TECHNOLOGY IN VOCABULARY LEARNING IN EFL CLASSROOMS

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Annotation: *This article examines the role of digital technologies in supporting vocabulary acquisition in English as a Foreign Language (EFL) classrooms. Based on a review of existing research, it explores how digital flashcards, captioned videos, and concept-mapping tools contribute to vocabulary recognition, retention, and meaningful language use. Particular attention is given to retrieval practice, spaced repetition, learner engagement, and the importance of constructive feedback. The analysis suggests that successful vocabulary development depends not merely on the availability of technological resources but also on how effectively they are incorporated into teaching activities. Furthermore, differences in learners' prior knowledge, instructional approaches, and assessment methods influence the outcomes of technology-supported learning. The article proposes a structured approach combining vocabulary exposure, active recall, contextual practice, and delayed assessment. It emphasizes the importance of selecting appropriate digital resources according to learners' needs and classroom conditions while identifying areas requiring further investigation.*

Keywords*: EFL vocabulary learning, educational technology, digital flashcards, captioned videos, concept mapping, vocabulary retention, spaced repetition.*

Introduction

Although technology-assisted vocabulary learning has received considerable research attention, several issues remain unresolved. Reviews by Okumuş Dağdeler [10] and Simonnet et al. highlight the diversity of digital learning approaches and the methodological challenges involved in evaluating their effectiveness. In addition, learners' existing vocabulary knowledge and self-regulation abilities may influence their responses to technology-supported instruction, as discussed in studies by Boroughani et al. [1] and Ye et al. Differences in participants, instructional procedures, and assessment methods make it difficult to establish which technological approaches are consistently more effective across different learning environments.

Against this background, the present article reviews selected studies on the application of digital technologies in EFL vocabulary learning, with particular attention to digital flashcards, captioned videos, and concept mapping. It examines the relationship between technological tools, vocabulary retrieval, spaced practice, and contextual language use. Rather than reporting the results of a new classroom experiment, the article critically discusses existing research findings and their implications for teaching. Its main purpose is to identify practical considerations for integrating digital resources into vocabulary instruction and to propose a classroom learning sequence that combines active recall, meaningful vocabulary use, feedback, and delayed assessment.

Literature Review

Vocabulary learning has attracted considerable attention in foreign language education because lexical knowledge plays a significant role in developing learners' communicative competence. Researchers have examined vocabulary acquisition from different perspectives, including cognitive processes, instructional strategies, and the application of technological resources. Nation[9] describes vocabulary knowledge as a combination of form, meaning, and use, emphasizing that learners need to develop both receptive and productive knowledge. This perspective suggests that effective vocabulary instruction should extend beyond recognizing unfamiliar words and provide opportunities to apply them appropriately in different communicative situations. The importance of repeated exposure and active engagement in vocabulary learning has been explored in several studies. Karpicke and Roediger demonstrated that retrieving previously learned information contributes significantly to long-term retention. Similarly, Kim and Webb [4] through a meta-analysis of second-language learning research, identified positive effects of spaced practice, particularly when learners' knowledge was assessed after a period of time. These findings indicate that vocabulary learning activities should encourage students to recall words independently rather than depend exclusively on repeated exposure to their meanings. Furthermore, Laufer and Hulstijn[5] introduced the concept of task-induced involvement, suggesting that vocabulary acquisition is influenced by the cognitive demands associated with learning activities, including need, search, and evaluation.

With the increasing availability of digital learning resources, researchers have investigated how technological applications can support vocabulary development. Nakata[8] examined several computer-based flashcard programs and highlighted differences in their instructional features. The study suggests that the effectiveness of digital flashcards depends not only on the software itself but also on how

vocabulary items are presented, reviewed, and retrieved. Xodabande et al. compared digital flashcards with traditional vocabulary learning approaches among university students and reported stronger receptive academic vocabulary performance among learners using digital flashcards. However, these findings do not necessarily demonstrate equivalent improvements in productive vocabulary skills. Other researchers have considered the relationship between technology-supported learning and students' ability to regulate their own learning processes. Boroughani et al. investigated mobile-assisted academic vocabulary learning using digital flashcards and found improvements in vocabulary learning outcomes and self-regulatory capacity among university students. Their findings indicate that technological tools can support vocabulary development when combined with opportunities for monitoring progress and organizing independent learning activities. Nevertheless, differences in instructional procedures should be considered when interpreting the effects of particular applications.

In addition to flashcards, multimedia resources have been examined as a means of presenting vocabulary in meaningful contexts. Montero Perez et al. investigated the effects of captioned videos on second-language listening and vocabulary learning.[7] Their findings provide evidence that captions can facilitate vocabulary acquisition by connecting spoken language with its written representation. Digital concept mapping represents another instructional approach. Mellati and Akbarian [6] explored the integration of technology-based concept mapping into EFL vocabulary instruction and reported positive learning outcomes. However, the combination of concept mapping, collaborative activities, and digital communication makes it difficult to identify the independent contribution of each instructional element. Learner characteristics also influence the effectiveness of technology-assisted vocabulary instruction. Ye et al. examined digital flashcards and video-based vocabulary learning in relation to self-regulation and prior vocabulary knowledge. Their findings revealed differences between instructional approaches and indicated that learning support did not influence all aspects of vocabulary knowledge equally. These results emphasize the importance of considering learners' existing abilities and the specific vocabulary skills being developed. Broader reviews have also addressed the opportunities and limitations associated with educational technology. Okumuş Dağdeler examined research on mobile-assisted vocabulary learning, while Simonnet et al. [10] reviewed studies of technology-assisted vocabulary learning tools and identified methodological challenges in the existing literature. Chun et al. [2] further emphasized the importance of considering the relationship between technology, language use, and instructional objectives. Taken together, these studies suggest that the educational value of digital tools

depends on their integration into appropriately designed learning activities. Despite the generally encouraging findings, existing studies differ in their participants, instructional conditions, duration, and methods of vocabulary assessment. Consequently, improvements in word recognition cannot automatically be interpreted as improvements in independent vocabulary production or long-term retention. This highlights the need for a critical examination of how digital learning tools support different dimensions of vocabulary knowledge and how their effectiveness can be evaluated in EFL classrooms.

Research Methodology

The present study employs a qualitative, literature-based research approach to examine the application of digital technologies in EFL vocabulary learning. A narrative literature review was selected because the main objective is to analyze and interpret existing scholarly findings rather than conduct an experimental investigation or collect new data from language learners.

The review draws on 13 academic sources included in the article's reference list, comprising empirical investigations, theoretical contributions, and research reviews related to vocabulary acquisition and technology-supported language instruction. Particular attention was given to studies examining digital flashcards, captioned videos, concept-mapping applications, retrieval practice, spaced repetition, and learner self-regulation. The literature examination initially focused on studies by Mellati and Akbarian, Simonnet et al. and Ye et al.[13]. Further focused searches, conducted on 20 September 2026, considered research associated with digital vocabulary learning, educational applications, vocabulary retention, and independent learning strategies. Relevant materials were examined using information available through academic publishers, scholarly repositories, and accessible research manuscripts. The selected literature was analyzed through a thematic approach. The analysis focused on four interconnected areas: the theoretical foundations of vocabulary acquisition, the instructional functions of digital technologies, learner-related factors affecting vocabulary development, and the methods used to assess learning outcomes. This organization provided a framework for comparing the pedagogical implications of different technological approaches without assuming that all studies investigated identical learning conditions. Particular attention was also given to the distinction between receptive and productive vocabulary knowledge. Drawing on Nation's framework[9], the analysis considered whether reported outcomes related primarily to word recognition, independent recall, contextual vocabulary use, or longer-term retention. Findings concerning retrieval practice and spaced learning were interpreted in

relation to the contributions of Karpicke and Roediger and Kim and Webb [4]. A comparative examination was undertaken to identify similarities and differences in the instructional approaches described in the selected studies. The analysis considered the learning activities, characteristics of participants, comparison conditions, and assessment procedures reported by the researchers. Methodological limitations were also considered when interpreting the findings, particularly where differences in instructional support or learning environments could influence the reported outcomes. As a selective narrative review, the present study does not employ statistical meta-analysis or claim to provide an exhaustive evaluation of all published research in this field. No new classroom intervention, questionnaire, or experimental assessment was conducted. Instead, conclusions were developed through the critical interpretation and thematic synthesis of existing scholarly evidence. Based on this analysis, the study proposes pedagogical considerations for integrating digital vocabulary learning resources into EFL instruction. These considerations emphasize the relationship between active vocabulary retrieval, spaced revision, contextual practice, corrective feedback, and delayed assessment. The proposed instructional sequence is presented as a practical recommendation derived from the reviewed literature rather than as an experimentally validated teaching model.

Results and Discussion

The analysis of the reviewed studies indicates that digital technologies can positively influence vocabulary acquisition in EFL classrooms. However, their effectiveness depends on instructional methods, learners' individual characteristics, and assessment procedures. The findings suggest that digital tools can support vocabulary recognition, retention, and contextual language use when integrated into well-structured learning activities. Research by Xodabande et al. demonstrated that digital flashcards improved students' receptive academic vocabulary knowledge compared with traditional learning methods. Similarly, Boroughani et al. reported positive outcomes in vocabulary development and self-regulated learning through mobile-assisted activities. These findings suggest that digital flashcards can encourage independent practice and regular vocabulary revision.

The importance of active recall and repeated practice was emphasized by Karpicke and Roediger and Kim and Webb. Their findings indicate that retrieval practice and spaced repetition contribute to long-term learning. Therefore, vocabulary activities should provide learners with opportunities to recall previously studied words at different intervals rather than rely exclusively on memorization. Multimedia technologies also offer advantages for vocabulary development.

Montero Perez et al. found that captioned videos could facilitate vocabulary acquisition by connecting spoken and written language. Mellati and Akbarian \[6\] reported positive results from technology-supported concept-mapping activities. These approaches may help learners understand relationships between words and practise vocabulary in meaningful contexts. Nevertheless, the effectiveness of digital resources may vary according to learners' prior knowledge and learning strategies. Ye et al. dentified differences in vocabulary learning outcomes associated with technological approaches and self-regulation support. Furthermore, Simonnet et al. highlighted methodological limitations in existing research, suggesting that differences in instructional conditions and assessment methods should be considered when interpreting results. The findings also have practical implications for EFL teachers. Combining digital flashcards, contextual learning activities, and regular feedback may create more effective opportunities for vocabulary development. Vocabulary assessment should examine not only immediate word recognition but also independent recall and long-term retention. As Nation \[9\] emphasizes, vocabulary knowledge involves understanding word form, meaning, and use. Overall, the reviewed studies suggest that digital technologies can enhance vocabulary learning when supported by appropriate teaching strategies. However, further research is necessary to determine their long-term effectiveness and their contribution to learners' ability to use newly acquired vocabulary in authentic communication.

Conclusion

The present study highlights the importance of integrating digital technologies into vocabulary instruction in EFL classrooms. The reviewed literature indicates that digital flashcards, captioned videos, and concept-mapping tools can support vocabulary acquisition by providing opportunities for active learning, regular revision, and contextual language use. The findings also emphasize that the effectiveness of technological resources depends on instructional strategies rather than the tools themselves. Retrieval practice and spaced repetition play important roles in improving vocabulary retention, while meaningful activities and feedback help learners develop their ability to use newly acquired words appropriately. Furthermore, teachers should consider learners' individual needs, language proficiency, and access to digital resources when selecting technological tools. Vocabulary assessment should focus not only on immediate recognition but also on long-term retention and practical language use. Overall, technology-supported vocabulary instruction offers promising opportunities for EFL education. However,

further research is needed to examine its long-term effectiveness and identify the most appropriate approaches for different learning environments.

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