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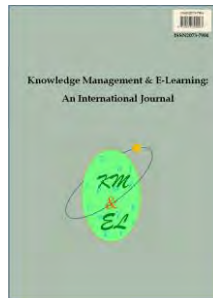
Julio Antonio Álvarez Martínez

Universidad de Antioquia, Medellín, Colombia

Juan Fernando Gómez

Juan Carlos Restrepo Botero

Tecnológico de Antioquia - Institución Universitaria, Medellín, Colombia



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Mobile-assisted language learning (MALL) for improving English language teaching and learning in higher education: A systematic literature review

Julio Antonio Álvarez Martínez* 

Escuela de Idiomas
Universidad de Antioquia, Medellín, Colombia
E-mail: alvarez2283@yahoo.es

Juan Fernando Gómez 

Departamento de Ciencias Básicas y Áreas Comunes
Tecnológico de Antioquia - Institución Universitaria, Medellín, Colombia
E-mail: jgomez2@tdea.edu.co

Juan Carlos Restrepo Botero 

Facultad de Educación y Ciencias Sociales
Tecnológico de Antioquia - Institución Universitaria, Medellín, Colombia
E-mail: juan.restrepo11@tdea.edu.co

*Corresponding author

Abstract: The aim of this review is to provide a synthesis of empirical evidence regarding the utilization and influence of Mobile-Assisted Language Learning (MALL) in teaching and learning of English as a Foreign Language (EFL) within higher education establishments. The results show the considerable potential of MALL in enhancing various facets of language acquisition, such as vocabulary growth, grammatical aptitude, listening and speaking proficiency, and writing competence. Notably, the review highlights MALL's capacity to promote learner's motivation, engagement, and autonomy, enabling personalized and interactive learning experiences that transcend traditional classroom limitations. Nonetheless, the review also reveals the intricate challenges entailed in integrating MALL, including technical barriers, pedagogical concerns, the imperative for comprehensive teacher training, student readiness, and the need for institutional support. It is essential to address these complex challenges through a balanced and collaborative approach to fully leverage the transformative potential of mobile technologies in EFL education. The findings emphasize the necessity for ongoing research, innovation, and interdisciplinary collaboration to further investigate the developing domain of MALL. Through the utilization of these discoveries, stakeholders can develop customized MALL interventions that address the distinct requirements and circumstances of higher education institutions, ultimately promoting language proficiency, digital literacy, and lifelong learning among students in the digital era.

Keywords: Mobile-assisted language learning (MALL); Teaching and learning; Higher education; English as a foreign language (EFL); Mobile devices; Systematic literature review

Biographical notes: Dr. Julio Álvarez graduated with a PhD in Education Sciences from the Cuauhtémoc University of Mexico, Master's in Teaching English as a Foreign Language from the UNINI University of Mexico, Master in Linguistics Applied to the Teaching of English as a Foreign Language from the UNINI University of Mexico. English teacher at the Language Department of the University of Antioquia (Medellín-Colombia). He has been involved in research around technology-enhanced English language teaching and learning (TEFL), including MALL, Artificial Intelligence, E-learning, among others.

Dr. Juan Gómez holds a PhD in Education Sciences from the Universidad Cuauhtémoc de México and a Master's Degree in Applied Linguistics for the Teaching of English as a Foreign Language from the Universidad de Jaén. English teacher at the Department of Basic Sciences and Common Areas of the Tecnológico de Antioquia, Institución Universitaria (Medellín-Colombia). Researcher teacher of the CBATA Group in the line of Education for Society. His research focuses on the learning and teaching of English as a foreign language, design of instructional materials, curriculum design and English teacher training.

Dr. Juan Restrepo has a PhD in Psychology with orientation in Applied Cognitive Neuroscience from the Maimonides University of Buenos Aires (Argentina), a specialization in neurocognitive rehabilitation from the Neurobehavioral Institute of Miami (USA) and his undergraduate degree in Psychology from the Pontificia Universidad Javeriana of Bogota (Colombia). He is a professor and researcher at the Tecnológico de Antioquia, Institución Universitaria (Medellín-Colombia). His main areas of research have focused on child and adolescent psychology and neuropsychology.

1. Introduction

The exponential growth of mobile technologies has reshaped the educational landscape in the 21st century (Yeh et al., 2021). The increasing popularity of portable devices like smartphones and tablets has resulted in the emergence of mobile-assisted language learning (MALL) (Hidayati & Diana, 2022). This innovative teaching method utilizes the features of these technologies to improve and accelerate the learning of foreign languages (Gonulal, 2019). MALL represents a revolutionary change in language education, surpassing the limitations of conventional classroom environments and providing unparalleled levels of adaptability, customization, and immersion (Abugohar et al., 2019; Kusmaryani et al., 2019). Fundamentally, MALL leverages the inherent benefits of mobile devices, such as their portability, connectivity, and multimedia capabilities (Balula et al., 2020; Nesrallah & Zangana, 2020). These characteristics empower learners to pursue language learning at their own convenience, effortlessly integrating it into their everyday activities.

Additionally, the abundance of interactive applications and digital resources offered by MALL allows learners to customize their learning experiences according to their specific requirements, levels of proficiency, and areas of interest, thereby promoting a personalized and self-directed educational voyage (Lei, 2018). Nevertheless, the paradigm-altering potential of MALL is accompanied by certain obstacles. First, the widespread adoption and effective implementation of digital tools face significant challenges in terms of accessibility, digital literacy, and pedagogical integration (Gómez Paniagua et al., 2024; Jiang & Liou, 2022; Sanda et al., 2021). Second, disparities in

access to mobile devices and reliable internet connectivity have the potential to worsen educational inequalities, as the skills for effectively utilizing MALL resources may not be evenly distributed among educators and learners (Criollo-C et al., 2022; Yassin & Abugohar, 2022).

Moreover, it is of utmost importance to navigate these complexities, as proficiency in foreign languages particularly English that has become an essential asset in our evermore interconnected global society (Hasan et al., 2022; Imamyartha et al., 2022). Consequently, the ability to effectively communicate in this widely spoken language creates opportunities for academic mobility, international collaboration, and professional growth, highlighting the importance of investigating innovative methods in language education (Xu, 2020; Kusmaryani et al., 2019).

To this end, this systematic review clarifies the complex implications of MALL for teaching and learning of English as a Foreign Language (EFL) in higher education. Through the synthesis of empirical evidence from an extensive range of literature, this review aims to provide insights into the significant influence of MALL on pedagogical practices, student outcomes, and institutional policies. Moreover, it explains the intricate relationship between technological advancement and educational revolution, shedding light on both the potential benefits and risks associated with incorporating MALL into the esteemed realm of academia. In short, this systematic review focuses on the following aspects: (1) MALL applications and how they support EFL teaching and learning in higher education institutions; (2) the impact of MALL on EFL education in higher education institutions, and (3) the barriers and challenges in integrating MALL into EFL teaching and learning.

2. Literature review

2.1. Mobile-assisted language learning (MALL)

Language education has undergone a revolutionary transformation with mobile technologies. Research by Kukulska-Hulme and Viberg (2018) and Tanna and Raval (2018) shows that MALL leverages the portability, connectivity, and multimedia features of smartphones and tablets to create engaging and customizable learning experiences. Unlike traditional classrooms limited by space and time, MALL integrates language learning into daily activities (Kusmaryani et al., 2019; Darmawati, 2018). This approach significantly boosts learners' motivation, autonomy, and engagement. Mobile devices provide instant access to diverse educational resources and interactive tools, fostering self-directed learning (Hidayati & Diana, 2022). Their multimedia capabilities support multisensory learning environments, accommodating different learning styles and enhancing language acquisition.

2.2. Supporting reading comprehension

MALL has emerged as an effective tool for engaging with authentic texts across various genres and domains. Unlike conventional textbooks, mobile applications provide access to real-world texts like news articles, literature, and academic publications (Criollo-C et al., 2022; Lin, 2018). This exposure to genuine language use enhances reading comprehension and overall language proficiency (Huzairin et al., 2020; Mauricio & Genuino, 2020). Additionally, mobile apps offer interactive features that promote active engagement with the text. In-app dictionaries, as studied by Chen and Lin (2018) and Lei

(2018), help learners quickly find definitions and contextual information, aiding vocabulary acquisition and comprehension. Features like comprehension quizzes and interactive annotations provide immediate feedback, reinforcing learning and fostering active cognitive processing (Tanna & Raval, 2018).

2.3. Enhancing writing proficiency

Implementing MALL has benefited from teaching writing. Mobile devices provide a flexible platform for composition, editing, feedback, and collaborative writing exercises (Al-Shehab, 2020; Imelda et al., 2019). Mobile apps enable real-time collaboration, facilitating exchange of drafts and constructive feedback (Nariyati et al., 2020; Simanjuntak, 2020). This encourages an interactive and dialogic writing process (Al-Shehab, 2020; Pramesti & Susanti, 2020). Additionally, incorporating natural language processing technologies into mobile apps enables automated grammar and style recommendations, improving writing fluency and precision (Ghorbani & Ebadi, 2019; Sila Ahmad et al., 2017). These advanced writing assistants can evaluate grammatical errors, word selection, sentence structure, and coherence promptly (Huzairin et al., 2020; Mauricio & Genuino, 2020), creating a supportive environment for refining writing skills.

2.4. Revolutionizing spoken language acquisition

MALL has revolutionized the development of spoken English abilities in higher education, since mobile devices provide access to audio and video resources, immersing learners in authentic speech patterns and contexts (Jiang & Liou, 2022; Sanda et al., 2021). This exposure develops listening comprehension, pronunciation, and conversational fluency (Balula et al., 2020; Khan et al., 2019), which are difficult to cultivate in traditional classrooms. In addition, apps provide real-time feedback on pronunciation, intonation, and fluency, and this allows language teachers to identify areas for improvement by analyzing learners' speech against native models (Imelda et al., 2019; Kassem, 2018; Mauricio & Genuino, 2020), and also contributes to enhance students' oral production skills (Kusmaryani et al., 2019; Darmawati, 2018). Furthermore, virtual agents and conversational Artificial Intelligence facilitate simulated dialogues, promoting spontaneous communication and pragmatic proficiency (Ermağan, 2021). These interactive interlocutors are also capable of adapting responses based on learner input, mimicking genuine conversations and allowing practice of pragmatic strategies (Ermağan, 2021; Gao, 2021).

2.5. Fostering learner autonomy and cultural immersion

MALL has the potential to promote learner's autonomy and self-regulated learning through mobile learning analytics, intelligent tutoring systems, and data-driven methods (Gonulal, 2019; Chen & Lin, 2018). These approaches enable personalized feedback, tailored learning paths, and metacognitive development by providing comprehensive performance data and progress reports (Imamyartha et al., 2022). Additionally, the multimedia functionalities of mobile devices offer novel opportunities for situating language acquisition in genuine cultural contexts through Augmented Reality (AR) and Virtual Reality (VR) applications (Gao, 2021). These technologies have the power to replicate real-life situations and cultural environments, fostering intercultural communicative competence and situated learning experiences. By incorporating AR and VR, learners can immerse themselves in simulated real-world settings, enhancing the

significance and adaptability of their language skills for authentic communication in diverse social and professional settings (Hasan et al., 2022).

2.6. Challenges and considerations

Implementing MALL in higher education faces several challenges, primarily because of unequal access to mobile devices and reliable internet, which exacerbate existing educational inequalities (Sanda et al., 2021; Hasan et al., 2022). One of these deals with socioeconomic disparities which may hinder effective MALL adoption among certain student groups (Xu, 2020), and the deep understanding educators must possess about instructional design, learner needs, and technological capabilities, and be adept at curating and generating high-quality digital learning materials (Dağdeler & Demiröz, 2022; Jiang & Liou, 2022). Additionally, successful MALL integration demands substantial educator training in digital literacy and pedagogical skills to create engaging mobile learning experiences (Khan et al., 2019). The rapid evolution of technology and mobile applications presents ongoing challenges for curriculum development and resource curation, requiring educators to continuously assess the pedagogical validity and suitability of new technologies to ensure alignment with established language learning principles and objectives (Yassin & Abugohar, 2022; Kukulska-Hulme & Viberg, 2018).

3. Research questions (RQs)

The significance of formulating clear and specific research questions in a systematic review cannot be overstated, as they determine the study's scope, focus, and the aim. The research questions need to be aligned with the overall aim and facilitate a comprehensive exploration of the topic. In this review, the researchers identified three central research questions concerning the effects, educational implications, and obstacles of integrating MALL into EFL education. In line with the research aim of this study, the following three research questions (RQs) are addressed in this review.

RQ1. How do MALL applications support EFL teaching and learning in higher education institutions?

RQ2. To what extent does the MALL impact EFL teaching and learning in higher education institutions?

RQ3. What are the barriers and challenges in integrating MALL into EFL teaching and learning?

4. Methods

The methodological approach employed in this study aligns to conduct a systematic review to explore the influence of MALL on pedagogical practices, student outcomes, and institutional policies within the context of English language education. Drawing on established guidelines for systematic review research (Page et al., 2021), including those outlined by Hernández-Sampieri and Mendoza (2020), this study follows rigorous procedures to analyze previous literature systematically. By synthesizing empirical evidence, this review aims to address specific research questions and provide insights into the impact of MALL across diverse educational settings globally. The methodological framework encompasses various stages, including the research questions, literature search using clear and systematic strategies, the selection of relevant research

articles based on predefined inclusion and exclusion criteria, data extraction, and the synthesis of findings to identify patterns, gaps, and inconsistencies in the literature.

4.1. Literature search

To ensure a comprehensive review of the literature pertaining to the topic, a systematic search was performed across four prominent databases: ERIC, Mendeley, Redalyc, and ScienceDirect. Furthermore, to capture the latest developments in the field, the review selected the studies published from 2018 to 2022. The process of the literature search is illustrated below (Hernández-Sampieri & Mendoza, 2020).

4.1.1. Establishing the research focus

The initial and vital step involves clearly defining and expressing the principal aim of the systematic literature review on MALL, and its impact on English language instruction and acquisition in higher education environments. The researchers generated a compilation of search terms by focusing on the research topic and engaging in a brainstorming process. These terms may include MALL-related terms such as “mobile-assisted language learning,” “mobile learning,” and “m-learning,” as well as terms related to English language teaching and learning in higher education, such as “English language teaching in higher education”, “English language learning in higher education”, “language acquisition in higher education”, and “language education in higher education”. To illustrate, we can see the combination of search descriptors and Boolean operators (“mobile-assisted language learning” OR “mobile learning” OR “m-learning”) AND (“English language teaching in higher education” OR “English language learning in higher education” OR “language acquisition in higher education” OR “language education in higher education”) (“mobile-assisted language learning” OR “mobile learning” OR “m-learning”) AND “English” AND “higher education”.

4.1.2. Conducting a literature review

The researchers scrutinized previously published works on MALL and English language instruction to discover any supplementary relevant terminology employed in prior studies. This method helped to ensure that the search terms are comprehensive and encompass a diverse array of pertinent literature.

4.1.3. Refining search terms

The researchers refine the list of potential search terms, ensuring that they are specific enough to encompass relevant literature while avoiding the exclusion of potentially significant studies. As an illustration, the researchers in this study opted to employ the term “MALL” as an umbrella term for mobile-assisted language learning, as opposed to narrower terms such as “m-learning” or “mobile learning”.

4.1.4. Testing search terms

To prepare for the literature search, it was necessary for the researchers to conduct preliminary searches in academic databases to assess the effectiveness of the selected search terms. This process aided in the identification of problems related to the search terms and enables necessary modifications.

4.1.5. Completing the search strategy

After refining and testing the search terms, the researchers completed the search strategy. This included selecting the databases to search, establishing inclusion and exclusion criteria, and applying any additional search filters or limits.

4.1.6. Conducting literature search

Employing the completed search strategy, the researchers performed an extensive literature search on designated databases to retrieve pertinent studies on MALL and its impact on English language teaching and learning in higher education.

4.2. Inclusion and exclusion criteria

Once the search results were obtained, the researchers evaluated the studies using predetermined inclusion and exclusion criteria to identify the relevant studies to include in the systematic literature review. Through the systematic application of defined inclusion and exclusion criteria, the initial literature search results were filtered and the final collection of studies for analysis was refined. In order to guarantee the review of only the highest quality and most relevant evidence, the development of these criteria also considered the feasibility of the study. The established criteria are presented in Table 1.

Table 1
Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Year of publication	2018 – 2022	Before 2018
Title	Corresponds to the topic	Not applicable
Aim	Mention the object of study	No mention of the object of study
Type of study	Empirical	Non-empirical
Language	English	Non-English
Context of the study	EFL/ESL	Non-EFL/ESL
Quality	Indexed and recognized databases	Non-indexed and non-recognised databases

During the initial search across four databases: ERIC, Mendeley, Redalyc, and ScienceDirect - using targeted keywords and Boolean operators related to MALL in higher education English language teaching and learning, a total of 1,257,024 outcomes were obtained. Nonetheless, the initial search was comprehensive and needed further refinement by applying specific inclusion and exclusion criteria. Through implementing a search strategy involving targeted keywords and Boolean operators, a grand total of 2,535 potentially relevant titles and abstracts were identified. A total of 765 studies were identified through the ERIC database, with an additional 619 studies from the Mendeley database. Furthermore, 578 articles were discovered through Redalyc, and ScienceDirect yielded 573 studies.

To refine the search results, the researchers only examined peer-reviewed journal articles, disregarding conference proceedings, reviews, and duplicate entries. A grand total of 987 original studies were generated through this filtering process. Following this, the authors implemented an additional criterion of including only studies written in English, resulting in a reduction of the total number of studies to 398. After evaluating the pertinence of these 398 studies to the research subject, 176 articles were suitable

because of their titles and aims aligning with the focus of the study, which was MALL in higher education, English language teaching and learning. Ultimately, a decision was made by the researchers to exclusively consider open-access journals and subsequently implement the remaining inclusion and exclusion criteria, as specified in Table 1. Following the application of these stringent criteria, the sample size was narrowed down to 51 studies, constituting the definitive set of empirical studies incorporated in the systematic literature review.

4.3. PRISMA model

The method employed in the current systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (Page et al., 2021). The PRISMA guidelines offer guidance for performing transparent, comprehensive, and replicable systematic reviews and meta-analyses. Using the PRISMA flow diagram (see Fig. 1), identifying, screening, and selecting eligible studies at each stage was systematically documented and reported. By explicitly accounting for all considered studies and providing transparent reasons for inclusion/exclusion decisions, this approach effectively minimizes reporting bias. The adherence to PRISMA standards contributes to the enhancement of rigor, reproducibility, and eventual credibility of findings in systematic reviews.

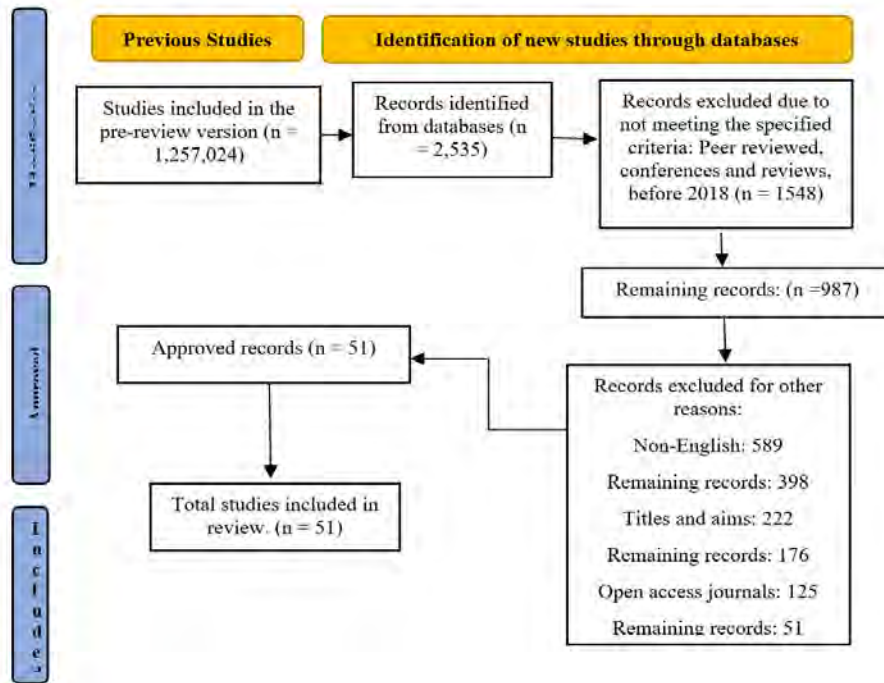


Fig. 1. PRISMA diagram

4.3.1. Coding and analysis

A standardized coding strategy, developed beforehand, was employed to ensure consistent data extraction from the included studies by all reviewers. The coding

framework was deductively constructed to align with the research questions, ensuring that the extracted data directly addressed the review's objectives while allowing for the identification of additional themes through an inductive approach. Details extracted from each study included publication information, study context (region, country, education level), participant characteristics, MALL technology and implementation approach, MALL application functionalities (vocabulary learning, grammar practice, listening skills, speaking skills, writing skills, translation, multimodal learning, formative assessment, collaborative learning, and autonomous learning), research design and methods, and significant findings related to MALL's impacts, pedagogical implications, and barriers/challenges in English language education contexts.

To ensure consistent application, two reviewers independently applied this framework to code all studies, conducting a thorough comparison of the results. Any discrepancies were addressed through discussion or, if required, by seeking input from a third reviewer. As a result, the application of this meticulous coding method has heightened the accuracy of the extracted data (Page et al., 2021; Hernández-Sampieri & Mendoza, 2020).

5. Results

The selected 51 studies varied significantly in the number of participants, from 6 to 665 students (Mean = 203; SD = 237), including 80 in the UAE, 598 in Saudi Arabia, 40 in Iran, 379 in Turkey, and 118 in Colombia. These studies spanned countries such as the UAE, Saudi Arabia, Iran, Taiwan, Egypt, Georgia, Turkey, Indonesia, China, Kuwait, Thailand, and Colombia, with China having the highest number of studies, 11 in total.

The systematic literature review incorporated a range of empirical study designs, including controlled and non-controlled experiments, case studies, surveys, and mixed-method approaches. Controlled experimental studies offer compelling evidence on the efficacy of MALL interventions in English language instruction, whereas non-controlled experimental studies shed light on practical implementation and associated difficulties. Additionally, case studies, surveys, and mixed-methods research provide valuable insights and comprehensive analyses of the experiences, perceptions, and attitudes of students and instructors towards MALL. These studies also examine the various factors that impact the successful incorporation of mobile technologies in language learning settings.

These studies employed diverse methodologies, encompassing variations in sample size, intervention duration, targeted language skills, learner's competence levels, and learning focus. Several studies employed a combination of methods (Darsih & Asikin, 2020), (Tra, 2020), while others only utilized quantitative (Hu & Du, 2022), or qualitative approaches (Zubenko et al., 2022) (Walsh, 2021). The range of sample sizes encompassed small-scale studies with fewer than 10 participants (Walsh, 2021) and larger studies with over 100 participants (Hu & Du, 2022), (Zubenko et al., 2022). The lengths of the interventions ranged from a few weeks to several months (Al-Ahdal & Alharbi, 2021).

The main findings of the review show that MALL applications have a significant impact on enhancing proficiency in the English language. Yassin and Abugohar (2022) demonstrated improvements in listening, vocabulary, and grammar skills through apps like Kahoot! and Quizizz. Ghorbani and Ebadi (2019) found that using Telegram improved grammatical accuracy and fostered positive perceptions towards MALL. Jiang

and Liou (2022) highlighted the effectiveness of mobile vocabulary units with in-class writing, enhancing vocabulary retention and collaborative learning.

Furthermore, these studies underscore the functionalities of MALL in fostering active interaction, offering immediate feedback, and facilitating collaboration. In addition, readers, researchers, educators and policymakers can derive new ideas about transforming traditional language learning methods through MALL. Incorporating gamified elements and structured peer interactions significantly enhances engagement and outcomes. Yassin and Abugohar (2022) utilized gamified apps to improve language proficiency and motivation. Kassem (2018) emphasized that well-trained teachers using targeted mobile applications could boost vocabulary acquisition. These insights advocate for a blended learning approach, integrating MALL tools with traditional instruction to maximize technology-enhanced language learning.

***RQ1.** How do MALL applications support EFL teaching and learning in higher education institutions?*

Mobile-Assisted Language Learning (MALL) applications offer an array of functionalities aimed at improving different facets of language acquisition. The present analysis compiles and categorizes the reported functionalities of MALL applications from a selection of academic articles, while also assessing their frequency of occurrence. The functionalities of MALL applications can be broadly classified into distinct types, each contributing uniquely to language learning. Table 2 presents the functionalities and their corresponding frequencies, as observed in the selected articles.

Table 2
Functionalities of MALL applications

Functionality	Description	Frequency
Vocabulary Learning	Applications focusing on vocabulary acquisition, often through flashcards, quizzes, and games	5
Grammar Practice	Tools providing exercises and feedback on grammatical accuracy	3
Listening Skills	Resources offering listening practice through audio materials and interactive listening tasks	2
Speaking Skills	Applications facilitating spoken language practice via voice recording and playback features	3
Writing Skills	Platforms that support writing practice, including collaborative writing and feedback mechanisms	2
Translation	Tools that assist in translating text between languages	2
Multimodal Learning	Applications incorporating various modes (text, audio, video) to enhance learning	3
Formative Assessment	Apps designed to provide formative feedback and assessments	2
Collaborative Learning	Features that enable pair or group work, fostering peer interaction and collaborative learning	2
Autonomous Learning	Applications supporting self-directed learning activities	3

The most commonly cited feature is vocabulary acquisition, which centers on improving learners’ vocabulary by utilizing diverse interactive techniques (Al-Shehab, 2020; Jiang & Liou, 2022; Kassem, 2018; Korlu & Mede, 2018; Yassin & Abugohar, 2022). Hence, grammar practice is also emphasized in several applications, reflecting the importance of grammatical accuracy in English language proficiency (Ghorbani & Ebadi, 2019; Korlu & Mede, 2018; Jiang & Liou, 2022). Although less common, some

applications offer robust listening practice resources (Yassin & Abugohar, 2022; Korlu & Mede, 2018).

Thus, speaking practice is facilitated through voice recording and playback, helping learners improve their spoken language (Ghorbani & Ebadi, 2019; Korlu & Mede, 2018). Furthermore, writing support features are included in some applications, promoting better writing through practice and feedback (Al-Shehab, 2020; Pingmuang & Koraneekij, 2022). In addition, translation tools are integrated into a few applications, aiding learners in understanding and utilizing new languages, particularly the English language (Zhang & Pérez-Paredes, 2021). Applying various media forms is a significant feature in several applications, enhancing the learning experience (Korlu & Mede, 2018; Loewen et al., 2019). Applications providing formative feedback and assessments are noted, supporting continuous learning and improvement (Yassin & Abugohar, 2022; Zhang & Pérez-Paredes, 2021). Some applications include features that promote peer interaction and collaborative learning (Jiang & Liou, 2022; Zhang & Pérez-Paredes, 2021). Additionally, there are applications that support self-directed learning, allowing learners to engage in personalized learning activities.

In summary, MALL applications offer various functionalities, with vocabulary acquisition and grammar practice being the most notable. By including features like listening and speaking practice, writing support, translation tools, multimodal learning resources, formative assessments, and collaborative learning, MALL applications provide a comprehensive learning experience. As a result, they play a crucial role in modern language education by facilitating the overall linguistic growth of learners.

RQ2. To what extent does the MALL impact EFL teaching and learning in higher education institutions?

The presented research examines the impact of MALL on English language teaching and learning, specifically in higher education settings. The primary areas of focus include the perceptions and experiences of students regarding MALL. Darsih and Asikin (2020) explored the perceptions of EFL learners in Saudi Arabia toward using mobile applications for language learning. The study found that the students showed positive attitudes, suggesting MALL's potential positive impact. Similarly, Chaikovska and Zbaravska (2020) investigated Saudi EFL learners' perceptions regarding MALL's effect on improving motivation and found that students viewed it as beneficial.

Another significant aspect that is addressed is the impact of MALL on specific language skills and proficiencies. Regarding the targeted language skills, several studies focused on vocabulary acquisition (Chaikovska & Zbaravska, 2020), (Al-Ahdal & Alharbi, 2021), (Chaikovska & Zbaravska, 2020), (Zubenko et al., 2022), while others concentrated on broader language proficiency (Hu & Du, 2022), (Bakan et al., 2022), (Sun & Gao, 2020) or specific skills such as listening and speaking (Chien & Valcke, 2020), (Phetsut & Waemusa, 2022), (Xu, 2020). The learner's competence levels ranged from beginner (Gamlo, 2019) to intermediate (Al-Ahdal & Alharbi, 2021) and advanced (Bakan et al., 2022) levels.

Multiple studies have examined the impact of MALL on vocabulary acquisition. To illustrate, a study undertaken in Saudi Arabia by Al-Ahdal and Alharbi (2021) and another one conducted in Taiwan by Daly (2022) both yielded evidence of enhancement in this field. The research conducted by Phetsut and Waemusa (2022) analyzed the impact of MALL in Thailand and revealed a positive association between MALL and the enhancement of oral accuracy among EFL learners. In addition, the literature investigates the connections between MALL and different factors. These factors include motivation,

readiness for self-directed learning, and autonomy. These findings are consistent with a study conducted by Li and Park (2019). Their study explored the effects of MALL on motivation and self-directed learning readiness in Korean EFL learners.

The findings of the study conducted by Walsh (2021) show that MALL can effectively create an interactive, motivating, differentiated, authentic, and autonomous learning environment, potentially exceeding the benefits offered by traditional material sources. Similarly, it was found by Phetsut and Waemusa (2022) that an intervention based on MALL led to a significant improvement in the oral accuracy of Thai English as a Foreign Language (EFL) learners. In addition, Chaikovska and Zbaravska (2020) observed enhanced vocabulary acquisition in Ukrainian undergraduate students after implementing a MALL application, Quizlet, and a spaced repetition method.

RQ3. *What are the barriers and challenges for integrating MALL into the teaching and learning of this foreign language?*

Incorporating MALL into English language instruction has attracted considerable interest because of the widespread use of mobile devices and their capacity to improve language acquisition. Nevertheless, numerous studies have identified multiple obstacles and difficulties that hinder the successful implementation of MALL in educational environments. This systematic literature review presents a synthesis of multiple studies, explaining the primary challenges faced in integrating MALL for English language teaching and learning. Integrating MALL into English language education poses various barriers and challenges, as outlined in Table 3, based on the reviewed studies.

Table 3
Major barriers and challenges of MALL integration into ELTL

Study	Major Barriers and Challenges
Chen and Lin (2018)	Learners’ attitudes and preferences significantly impact the effectiveness of MALL tools.
Sato et al. (2020)	Learner autonomy and effective utilization of mobile technologies for vocabulary recall remain challenging.
Gao and Shen (2021)	Cultural and contextual factors influence students’ engagement with MALL tools.
Van Vo and Thuy Vo (2020)	Resistance from teachers due to lack of training and perceived pedagogical value.
Chaya and Inpin (2020)	Technological constraints and access issues in resource-limited contexts.
Alamri (2021)	Technical difficulties, lack of institutional support, and resistance to change among instructors.
Guo (2022)	Institutional barriers and infrastructural limitations constrain implementation.
Fan (2019)	Cultural differences and language proficiency levels influence engagement with MALL.
Dağdeler and Demiröz (2022)	Pedagogical concerns, technical challenges, and institutional support issues.
Bozorgian (2018)	Limited access to technology, privacy and security concerns, and cultural factors.
Imamyartha et al. (2022)	Privacy issues and distractions when using mobile messaging platforms.
Hoang et al. (2022)	Perceived usefulness, ease of use, and social influences affect adoption of MALL tools.
Lu et al. (2022)	User’s experience factors significantly influence satisfaction and engagement with MALL.
Haron and Kasuma (2022)	Need for teacher support in scaffolding learning activities and providing timely feedback.

Technical Barriers. A challenge that has been consistently emphasized in multiple studies (Gao & Shen, 2021; Alamri, 2021; Dağdeler & Demiröz, 2022; Bozorgian, 2018) relates to technical constraints, such as insufficient internet connectivity, limited mobile device battery life, and a scarcity of online resources and technical help. As an example, Dağdeler and Demiröz (2022) observed that users of MALL encountered obstacles arising from unreliable internet connections and battery limitations, impeding the smooth

execution of mobile learning tasks. In a similar manner, the absence of online tools and resources was identified by Bozorgian (2018) as a notable obstacle in implementing MALL instruction within the Iranian EFL environment.

Pedagogical Challenges. Several studies (Chen & Lin, 2018; Dağdeler & Demiröz, 2022) have emphasized the challenge of developing pedagogical designs that can effectively capitalize on the distinctive capabilities of mobile devices, such as their portability and widespread availability. As an illustration, Chen and Lin (2018) expressed his disappointment in the absence of a pedagogical framework that effectively aligns with the versatile capabilities of mobile devices and leverages their functionalities. Moreover, the challenge of dedicating significant time to create content specifically for mobile learning platforms is acknowledged (Yufrizal, 2021), which may discourage instructors from embracing MALL approaches.

Teacher Competency and Readiness. Several studies (Dağdeler & Demiröz, 2022; Bozorgian, 2018) underscored teachers' lack of knowledge and digital literacy skills have been recognized as obstacles to the effective adoption of MALL. The study conducted by Dağdeler and Demiröz (2022) revealed that inadequate digital literacy among educators presented a hurdle to the successful implementation of MALL in higher education. In a similar vein, Bozorgian (2018) recognized that teachers' inadequate familiarity with online instruction served as a substantial hindrance to incorporating MALL into the Iranian EFL context.

Student Readiness and Attitudes. While some studies reported positive student attitudes towards MALL (Imamyartha et al., 2022; Van Vo & Thuy Vo, 2020), others (Alamri, 2021) identified negative student attitudes as a barrier. For instance, Alamri (2021) highlighted that students' attitudes towards using technology were among the challenges that hindered or prevented teachers from applying technology in ESL (English as a Second Language) writing classrooms. Additionally, the authors Dağdeler and Demiröz (2022) recognized limited digital literacy among students as a significant hurdle in the successful execution of MALL.

Infrastructure and Resource Limitations. Besides technical constraints, certain studies (Alamri, 2021; Bozorgian, 2018) have highlighted the limited availability of computers and other devices as a hindrance to implementing MALL. Alamri (2021) specifically pointed out the shortage of computers and other devices as a difficulty confronted by ESL writing educators when incorporating technology into their instructional settings. The limited availability of resources can hinder the widespread implementation of mobile learning methods, especially in educational settings with limited resources.

In summary, integrating MALL into the teaching and learning of the English language faces multifaceted challenges spanning technical, pedagogical, teacher competency, student readiness, and infrastructural domains. Addressing these barriers through targeted interventions, professional development, resource allocation, and policy reforms is crucial for leveraging the potential of mobile technologies in language education.

6. Discussion

The systematic review has scrutinized the effects of MALL on English language instruction and acquisition in higher education establishments. The findings underscore the wide range of potential applications of MALL in enhancing multiple facets of language acquisition, encompassing speaking, writing, vocabulary, grammar, and

collaborative learning. Several studies have extensively documented the positive views of both students and instructors regarding the integration of MALL. This integration is recognized for its ability to generate interactive, personalized, and authentic language learning experiences (Darsih & Asikin, 2020; Chaikovska & Zbaravska, 2020; Walsh, 2021).

The synthesis of the selected studies showcases the various functionalities available through MALL applications, encompassing vocabulary acquisition tools, grammar practice exercises, listening resources, speaking practice modules, and writing support features (Al-Shehab, 2020; Ghorbani & Ebadi, 2019; Jiang & Liou, 2022; Kassem, 2018; Yassin & Abugohar, 2022). These functionalities have been shown to significantly enhance specific language skills, such as oral fluency, written accuracy, and vocabulary retention (Al-Ahdal & Alharbi, 2021; Daly, 2022; Phetsut & Waemusa, 2022). Furthermore, applications utilized in MALL promote active participation, prompt feedback, and collaborative learning prospects, thereby aligning with modern pedagogical approaches that prioritize learner-centric and interactive educational settings.

Despite the positive effects, the review emphasizes various obstacles linked to incorporating MALL into English language instruction. Significant obstacles have been identified, including technical limitations such as unreliable internet connectivity, limited device battery life, and a shortage of online resources and technical assistance (Dağdeler & Demiröz, 2022; Gao & Shen, 2021; Bozorgian, 2018). In addition, there have been raised pedagogical concerns regarding the effective alignment of MALL activities with established language learning principles and objectives (Chen & Lin, 2018; Dağdeler & Demiröz, 2022). Furthermore, the review emphasizes the necessity of ongoing professional development and training for educators and learners alike, to enhance their digital literacy skills and promote the effective utilization of resources in MALL (Dağdeler & Demiröz, 2022; Bozorgian, 2018). Disparities in access to mobile devices and reliable internet connectivity, together with differing levels of technological preparedness among educational institutions, possess the potential to further compound preexisting educational inequalities (Alamri, 2021; Bozorgian, 2018; Criollo-C et al., 2022).

To sum up, the systematic review provides a thorough examination of how MALL impacts English language teaching and learning in higher education, offering a comprehensive analysis. Although there are numerous benefits and positive impacts associated with MALL, it is important to acknowledge the challenges that need to be addressed to successfully integrate it into educational settings. By implementing targeted interventions, providing professional development opportunities, allocating necessary resources, and implementing policy reforms, educators, learners, and researchers can work together to effectively implement MALL. This collaborative effort will ultimately lead to the promotion of language competence, motivation, and lifelong learning in the digital age.

7. Limitations

Although the current systematic review offers valuable insights into incorporating MALL into higher education English language teaching and learning, it is crucial to acknowledge specific limitations and suggest recommendations for future research and pedagogical approaches. One constraint of this review is its dependence on a few studies, which may not represent the entirety of MALL research in higher education settings. Future researchers ought to contemplate broadening the extent of their literature inquiries

to encompass a more extensive array of studies incorporating diverse contexts and methodological approaches. Furthermore, the review predominantly concentrates on incorporating MALL into the realm of English language acquisition, potentially restricting the applicability of the results to different language learning settings. Future research endeavors should dedicate attention to assessing the viability of MALL to acquire new languages, while also exploring any potential variations in its efficacy across different languages.

Moreover, most of the studies that were reviewed utilized quantitative or mixed-methods methodologies, underscoring the necessity for additional qualitative research to attain a more comprehensive comprehension of the lived experiences and perspectives of MALL users, encompassing students, educators, and other relevant parties. By leveraging these high-quality insights, it becomes possible to create and implement customized MALL interventions that cater to the unique demands of educational environments and learners.

8. Conclusion

This current review provides a thorough analysis of the applications and implications of MALL in the higher education setting, particularly within the context of English language teaching and learning. The synthesized findings from the selected studies highlight the significant potential of MALL in enhancing multiple facets of language acquisition, such as vocabulary development, grammatical proficiency, listening and speaking skills, as well as writing abilities. Beyond that, it also fosters learners' motivation, engagement, and autonomy. However, the review also sheds light on the intricate hurdles that must be overcome for a successful execution, encompassing technical obstacles, pedagogical considerations, the necessity of extensive teacher training, student preparedness, and institutional support factors. In the future, this systematic review might emphasize on the need for ongoing research, innovation, and interdisciplinary collaboration to further investigate the changing nature of MALL. This will ultimately promote language proficiency, digital literacy, and lifelong learning among students in the digital era.

Author Statement

The authors declare that there is no conflict of interest.

ORCID

Julio Antonio Álvarez Martínez  <https://orcid.org/0000-0001-9481-7422>

Juan Fernando Gómez  <https://orcid.org/0000-0003-1004-6793>

Juan Carlos Restrepo Botero  <https://orcid.org/0000-0002-0879-1148>

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