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- 13.00.00 Pedagogika fanlari
- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
- 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
- 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
- 13.00.07 Ta'limda menejment
- 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
- 13.00.09 Ijtimoiy pedagogika
- 07.00.00 Tarix fanlari
- 19.00.00 Psixologiya fanlari
- 01.00.00 Fizika-matematika fanlari
- 02.00.00 Kimyo fanlari
- 03.00.00 Biologiya fanlari
- 09.00.00 Falsafa fanlari
- 10.00.00 Filologiya fanlari
- 11.00.00 Geografiya fanlari

M

AKTABGACHA VA AKTAB TA'LIMI

Pedagogika, psixologiya fanlariga ixtisoslashgan ilmiy jurnal



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WAYS OF TEACHING VOCABULARY USING MOBILE- ASSISTED LANGUAGE LEARNING (MALL) IN ENGLISH LANGUAGE TEACHING: A REVIEW

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Abstract: Vocabulary knowledge underlies every language skill, yet it remains one of the most time-consuming components of English language teaching (ELT) to develop and sustain. Over the past decade, the near-universal availability of smartphones has turned Mobile-Assisted Language Learning (MALL) into one of the most actively researched avenues for addressing this challenge. This paper presents a narrative review of the ways vocabulary is taught through MALL in ELT, synthesizing peer-reviewed studies, systematic reviews, and meta-analyses published mainly between 2010 and 2026. The review is organized around six broad approaches identified in the literature: digital flashcard and spaced-repetition platforms, messaging- and social-media-mediated instruction, gamified and game-based platforms, adaptive and AI-driven tools, augmented reality applications, and discipline-specific approaches used in English for Specific Purposes (ESP). Drawing on established frameworks from vocabulary acquisition (Nation), the Noticing Hypothesis (Schmidt), Task-Based Learning (Willis), and mobile learning (Stockwell), the review situates empirical findings within a coherent pedagogical rationale. Meta-analytic evidence indicates a generally positive, often large, effect of MALL on vocabulary gains, particularly for interventions sustained beyond ten weeks, alongside consistently positive learner attitudes. The review also identifies recurring barriers—infrastructural constraints, uneven teacher readiness, and a tendency for gamified tools to reward rote recognition over deeper word knowledge—and points to a research base still concentrated in a narrow set of national contexts. The paper closes with practical implications for ELT and ESP practitioners and recommendations for future research, including a call for more longitudinal and regionally diverse studies.

Key words: mobile-assisted language learning (MALL); vocabulary acquisition; English language teaching; English for Specific Purposes (ESP); gamification; digital flashcards; vocabulary retention.

Annotatsiya: Lug'at bilimi tilning barcha ko'nikmalari uchun asos bo'lib, u ingliz tili ta'limida (ELT) rivojlantirish va saqlab qolish eng ko'p vaqt talab qiladigan komponentlardan biri bo'lib qolmoqda. So'nggi o'n yillikda smartfonlarning deyarli universal ommalashuvi mobil qurilmalar yordamida til o'rgatish (MALL)ni ushbu muammoni hal etishning eng faol o'rganilayotgan yo'nalishlaridan biriga aylantirdi. Ushbu maqola ELTda lug'atni MALL orqali o'rgatish usullariga bag'ishlangan tavsifiy sharh bo'lib, asosan 2010–2026-yillar oralig'ida chop etilgan retsenziyadan o'tgan tadqiqotlar, tizimli sharhlar va meta-tahlillarni umumlashtiradi. Sharh adabiyotlarda aniqlangan oltita asosiy yondashuv asosida tuzilgan: raqamli fleshkartalar va oraliqli takrorlash platformalari, messenjerlar va ijtimoiy tarmoqlar orqali o'qitish, o'yinlashtirilgan va o'yinlarga asoslangan platformalar, moslashuvchan hamda sun'iy intellektga asoslangan vositalar, kengaytirilgan reallik ilovalari va maxsus maqsadlar uchun ingliz tili (ESP) doirasidagi sohaga xos yondashuvlar. Nation (lug'at o'zlashtirish), Schmidt (Noticing Hypothesis), Willis (Task-Based Learning) va Stockwell (mobil ta'lim) kabi tan olingan nazariy asoslarga tayangan holda, sharh empirik natijalarni izchil pedagogik asos doirasida yoritadi. Meta-tahlillar natijalari shuni ko'rsatadiki, MALL lug'at o'zlashtirishga, ayniqsa o'n haftadan ortiq davom etgan aralashuvlarda, umuman olganda ijobiy va ko'pincha yuqori ta'sir ko'rsatadi. Bunga o'quvchilarning barqaror ijobiy munosabati ham qo'shiladi. Sharh, shuningdek, takrorlanuvchi to'siqlarni – infratuzilma cheklovlari, o'qituvchilarning notekis tayyorgarligi va o'yinlashtirilgan vositalarning chuqur lug'at bilimi o'rniga yuzaki tanib olishni rag'batlantirish tendensiyasini – aniqlaydi hamda tadqiqot bazasining tor doiradagi milliy kontekstlarda jamlanganligini ko'rsatadi. Maqola ELT va ESP amaliyotchilari uchun amaliy tavsiyalar hamda kelgusi tadqiqotlar, jumladan, ko'proq uzoq muddatli va mintaqaviy jihatdan xilma-xil tadqiqotlarni amalga oshirish zarurligi haqidagi tavsiyalar bilan yakunlanadi.

Kalit so'zlar: mobil qurilmalar yordamida til o'rgatish (MALL); lug'at o'zlashtirish; ingliz tili ta'limi; maxsus maqsadlar uchun ingliz tili (ESP); o'yinlashtirish; raqamli fleshkartalar; lug'atni yodda saqlash.



Аннотация: Владение лексикой лежит в основе всех языковых навыков, однако её развитие и поддержание остаются одними из наиболее трудоёмких аспектов преподавания английского языка (ELT). За последнее десятилетие практически повсеместное распространение смартфонов сделало обучение языку с помощью мобильных технологий (MALL) одним из наиболее активно исследуемых направлений решения этой задачи. В данной статье представлен нарративный обзор способов обучения лексике посредством MALL в рамках ELT, обобщающий рецензируемые исследования, систематические обзоры и метаанализы, опубликованные преимущественно в 2010–2026 годах. Обзор построен вокруг шести широких подходов, выявленных в литературе: платформы цифровых флеш-карт и интервального повторения, обучение с использованием мессенджеров и социальных сетей, геймифицированные и игровые платформы, адаптивные и основанные на искусственном интеллекте инструменты, приложения дополненной реальности, а также предметно-ориентированные подходы, используемые в преподавании английского языка для специальных целей (ESP). Опираясь на устоявшиеся теоретические основы – усвоение лексики (Nation), гипотезу “замечания” (Schmidt), обучение на основе заданий (Willis) и мобильное обучение (Stockwell), – обзор помещает эмпирические данные в целостную педагогическую рамку. Результаты метаанализов свидетельствуют о в целом положительном, зачастую значительном эффекте MALL на прирост словарного запаса, особенно при вмешательствах продолжительностью свыше десяти недель, наряду со стабильно позитивным отношением учащихся. Обзор также выявляет повторяющиеся барьеры – инфраструктурные ограничения, неравномерную готовность преподавателей и тенденцию геймифицированных инструментов поощрять поверхностное узнавание слов вместо более глубокого владения лексикой – и указывает на то, что исследовательская база по-прежнему сосредоточена в узком круге национальных контекстов. Статья завершается практическими рекомендациями для преподавателей ELT и ESP, а также предложениями для будущих исследований, включая призыв к проведению более продолжительных и регионально разнообразных исследований.

Ключевые слова: обучение языку с помощью мобильных технологий (MALL); усвоение лексики; преподавание английского языка; английский язык для специальных целей (ESP); геймификация; цифровые флеш-карты; удержание лексики в памяти.

INTRODUCTION

Vocabulary knowledge is often described as the single largest practical obstacle for learners of English as a foreign or second language, since even strong grammatical control cannot compensate for gaps in lexical knowledge when learners try to read, listen, speak, or write (Nation, 2001). Nation's body of work has consistently shown that a well-balanced language course should devote deliberate, sustained attention to vocabulary alongside meaning-focused input, meaning-focused output, and fluency development (Nation, 2022). Yet vocabulary is also notoriously demanding to teach effectively: the sheer number of word families learners must encounter, the repeated and varied exposures required to move a word from initial recognition to confident productive use, and the additional burden of technical or discipline-specific terminology in English for Specific Purposes (ESP) settings all place practical limits on what a timetabled classroom can achieve on its own (Dudley-Evans & St John, 1998). Two developments over the past fifteen years have reshaped how this challenge is approached. First, the near-universal ownership of smartphones among university-age learners has transformed the mobile device from a classroom distraction into a viable extension of the learning environment—one that accompanies learners beyond scheduled lessons. Second, this shift has been theorized within the broader evolution of Computer-Assisted Language Learning (CALL), from which Mobile-Assisted Language Learning (MALL) has emerged as a distinct strand with its own affordances and constraints (Stockwell, 2013). Unlike earlier desktop-based CALL, MALL is defined less by any single piece of software than by the physical, pedagogical, and psychosocial characteristics of the mobile device itself: portability, connectivity, personal ownership, and the possibility of “anytime, anywhere” access to language input and practice (Stockwell, 2022; Stockwell & Hubbard, 2013).

Vocabulary has consistently been among the most extensively researched language domains within the MALL literature, surpassing grammar, listening, speaking, and pronunciation. This is unsurprising given how well short, repeatable, self-contained microtasks align with both the constraints of mobile screens and the cognitive demands of vocabulary learning—namely, the need for multiple, spaced encounters with lexical items before they are reliably retained. Over the same period, an increasingly diverse range of tools and approaches has been employed for this purpose, including dedicated flashcard and spaced-repetition applications, general-purpose messaging platforms repurposed for vocabulary instruction, gamified quiz platforms, adaptive systems that personalize item selection, and, more recently, chatbot- and augmented-reality-based tools. Given the pace at which this body of literature has expanded, and the fact that relevant findings are dispersed across educational technology, applied linguistics, and general education journals, there is considerable value in periodically integrating these strands into a single, theory-informed review. This is particularly important for English for Specific Purposes (ESP) contexts, where vocabulary demands are more specialized and where much of the general MALL literature is not directly applicable. Accordingly, this paper addresses the following research questions: RQ1. What broad approaches and tool types has the literature identified for teaching



vocabulary through MALL? RQ2. What do the empirical findings and meta-analytic evidence indicate about the effectiveness of these approaches? RQ3. How do learners and teachers perceive MALL-based vocabulary instruction, and what challenges do they report? RQ4. What gaps remain in the current evidence base, particularly regarding ESP and underrepresented regional contexts? The remainder of this paper is organized as follows. Section 2 outlines the theoretical framework underpinning the review, drawing on theories of vocabulary acquisition, the Noticing Hypothesis, task-based learning, and mobile learning. Section 3 describes the review methodology. Section 4 presents a thematic synthesis of MALL-based vocabulary-teaching approaches. Section 5 synthesizes evidence regarding instructional effectiveness. Sections 6 and 7 examine learner and teacher perceptions, together with the principal challenges reported in the literature. Sections 8 and 9 discuss implications for practice and directions for future research, and Section 10 concludes the paper.

LITERATURE REVIEW

Nation's (2001, 2022) account of vocabulary learning remains the most widely cited framework in the field and provides one of the clearest rationales for the proliferation of MALL tools. Nation argues that a well-designed language course should distribute learning time across four strands: meaning-focused input, meaning-focused output, language-focused learning, and fluency development. Vocabulary, in particular, benefits from both incidental exposure (encountering words repeatedly in context) and deliberate, decontextualized study, such as that provided by flashcards and quizzes. Central to this framework is the premise that knowing a word is not an all-or-nothing phenomenon. Full lexical mastery encompasses form, meaning, and use, each of which can be acquired receptively or productively and strengthened through repeated, spaced, and varied retrieval rather than through a single exposure. This principle—the superiority of spaced, effortful retrieval over passive rereading—closely aligns with the design principles underpinning flashcard and spaced-repetition applications, helping to explain why this category of tools has attracted considerable attention within MALL research. Schmidt's (1990) Noticing Hypothesis maintains that linguistic input becomes intake for language acquisition only when learners consciously attend to it; input that passes unnoticed contributes little to learning regardless of the amount of exposure. This principle has direct implications for the design of mobile vocabulary-learning tools. Features such as on-screen glosses, highlighted target forms, retrieval-practice prompts, and push notifications that reintroduce vocabulary at spaced intervals can all be viewed as intentionally designed opportunities for noticing. Conversely, the theory cautions against assuming that mere exposure through a mobile application—for example, passively scrolling through vocabulary embedded in a chat stream—will reliably result in learning unless the instructional design explicitly directs learners' attention to the target lexical items.

Stockwell (2013, 2022) situates MALL within the broader evolution of Computer-Assisted Language Learning (CALL) while emphasizing that mobile devices introduce distinct pedagogical and psychosocial considerations not present in traditional desktop-based CALL. Stockwell and Hubbard (2013) proposed a set of guiding principles for MALL implementation that emphasize aligning learning tasks with the physical constraints of mobile devices, including small screens, intermittent connectivity, and shorter attention spans associated with mobile learning contexts. They also highlight the importance of recognizing learners' personal relationships with their devices and caution against assuming that instructional approaches effective in desktop CALL environments can be transferred unchanged to mobile settings. These principles provide an important corrective within the vocabulary-teaching literature, where technological tools are frequently evaluated solely on learning outcomes without sufficient consideration of whether their design genuinely accommodates the affordances and constraints of mobile learning. Although Willis's (1996) framework for Task-Based Learning (TBL) was developed independently of digital technologies, its emphasis on practicing language through authentic communicative tasks rather than isolated drills provides a valuable perspective for evaluating MALL vocabulary applications. When vocabulary-learning activities are integrated into a broader task cycle—for example, by requiring learners to use newly acquired vocabulary to complete a WhatsApp-mediated collaborative task or a Kahoot-based group activity—they align more closely with communicative language teaching principles than when they function merely as digital drill-and-practice exercises. Scrivener's (2011) broader account of English Language Teaching (ELT) methodology reinforces this argument by emphasizing that technology should support sound pedagogical design rather than replace it. Ultimately, the effectiveness of any MALL activity depends on the coherence of the lesson or course in which it is embedded.

Dudley-Evans and St John (1998) define English for Specific Purposes (ESP) primarily through rigorous needs analysis. The language learners need to use within particular professional or academic contexts determines which vocabulary should receive instructional priority. This perspective has direct implications for MALL-based vocabulary instruction because general-purpose flashcard collections and commercially available gamified quizzes frequently focus on high-frequency general vocabulary rather than the technical or semi-technical terminology required by ESP learners, including students specializing in economics or international relations.

Consequently, evaluations of MALL tools for ESP vocabulary instruction should consider not only whether learners demonstrate measurable vocabulary gains, but also whether the selected lexical items reflect the same rigor in needs analysis that underpins effective ESP curriculum design.

RESEARCH METHODOLOGY

This paper adopts a narrative, thematically organized review rather than a fully systematic review conducted under a formal protocol such as PRISMA. This methodological choice reflects the paper's objective: to synthesize a broad and methodologically heterogeneous body of literature—including quasi-experimental studies, mixed-methods perception studies, systematic reviews, and quantitative meta-analyses—into a coherent account organized around recurring tool types and pedagogical themes, rather than to generate new pooled effect-size estimates. The sources were drawn from peer-reviewed journals and publisher platforms in applied linguistics and educational technology, including Computer Assisted Language Learning, Language Learning & Technology, ReCALL, the Arab World English Journal, the Journal of Educational Computing Research, Psychologica Belgica, and several open-access education journals, together with indexed systematic reviews and meta-analyses identified through academic database searches. Priority was given to studies involving EFL/ESL learners in higher education or upper-secondary contexts, as these settings account for the majority of MALL vocabulary research to date. Particular emphasis was placed on systematic reviews and meta-analyses published from 2019 onward, supplemented by earlier foundational and highly cited studies. Studies focusing primarily on other language skills (e.g., pronunciation or speaking) were excluded unless they reported vocabulary-specific outcomes or were cited for comparative purposes. The resulting body of literature was organized thematically according to tool type and synthesized in relation to the theoretical framework presented in Section 2. As with any narrative review, the selection and organization of sources inevitably reflect the reviewer's scholarly judgment rather than an exhaustive, fully reproducible search strategy; this limitation is discussed further in Section 7.4.

The most extensively researched approach to vocabulary instruction through MALL is the use of digital flashcards, most commonly delivered through general-purpose platforms such as Quizlet rather than purpose-built language-learning software. Ho and Kawaguchi (2021) compared Quizlet with traditional paper flashcards among EFL learners and found that, although both approaches improved receptive vocabulary knowledge, Quizlet produced significantly stronger outcomes. The authors attributed this advantage to the platform's richer multimodal presentation of word–meaning pairings compared with static paper flashcards. Similarly, Setiawan and Wiedarti (2020) reported that Quizlet use improved vocabulary recall and was consistently associated with high levels of learner motivation. Al-Malki (2020), working with foundation-level EFL students in Oman, reached comparable conclusions while additionally reporting high learner-perceived ease of use. Beyond Quizlet specifically, digital flashcard interventions based on the same principles of spaced retrieval have demonstrated similar patterns among university students learning technical and academic vocabulary. Several studies report that vocabulary gains are maintained in delayed post-tests administered weeks after the intervention, providing empirical support for Nation's argument that spaced, effortful retrieval is a key mechanism underlying long-term vocabulary retention. A second recurring approach repurposes everyday messaging platforms—particularly WhatsApp—as low-cost channels for vocabulary instruction. In these interventions, teachers or peers periodically share target vocabulary, definitions, example sentences, or short quizzes within existing group chats. Barzani and Omar (2024), investigating Kurdish EFL learners, found that a WhatsApp-mediated vocabulary-learning group significantly outperformed a traditionally instructed control group while also generating highly positive learner attitudes toward the instructional approach.

This pattern—substantial vocabulary gains accompanied by favorable learner perceptions—has been replicated across numerous studies involving different learner populations. Nevertheless, the evidence is not entirely consistent. Several investigations attribute weaker or statistically insignificant outcomes to inconsistent learner engagement outside classroom hours rather than to limitations inherent in the WhatsApp platform itself. These findings suggest that messaging applications function primarily as delivery channels and cannot compensate for weaknesses in instructional design. Gamified quiz platforms—including Kahoot!, Blooket, Quizizz, and Word-wall—constitute a third major category of MALL vocabulary tools and have attracted increasing scholarly attention because of their motivational appeal. Hadijah, Pratolo, and Rondiyah (2020) found that using Kahoot! as a vocabulary-assessment tool significantly improved learner performance. They further reported that the platform's competitive, game-based format enhanced learner engagement and increased the amount of voluntary retrieval practice. Comparative research across multiple gamified platforms has generally demonstrated broadly similar levels of effectiveness, suggesting that the underlying mechanism of timed, competitive retrieval practice may be more influential than the specific interface of any individual platform. Sandberg, Maris, and Hoogendoorn (2014) provided early experimental evidence that incorporating a gaming environment together



with adaptive item selection into a mobile vocabulary application produced measurable advantages over a comparable non-gamified application. Similar findings have been reported in more recent multi-platform investigations. One mixed-methods study integrating Kahoot!, Quizlet, and WhatsApp within an English for Academic Purposes (EAP) course found that the combined approach enhanced academic vocabulary acquisition while learners valued the diversity of learning experiences offered by multiple platforms. At the same time, several studies caution against viewing gamified repetition as sufficient in itself. Research examining Quizlet in a Business English course noted that gamified tools may encourage rote memorization unless deliberately combined with activities requiring learners to apply newly acquired vocabulary in meaningful communicative contexts. This concern directly reflects Nation's distinction between merely recognizing a word and being able to use it accurately and appropriately.

ANALYSIS AND RESULTS

A smaller but rapidly expanding body of research has examined adaptive systems that personalize both the selection and frequency of vocabulary items based on learners' demonstrated performance, as well as, more recently, large language model (LLM)-driven conversational chatbots. Secondary analyses of adaptive MALL implementations in undergraduate EFL contexts indicate that personalized content and immediate feedback are associated with stronger vocabulary retention and greater learner-reported autonomy than non-adaptive alternatives. The most recent strand of this literature investigates conversational AI chatbots as a medium for vocabulary learning. Hao, Xu, Abdul Halim, and Hao (2025), in an eight-week study involving Chinese university students, found that chatbot-assisted vocabulary practice improved learner performance both directly—through personalized, self-paced learning—and indirectly by strengthening learners' metacognitive vocabulary-learning strategies. These benefits were particularly pronounced among learners reporting higher levels of autonomy over their own learning. Because generative AI-based vocabulary tools have only become widely available since 2023, this remains the least mature area of MALL vocabulary research, and conclusions regarding its effectiveness relative to more established approaches should therefore be interpreted with appropriate caution. Augmented reality (AR) represents a smaller but distinctive category of MALL applications, in which vocabulary items are linked to virtual objects superimposed onto learners' physical environments through mobile-device cameras. A systematic review of forty AR-based language-learning studies published between 2016 and 2023 found that vocabulary acquisition was by far the most frequently targeted language skill. Most interventions relied on marker-based mobile technology rather than dedicated head-mounted devices, indicating that AR-supported vocabulary instruction is predominantly implemented through smartphones rather than specialized hardware. Wu (2021), using the location-based mobile game Pokémon Go to teach English prefixes, roots, and suffixes, reported that combining gameplay with flashcard-style activities enhanced vocabulary learning while significantly increasing learner engagement compared with flashcards alone. Overall, the AR literature suggests that the principal pedagogical value of this technology lies in contextualizing vocabulary within authentic learning experiences rather than in demonstrating inherent superiority over simpler instructional tools. The evidence further indicates that AR is most effective when used to complement, rather than replace, conventional teaching approaches.

Vocabulary instruction in English for Specific Purposes (ESP) presents a distinctive challenge that is only partially addressed within the broader MALL literature. By definition, ESP vocabulary is narrower, more specialized, and often more technical than general English vocabulary, making it less compatible with generic commercial flashcard collections. Kohnke and Ting (2021) explored this issue by examining learners' experiences with a discipline-specific vocabulary application developed in-house for an academic mentoring program. Their findings revealed that learners valued the application's relevance to their disciplinary needs considerably more than that of general-purpose vocabulary applications, while also identifying the development and maintenance of discipline-specific content as the principal practical challenge. Similarly, Al-Jarf (2022) found that EFL university students engaged actively with vocabulary-focused mobile applications obtained from commercial app stores, although considerable variation existed in the quality and specificity of the lexical content provided. Within Business English, a focus-group study involving undergraduate business administration students found that Quizlet supported both vocabulary memorization and contextualized language learning when deliberately integrated into classroom instruction. This finding reinforces the argument presented in Section 4.3 that gamified tools realize their full pedagogical potential only when embedded within a coherent instructional framework. Collectively, this body of research indicates that MALL can support ESP vocabulary learning effectively, provided that the rigorous needs analysis advocated by Dudley-Evans and St John (1998) is reflected in the selection or development of application content rather than assuming that resources designed for general EFL vocabulary instruction will automatically transfer to specialized disciplines such as economics, business, or international relations.

Beyond individual empirical studies, several meta-analyses have enabled researchers to evaluate the overall effectiveness of MALL for vocabulary learning with greater confidence than any single investigation could provide. Lin and Lin's (2019) systematic review and meta-analysis of mobile-assisted ESL/EFL vocabulary learning was among the earliest comprehensive syntheses demonstrating that MALL interventions consistently outperform non-mobile instructional approaches across a substantial body of quasi-experimental research. Mahdi's (2017) meta-analysis reached a similar conclusion based on an independently assembled dataset of mobile-device vocabulary interventions. More recently, Mihaylova, Gorin, Reber, and Rothen (2022) conducted a PRISMA-guided meta-analysis of MALL applications published between 2007 and 2019 and reported a moderate-to-strong overall effect (Hedges' $g = 0.88$) favoring MALL over traditional instructional approaches. They also noted considerable variation in effect sizes depending on research design and the specific language skill investigated. The most recent and methodologically comprehensive synthesis is Zhou and Zhou's (2026) Bayesian meta-analysis, which combined data from sixty-five quasi-experimental studies published between 2010 and 2024 on mobile application-based vocabulary learning. Restricting the analysis to interventions lasting ten weeks or longer, the authors reported a large overall effect size ($g = 1.28$), substantially exceeding the pooled estimate calculated across studies of all durations. This pattern provides compelling evidence that the benefits of MALL-based vocabulary instruction accumulate over time and are likely underestimated by the numerous short-term interventions that continue to dominate the literature. The same meta-analysis, together with earlier syntheses, also examined moderating variables such as educational level, application type, and cultural context. Although effect sizes varied across these categories, the overall pattern remained broadly consistent, supporting the tool-specific trends discussed in Section 4.

From a balanced perspective, however, the cumulative evidence should be interpreted with caution. Although the overall pattern is clearly positive, it is not uniformly so. Some individual studies have reported negligible or even negative short-term effects, particularly when interventions lasted only a few weeks or when learner engagement outside the classroom could not be adequately verified. At least one frequently cited investigation documented a decline in learner performance during a short messaging application-based vocabulary intervention, attributing this outcome to inconsistent learner participation rather than to shortcomings of the platform itself. Considered alongside the duration-related findings reported in recent meta-analyses, the available evidence supports a cautiously optimistic conclusion: MALL vocabulary tools are generally effective and can produce substantial learning gains, provided that their implementation is sustained over an extended period rather than introduced merely as a short-term instructional novelty. Across nearly every category of MALL tools reviewed in Section 4, learner perceptions of mobile-assisted vocabulary instruction have been consistently positive. This trend is evident across studies of digital flashcards, messaging applications, gamified platforms, and augmented reality environments. Learners consistently describe MALL tools as more engaging and less demanding than traditional paper-based study methods, reporting greater motivation to review vocabulary outside the classroom. In ESP contexts, learners place particular value on applications whose vocabulary content is directly relevant to their academic or professional disciplines. Several studies also report improvements in learner autonomy, particularly with respect to controlling the pace and frequency of vocabulary review. In AI chatbot-supported learning environments, this perceived autonomy appears to be one of the strongest predictors of successful learning outcomes. Teacher perspectives present a more complex picture. Whereas learner-centered studies consistently report positive attitudes, investigations focusing directly on teachers reveal substantially greater caution. Dashtestani (2013), examining Iranian EFL teachers' perceptions of MALL implementation, found that many participants did not incorporate MALL activities into their teaching despite expressing generally favorable attitudes toward mobile-assisted language learning. Teachers frequently reported lacking the pedagogical and technological expertise required to design or select appropriate mobile learning activities. This discrepancy between positive attitudes and actual classroom implementation recurs throughout the teacher-focused literature and suggests that successful integration of MALL depends as much on teacher preparation and professional development as on the pedagogical quality of the technological tools themselves.

CONCLUSION

The most frequently reported practical obstacle to MALL-based vocabulary instruction is unequal access to reliable internet connectivity and affordable mobile data, particularly outside major urban centers. Across several studies, teachers identified unstable internet access and the cost of mobile data as significant barriers discouraging both their own and their students' sustained engagement with MALL tools, even when attitudes toward mobile learning itself were favorable. Device-related limitations further compound this problem: not all learners have continuous access to smartphones capable of supporting modern educational applications, and instructional activities that assume universal device ownership risk widening, rather than narrowing, educa-



tional inequalities. A second closely related challenge concerns teachers' readiness to design, select, and effectively integrate MALL activities into classroom instruction. Multiple studies, including Dashtestani (2013) and subsequent investigations conducted in comparable contexts, indicate that teachers frequently perceive themselves as insufficiently prepared to implement MALL effectively. The principal barriers identified include limited professional training and inadequate institutional support rather than any fundamental opposition to mobile-assisted language learning itself. In addition, several studies report that some learners are reluctant to use their personal mobile devices for structured academic purposes, suggesting that successful implementation depends not only on selecting appropriate technological tools but also on fostering learner acceptance and establishing sustainable learning routines.

A more conceptual limitation concerns the types of vocabulary knowledge that MALL tools assess and reinforce. Several studies discussed in Section 4.3 caution that gamified platforms, because their scoring systems reward speed and recognition, may encourage superficial form–meaning matching rather than the multidimensional lexical competence described in Nation's framework, which includes collocations, register, and productive language use. Consequently, MALL tools that are not deliberately integrated with activities requiring contextualized and productive vocabulary use may generate strong performance on multiple-choice vocabulary tests without producing equivalent gains in authentic communicative competence. This concern directly reflects Willis's (1996) argument that language forms should be practiced within meaningful communicative tasks rather than through isolated drilling. The available evidence base also has important methodological limitations. Many of the primary studies reviewed rely on relatively small sample sizes, short intervention periods, and researcher-developed rather than independently validated vocabulary assessments. Furthermore, relatively few investigations include delayed post-tests capable of distinguishing durable vocabulary acquisition from short-term recognition effects. The geographical distribution of published research also remains relatively narrow. Most studies identified in this review, together with those synthesized in the systematic reviews and meta-analyses on which it draws, were conducted in East and Southeast Asia, the Middle East, and parts of South Asia. In contrast, comparatively little published research has examined MALL implementation in Central Asian higher education, despite increasing interest in MALL and ESP across the region. Finally, because the present study is a narrative rather than a fully systematic review, it is inevitably subject to selection bias and publication availability bias, limitations common to narrative reviews that do not follow fully preregistered systematic review protocols.

Taken together, the findings synthesized in this review support several practical recommendations for ELT and ESP practitioners considering the integration of MALL into vocabulary instruction. First, the duration-related findings presented in Section 5 indicate that MALL should be implemented as a sustained component of a language course lasting at least one academic term rather than as a short-term supplementary activity. Accordingly, educators and curriculum designers should evaluate instructional impact over months rather than weeks. Second, the selection of technological tools should reflect Nation's (2022) distinction between receptive vocabulary recognition and productive vocabulary use. While spaced-repetition flashcard applications are highly effective for developing initial form–meaning associations, they should be complemented by communicative tasks of the kind advocated by Willis (1996), requiring learners to retrieve and use newly acquired vocabulary in meaningful contexts. Third, within ESP settings, vocabulary content should be selected through the rigorous needs-analysis procedures advocated by Dudley-Evans and St John (1998) rather than relying on general-purpose vocabulary databases. Whenever possible, teacher-developed or learner-generated materials based on authentic disciplinary texts and communicative tasks are likely to be more effective than commercially available vocabulary collections. Fourth, institutions seeking to expand MALL implementation should regard teacher professional development and technical support as essential prerequisites rather than optional additions, given the consistent evidence linking successful implementation to teacher confidence and institutional support. Finally, in light of the infrastructural challenges identified in Section 7.1, educational institutions should prioritize mobile applications capable of functioning under conditions of intermittent internet connectivity or limited bandwidth in order to promote equitable access for all learners.

Several priorities for future research emerge directly from the limitations identified in this review. Longitudinal investigations examining vocabulary retention well beyond the conclusion of instructional interventions remain comparatively uncommon and are essential for determining the long-term sustainability of MALL-supported vocabulary learning once novelty effects diminish. Given the geographical concentration of existing research, future investigations conducted in underrepresented higher education contexts—including Central Asian ESP environments, where specialized vocabulary demands in fields such as economics, business, and international relations are substantial—would significantly strengthen the evidence base and help determine the generalizability of existing findings. Within ESP specifically, there is a clear need for intervention studies that integrate MALL applications with rigorous discipline-specific needs analysis from the outset rather than adapting general-purpose vocabulary applications retrospectively to specialized learner populations. Finally, as

generative AI-based technologies continue to evolve, carefully controlled comparative studies evaluating chatbot-mediated vocabulary learning against established MALL approaches—not merely traditional instruction—will be essential before firm conclusions can be reached regarding the educational value of this emerging category of instructional technology.

Overall, the evidence reviewed in this study supports a balanced yet clearly positive conclusion: Mobile-Assisted Language Learning has become one of the most effective and versatile approaches available for vocabulary instruction in English Language Teaching. The wide range of available tools—including spaced-repetition flashcards, messaging applications, gamified learning platforms, adaptive systems, AI-driven technologies, and augmented reality applications—has consistently demonstrated meaningful improvements in vocabulary acquisition, with meta-analytic evidence indicating particularly strong effects when interventions are implemented over extended periods. Nevertheless, this pedagogical potential is not realized automatically. The effectiveness of MALL depends fundamentally on adherence to established principles of vocabulary instruction, including Nation's emphasis on repeated, spaced, and meaningful engagement with lexical items, Schmidt's focus on conscious attention to linguistic form, and the shared view of Willis and Scrivener that technology should support, rather than replace, sound pedagogical design. For ESP practitioners, the discipline imposed by rigorous needs analysis, as advocated by Dudley-Evans and St John, remains indispensable for ensuring that technological tools target the vocabulary learners genuinely require rather than merely the vocabulary conveniently available within commercial applications. As MALL research continues to diversify across emerging technologies and broader geographical and disciplinary contexts, one conclusion is likely to remain constant: the educational value of any technological device ultimately depends on the quality of the pedagogy it is designed to support.

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- 13.00.00 Pedagogika fanlari
 - 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
 - 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
 - 13.00.03 Maxsus pedagogika
 - 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
 - 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
 - 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
 - 13.00.07 Ta'limda menejment
 - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
 - 13.00.09 Ijtimoiy pedagogika
 - 07.00.00 Tarix fanlari
 - 19.00.00 Psixologiya fanlari
 - 01.00.00 Fizika-matematika fanlari
 - 02.00.00 Kimyo fanlari
 - 03.00.00 Biologiya fanlari
 - 09.00.00 Falsafa fanlari
 - 10.00.00 Filologiya fanlari
 - 11.00.00 Geografiya fanlari



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