительное пространство развития, где ребёнок может безопасно осваивать контакт, выражать себя, переживать ситуацию совместности и постепенно расширять коммуникативный опыт. Наиболее эффективной такая деятельность становится при включении в комплексную систему психолого-педагогической поддержки.

ВЫВОДЫ:

Двигательно-ритмическое взаимодействие является значимым педагогическим условием формирования социального контакта у детей с аутизмом. Его эффективность определяется тем, что оно опирается на доступные ребёнку способы выражения — движение, ритм, жест, подражание, телесную реакцию и эмоциональное сонастраивание.

Хореографическая деятельность обладает высоким коррекционно-развивающим потенциалом, поскольку объединяет физическое, эмоциональное, когнитивное и социальное развитие ребёнка. В отличие от методов, ориентированных преимущественно на речь, хореография позволяет начинать коммуникацию с невербального уровня, что особенно важно для детей, испытывающих трудности в словесном общении.

Основными механизмами положительного воздействия хореографической деятельности являются развитие телесной осознанности, снижение тревожности, формирование совместного внимания, активизация подражания, развитие эмоциональной выразительности и расширение опыта социального взаимодействия. Через движение ребёнок учится быть в контакте с собой, педагогом, партнёром и группой.

Педагогическая ценность двигательно-ритмического взаимодействия состоит в том, что оно позволяет перейти от индивидуального движения к совместному действию, а затем — к более осознанной коммуникации. Такой переход должен осуществляться постепенно, с учётом индивидуальных особенностей ребёнка, его сенсорной чувствительности, уровня готовности к контакту и эмоционального состояния.

Для практики инклюзивного образования предложенный подход может быть использован при разработке коррекционно-развивающих программ, хореографических занятий, арт-терапевтических модулей и индивидуальных маршрутов сопровождения детей с аутизмом. Перспективой дальнейшего исследования является экспериментальная

проверка эффективности разработанной программы хореографических занятий с применением диагностических критериев, отражающих динамику зрительного контакта, инициативности, подражания, совместного внимания, эмоционального отклика и участия в групповой деятельности.

Таким образом, двигательно-ритмическое взаимодействие в хореографической деятельности может рассматриваться как гуманистически ориентированное средство развития коммуникативных навыков у детей с аутизмом. Оно создаёт условия, при которых движение становится не только формой художественного выражения, но и языком общения, доступным ребёнку на ранних этапах социального развития.

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