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Exploring Mobile-Assisted Language Learning

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Abstract
This independent study explores and establishes a synthesized overview of Mobile-Assisted Language Learning as a definitive medium of language acquisition in the digital age. This thematic paper aims to explore the following:1) The theoretical frameworks that inform the pedagogy of MALL 2) examine the characteristics of MALL, 3) the attitudes towards MALL, and 4) the challenges of MALL implementation in the context of higher education. This independent study used a literature review to explore the aforementioned research goals and found the following. The theoretical frameworks that inform the pedagogy of MALL are the Constructivist Theory, wherein educators play the role of an active facilitator of learning, while learners take on constructing active knowledge through their volition. Characteristics of MALL were informed via the Tripartite Model of Attitudes, which explored attitude formation, alongside the Technology Acceptance Model, which examines how users interact with and adopt new technologies. It was found that attitudes towards MALL have been positive, but some concerns have arisen towards its effectiveness, especially in educational contexts lacking certain resources. From the classroom level to the institutional level, MALL has received a broad range of support but is met with significant obstacles that prevent equitable implementation. Students' inability to obtain a MALL-based device, internet connectivity, and the lack of appropriate teacher training present a barrier to full acceptance. MALL-based education should account for different languages, writing systems, and cultural contexts. Furthermore, new technologies have led to concerns with data protection, privacy, ethics, and transparency. Data protection laws need to be codified to ensure data collection fully complies with ethical standards. Crucially, it must be noted that the biases of Large Language Models and AI-based learning systems can be traced back to the datasets they use. This paper finds that utilizing datasets that do not account for diverse linguistic backgrounds may lead to unfair assumptions in a model's output. In turn, this exacerbates inequalities for users that do not belong to the linguistic majority.

Keywords: Attitudes, MALL, Mobile Assisted Language Learning, International University, International Students

Theoretical Frameworks

Mobile Assisted Language Learning is a medium of instruction supporting language acquisition beyond a traditional classroom setting. One of its primary characteristics is portability, which is demonstrable through the ability by students to access classroom materials at anytime and anywhere. Kukulska-Hulme & Shield (2008) observed that initially, MALL was used to deliver content to learners, with some commonly cited formats including vocabulary lists and quizzes. However, it must be noted that new developments in language learning have revealed a strong need for activities that include a combination of interactivity and collaboration, specifically in areas of language learning that involve practicing speaking and listening.

Presently, creating and implementing these activities in a MALL-based context is a major challenge that affects both formal and informal learning. Kukulska-Hulme & Shield (2008) note that key concerns include user engagement as well as effective integration of technology to support language learners. The authors observed during their research that the mobility provided by mobile devices has proven to enhance motivation by enabling students to retain more control over their language learning journey and building community despite geographical separation. Currently, the trajectory of MALL is presently is moving towards social, interactive, and learner-centric features. Nevertheless, each of these proposed features presents challenges within a pedagogical and technological context.

This article establishes a synthesized overview of MALL that explores the pedagogical essence of MALL, the characteristics that define MALL, the advantages of MALL, attitudes towards MALL, and the challenges that MALL faces from a higher educational context.

This paper positions the Constructivist Theory as one of the primary theoretical frameworks necessary for analyzing the pedagogy of MALL. Szabo and Csépés (2022) explore its efficacy in their own thematic paper, which examines this from the context of digital learning environments. This exploration by the authors highlight constructivism's emphasis on the active creation of knowledge through the efforts of learners, which contrasts with passively receiving information. This type of approach is representative of a move from the familiar teacher-centered methodologies and into a learner-focused approach. The characteristics of this approach also emphasize inquiry-based learning, wherein students are encouraged to inquire, ask questions, and develop an understanding by engaging with meaningful contexts. Szabó and Csépés (2022) also viewed their thematic paper alongside a model known as the Technology Acceptance Model (TAM), which measures how people interact with and adopt technology, as well as Communicative Language Theory (CLT).

The authors emphasized that meaningful experiences are best supported by real life experiences and contexts, citing Bax (2003, as cited in Szabó and Csépés, 2022), who advocates for context-based approaches that account for situational factors to enhance language learning. Integration of CALL, TELL, and MALL facilitates the Constructivist approach via student-centered platforms promoting autonomy, real-world relevance, and interactivity.

Nevertheless, the authors point to the limited empirical research on the effectiveness of these digital tools from a constructivist framework and advise further studies be conducted.

While Constructivism emphasizes the observation of emerging learner behaviors, the following theory, known as the Technology Acceptance Model (TAM), explores and predicts whether people will adapt a form of technology. This model was originally conceptualized by Fred Davis (1989) and served as the basis of a modified TAM created by Kim and Lee (2016). The original TAM had two components: Perceived Usefulness (PU) and Perceived Ease of Use (PE), which together measured how useful a person thought a new technology system was and whether it was easy to familiarize themselves with it without requiring extensive training. It was noted by the authors that both PU and PE were ultimately influenced by external factors that affected a person's overall intentionality. TAM is contrasted by the Unified Theory of Acceptance and Use of Technology (UTAUT), which was explored by Al Arif et al. (2022). Whereas TAM used only two variables for predicting technology acceptance, the UTAUT made use of four. Performance Expectancy (PE) and Effort Expectancy (EE) had a notable overlap with TAM's Perceived Usefulness (PU) and Perceived Ease of Use (PE). Al Arif et al. (2022) explained that PE is a variable that examines a user's degrees of belief in a new system ,and in particular, how that system helps them achieve their performance-based goals. Meanwhile, Effort Expectancy (EE) examined if a user found the new system convenient to use, which is a major factor to adopting new forms of technology. UTAUT's similarities with TAM end here, and it instead introduces two new variables for its predictions. A social factor, which is covered by Social Influence (SI), and Facilitating Conditions (FC). The authors explain that SI examined how a person's social circle could be a crucial factor into influencing and ultimately convincing them to adopt a new form of technology. This is somewhat complemented by FC, which examines support for a new technology at both the organizational and the infrastructural level. Together, all four variables provide a degree of depth predictions compared to the two factors used by TAM.

Computer-Assisted Language Learning is the next theoretical framework, which is a crucial part of MALL's history. Mirani et al. (2019) explored CALL in their study and were able to explain three distinct periods, and the key characteristics that defined them. For instance, the CALL used during the 1950s and 1970s had behaviorist influences, establishing the relationship of computers as a tutor in learning. The activity systems used by CALL at this time were focused drills, vocabulary and grammar, as well as text translation. In contrast, the CALL of the 1980s transitioned into what Mirani et al. (2019) refer to as "Communicative CALL." The role of CALL shifted into that of a motivational agent for activities pertaining to writing and conversation, as well as games and promoting critical thinking.

Once again, the authors followed the evolution of CALL into the 21st Century, where it shifted focus into what they refer to as "Interactive CALL." Here, the focus was emphasized upon the sustainment of students and their learning technologies. The four language learning skills were emphasized: Listening, speaking, reading and writing. Mirani et al. (2019) noted that CALL of this time existed at a time when the World Wide Web and multimedia learning resources played increasingly prominent roles in the language learning space. However, CALL's challenges are similar to Mobile-Assisted Language Larning, broadly mapped out into personal, pedagogical, and technical challenges.

This theoretical exploration of MALL culminates with an examination of the Noticing Hypothesis, which establishes the suitability of certain frameworks into a digital language-learning context. Conceptualized by Richard Schmidt in 1990, this framework originated from Second Language Acquisition (SLA) and emphasizes the importance of attention and awareness in the student's learning process. Ronald P. Leow (2019) explained that at its core, the Noticing Hypothesis puts forward the notion that students possess a limited capacity in language processing and are not capable of addressing every language input they encounter. Leow (2019) further explains that learners can transform a language input into a language intake by making the conscious effort to notice a linguistic feature in their target language. He brings forth two points of consideration. Although considered to be a low-level form of awareness, noticing is important for a language intake to occur. Subsequently, its higher state of awareness, known as understanding, requires a combination of analysis and hypothesis testing. He notes that the role of understanding in language acquisition is contrasted by its facilitation of deeper language processing and learning.

This theory was subsequently applied by Kukulska-Hulme and Bull (2009) in the context of MALL, arguing for the unique suitability of mobile devices in facilitating noticing and putting forward the following methods to encourage it. Explicit recordings were the first method put forward, which is referred to as a modernized adaptation of language learning diaries. A language learner can use their device to capture examples of a language feature in the real world and on the spot, via texts and voice input. This can be further augmented by the suggested systematic tagging, a concept that entails rigorous categorization of recorded language features for students, educators, and researchers to explore and recall at a later time. Eventually, Kukulska-Hulme and Bull (2009) forward that systematic tagging would pave the way for the creation of what they refer to as an Open Language Model (OLM), which is intended to enable language learners to reflect on their language learning experiences. Once compared with an expert model, this would augment their understanding when they notice gaps in their own language learning.

Characteristics of MALL

Mobile-Assisted Language Learning (MALL) establishes a learner-centric platform promoting and facilitating independent study and access to relevant, real-world materials. This approach to language learning is affirmed by Gulati (2008); Judd & Cropper (2010); Mompean (2010); and Yang (2012), as cited in Lu (2023), who underscore that authenticity is attained through resources that bridge classroom content with real-life contexts. These include voice recordings of native speakers and related media. Personalization is another key characteristic of MALL, which (Miangah & Nezarat, 2012; Yu, 2012, as cited in Lu, 2023) state is a facilitator for learners to choose when, where, and how they desire to conduct their studies and adapt their study materials according to their academic needs.

This medium's ubiquity and portability grant a unique leverage to language learners, which Kukulska-Hulme & Shield (2007) and Ozdamli & Cavus (2011), as cited in Lu (2023), noted as elements necessary to sustain and facilitate real time access. Miangah & Nezarat (2012, as cited in Lu, 2023) observed that MALL's flexibility accommodates a diverse range of learner preferences and schedules. While Kukulska-Hulme (2010) and Nordin, Embi, &

Yunus (2010, as cited in Lu, 2023) noted that it also supported formal and informal learning, which in turn fostered lifelong learning. Collectively, these characteristics and features promote an effective form of language learning through varied and accessible experiences. This was acknowledged by Cheon, Lee, Crooks, & Song, 2012; Gilgen, 2005; Chinnery, 2006; and Kukulska-Hulme, 2010, 2012, as cited in Lu, 2023.

Kukuluska-Hulme (2013) explored mobile technologies and their impact on language, emphasizing Mobile Assisted Language Learning. She defines MALL as using mobile devices and wireless technologies as a facilitator and enabler of learning beyond a traditional classroom context and confirms that its core characteristics are its portability, accessibility, and personalization. Furthermore, social connectivity is mentioned as a key component and highlights MALL as a collaborative medium. Therefore, it can be described that MALL is an informal, active, and incidental channel for learning a language.

Kukulska-Hulme (2013) explores MALL's shift from a singular focus into acquiring language skills, noting that it has shifted into the acquisition of complementary skills such as cross-cultural communication and self-reliance. She advocates for the recognition of learner agency and informal knowledge acquisition when designing MALL-based experiences. With rapid advancements in technology, new challenges and opportunities have also arisen for language learners, which include curating their diverse selection of learning resources, adapting to wearables, and managing their online identities. The author underscores that educators and policymakers can support MALL by implementing a learner-centered approach. Authentic contexts, informal learning approaches, professional development for teachers, and promoting digital literacy for learners are among her suggestions. She concludes that a digitally literate and adaptive learner can better survive in an increasingly mobile and interconnected world.

Advantages of MALL in English Teaching

Martinez et al. (2025), documented MALL's transformation of English language learning in higher education, placing a spotlight on the following aspects in their study. Improvement of vocabulary and the four language learning components of listening and speaking, as well as reading and writing, which are critical for attaining language competency. The authors note in their findings the increased motivation of students, their overall engagement, and their independence. However, Martinez et al. (2025) noted that this method of learning faces pedagogical, technical, and institutional hurdles to proper implementation, requiring a strong support system at an institutional level and proper resource allocation. The authors point to MALL's potential to promote digital literacy and lifelong learning, arguing that it presents a strong case for continuous study and innovation.

MALL has been used to improve specific language learning aspects. In a quasi-experimental study by Phetsut and Waemusa (2022), a MALL-based intervention was conducted to improve the speaking accuracy of Thai EFL learners across 30 secondary schools in the country. Their study contained five speaking tasks implemented via WhatsApp and measured their participants' oral accuracy based on the frequency of error-free clauses they created. The study's success also included the use of structured scaffolding and helped identify effective strategies for oral accuracy. The eight steps used in their WhatsApp intervention began as simple prompts for repetition and progressed into more explicit corrections, with

students who struggled in the intervention requiring further scaffolding. Learners with advanced language skills improved through prompts.

Asynchronous learning and real-time feedback were utilized. Students had reduced speaking anxiety when tasked with submitting recordings of their voice and had the added benefit of receiving timely feedback from their teachers. However, Phetsut & Waemusa (2022) saw that there was a marked decline in student-teacher interactions during the five weeks of their study, which suggested to them that the students had attained a degree of self-reliance in their studies. Student reception to their MALL-based approach was positive, but certain strategies were favored. Text-based feedback gave students the time to review and perform corrections at their own pace, complemented by multimodal learning resources like videos, sentence examples, and pronunciation guides. It was indicated in the study that one feature the students appreciated was being able to create another recording and edit their response before submitting, which helped them reduce their anxiety. The authors note that oral feedback was the least preferred strategy. Some students found that it was difficult to use as a reference. Additionally, the structured scaffolding overwhelmed some of the students, especially when they were tasked to perform corrections multiple times. Meanwhile, internet connectivity was an occasional issue and presented a barrier for students when it was time to upload their voice recordings. The authors showcased WhatsApp's flexibility and effectiveness as a platform for learning and highlighted the preferred and least preferred methods of feedback their participants preferred.

Gamification is another characteristic of MALL explored by this paper. Pingmuang and Koranakeej (2022) introduced these gamification elements through their MALL-based app, which was designed with a task-based approach. The goal of the authors was to enhance the writing competence of lower secondary EFL students in Thailand. The authors clarified the three goals they desired to achieve:

1. Identifying the needs of learners and experiences through a survey of 665 students and five teachers.
2. Designing and developing the study's MALL application as well as writing tasks.
3. Implementing their writing-enhancement intervention on 35 selected students for eight weeks.

The entire process was conducted and achieved through a task spanning three phases: a pre-task phase, a core task-process, and a post-task. Their intervention focused on the key writing stages of topic exploration, idea drafting, theme selection, an editing task, the reviewing of submissions, and a final conclusion of their findings. Although the task faced some time management challenges, Pingmuang and Koranakeej's (2022) task was ultimately well-received and demonstrated MALL's capacity to enhance writing competencies.

Similarly, Khlaisang and Sukavatee (2023) validated MALL's utility during their study involving the language learning application MALLIE, which was used to enhance the English communication skills (ELCS) of students in higher education. This application was well received overall by their student participants, who perceived to be highly useful and easy to use. As a tool intended to facilitate language acquisition, MALLIE integrated a Facebook

messenger chatbot and an iReview webpage. The app and its associated tools focused upon interactive learning through vocabulary and grammar exercises. Additionally, the speaking and listening skills of the students were developed through creating vlogs. Khlaisang and Sukavatee (2023) illustrated the key value of technology integration in modern language education, pointing to the COVID-19 pandemic as a case study that led to a need for flexible and accessible digital solutions.

MALL's evolution has been previously addressed by Philip Hubbard and Glenn Stockwell (2013), both of whom proposed a set of ten principles acting as guidelines for the integration of mobile devices and tasks in language learning. The authors formed their ten principles by examining Computer-Assisted Language Learning (CALL), as well as Mobile Learning (ML); two fields which are related to MALL. From here, the authors drew upon their exploration of all three fields and devised a framework of principles to guide educators, students, and stakeholders.

Stockwell and Hubbard's (2013) ten principles can be broadly categorized into three areas: the physical traits of the device, the design of the pedagogy, and the implementation. The first category pertains to the nature of the device itself, which includes portability, learning on the go, social connectivity, in which the devices become tools for interaction; individualization, wherein students are empowered to personalize their learning; authenticity, where the use of real-world language is emphasized; and context sensitivity; which uses location to provide relevant learning tasks. The secondary category is concerned with the design of learner activities, and these encompass using push and pull strategies in content delivery, providing an educational scaffolding to students as they learn, and applying multi-modal content from a wide variety of formats. The final category explores the overall implementation of MALL strategies and highlights the importance of training learners, as well as giving careful consideration when implementing MALL into existing curricula. Stockwell & Hubbard (2013) conclude that their principles were conceptualized as an attempt to address MALL implementation in education, which they note is an increasingly complex matter. Furthermore, they also provide the caveat that the ten principles should be treated as points of consideration when implementing MALL in existing criteria, rather than as a full solution.

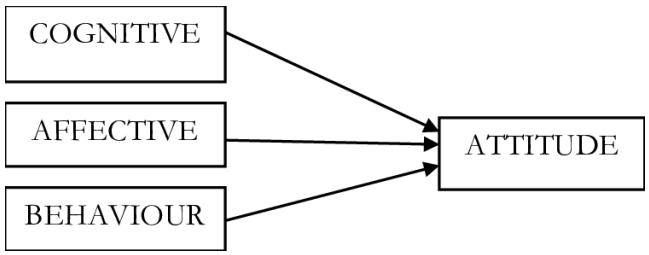
Attitudes towards MALL

The Multicomponent Framework of Attitudes was conceptualized by Haddock & Maio (2004, p. 36), which was in turn adapted from the Tripartite Model of Attitudes created by Baker (1992). The authors discussed the means to measure these categories, during which they proposed the use of tools such as Likert scales and factor analysis, while highlighting some of the challenges faced when attempting to measure attitudes. Some of these challenges include social desirability bias (in which people respond based on societal expectations rather than through their beliefs and experiences) as well as research influence.

This diagram comprises three components, and together, all three form the multicomponent framework conceptualized by the authors. The first attitudinal component is the cognitive component, which includes the beliefs and thoughts of a person about a particular

subject, such as learning a language. The second attitudinal component is the affective component, which pertains to the feelings and emotions towards this particular subject, and finally, the conative (or behavioral) component covers a person's intentions and behaviors towards that particular subject. Haddock & Maio's (2004) diagram is a framework that definitively illustrates the formation of attitudes through its three constituent parts, highlighting the dynamic interaction between these core components, and suggesting how a person's attitude can be maintained or change over time.

Figure 1 The Multicomponent Model of Attitudes (adapted from Baker, 1992)



Implementing MALL hinges upon measurable perspectives, which show the necessity of frameworks such as the Technology Acceptance Model (TAM). This model was used by Afshari et al. (2013) to investigate the attitudes of university students towards CALL implementation at the University of Malaya. The data they collected from the ten students identified key factors that influence technology acceptance. The findings revealed that students generally held a moderate attitude towards CALL, but Perceived Usefulness (PU), Perceived Ease of Use (PEU), and Subjective Norms (SN) were invaluable predictors for these attitudes. In essence, the students' perceptions of the technology's overall usefulness, its user-friendliness, combined with the social influences of their peers and instructors, ultimately determine their willingness to adopt MALL (Afshari et al., 2013).

Beyond the specified predictors, the willingness of students to adopt MALL is influenced by their access to the technology, prior experiences and motivations towards language learning. The study calls to attention that enhancing both Perceived Usefulness and Ease of Use combined with a supportive social system will create positive influence towards students' acceptance of MALL. It can be implied that effectively integrating MALL and language education requires prioritizing clear and demonstrable benefits, user-friendly learning platforms, and actively cultivating the necessary social support to increase both motivation and positive perceptions

TAM and similar are ideal frameworks for quantifying sentiments towards the introduction of new instructional mediums, further exploration must be conducted into the cultural dimension to account for a clearer picture of language learning. Mohammadi and Shirkamar (2018) address this gap in a related study, wherein their primary focus was the examination of attitudes by students and teachers across a broad range of cultural contexts within developing countries. Their goal was to explore and validate the efficacy of MALL across cultures.

Examining MALL from a cultural context, the authors expressed that MALL must be enhanced for specific aspects of language, specifically listening and speaking. Mohammedi et al. (2018) additionally suggest exploring the suitability of MALL through the writing systems of other languages, providing Arabic, Persian, and Chinese as examples. The authors investigated educational systems and cultural attitudes. Alongside individual differences and learning references, these factors were established by the authors as conditions that needed to be satisfied to implement MALL successfully.

In addition to exploring attitudes across cultural contexts, the direct applicability of MALL has been explored in Thai higher education. Anuhayong (2019) conducted a study in which his intent was to gain an understanding of the perspectives of students toward MALL-implementation at the Thai-Nichi Institute of Technology. The research conclusively found an overwhelmingly positive reception towards MALL and its related exercises. Subsequently, the student participants provided suggestions to further optimize MALL-based learning in their university, particularly the use of dictionary applications (referred to as English Mobile Dictionaries) into their learning systems. The students held the belief that integrating these applications would enhance their language learning.

Furthermore, Anuhayong (2019) determined that his student participants focused on several key aspects of language learning, namely: pronunciation, grammar, and acquiring new vocabulary. These particular aspects were seen as necessary by the students, who expressed that being able to use them in a variety of contexts as important to their language learning journey. The author's study discussed that while both students and instructors had positive sentiments towards MALL, it is important to design tasks that are user-friendly, culturally sensitive, and engaging.

Challenges of MALL Implementation

It has been established that MALL faces hurdles in its implementation from several factors. This section will explore some of these challenges faced by learners in their language learning journey, educators using MALL in their curricula, and the findings of researchers in this field.

This was explored by Jie Fang (2025) in her systematic literature review, specifically under the themes of acceptance, readiness, and challenges associated with MALL. The author examined 49 studies published between 2013 and 2022 that were selected for review and highlight the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) as key examples for understanding user acceptance and engagement. The author acknowledges that language learners and other users generally have a positive attitude towards MALL, and many possess sufficient skills and experience with mobile devices. The benefits of MALL also extend to (and include) pedagogical and psychological advantages. Reducing anxiety and promoting collaborative learning have been described as other key examples.

However, Fang (2025) has identified common challenges. Limited device access has been a consistent theme in her findings, with other concerns such as health and privacy being

mentioned. Some usability issues and other specific difficulties were discovered pertaining to practical contexts, but these roles pertain to medical and translation contexts. Drawing attention to these barriers, Fang (2025) indicates that they hindered effective implementation as well as user engagement. Consideration of diverse user needs and user-friendly designs should be prioritized, alongside a supporting infrastructure to effect the necessary changes. Addressing these challenges may enhance the overall effectiveness of MALL across educational and professional settings.

Some of the challenges explored by Fang (2025) can be found in the following study, which focuses on a Thai higher educational context. Thai higher education has placed an emphasis on integrating digital tools for English language learning. Digital learning platforms such as MALL have proven flexible and engaging, especially for promoting autonomous learning experiences. The benefits provided by these digital learning platforms are challenged by existing limitations. San-ngiamwibool & Mounggam (2025) explore these limitations via an analysis of 71 texts published from 2015-2023.

National and institutional support for digital education has grown, but the authors have noted that there is a marked disparity in the allocation of resources to support digital education. In particular, the authors found that the clarity of policies intended to facilitate this education remains inconsistent. Conversely, San-ngiamwibool & Mounggam (2025) highlighted that institutions with successful digital education policies have implemented the following actions. One of the first key policies mentioned was investment in infrastructure, which would provide the necessary support to set up and maintain these policies. Training teaching staff was also another key policy, as it enabled educators to handle digitized learning, along with inclusive policies that allowed further equity among the student body.

Nevertheless, the authors asserted a need for further clarity in institutional policies, readying the faculty, and student motivations to prepare for the use of these digital tools. Global advancements have provided significant research data, but the authors concede that research in policymaking and implementation pertaining to Thailand remains limited. San-ngiawibool & Mounggam (2025) also found other key barriers in the form of resistance to digital learning from undertrained faculty, a digital divide that affected students with a low-income background, and common issues such as internet connectivity and limited device access. The authors asserted that these challenges be addressed through professional development and policy reforms. They recommended that a coherent policy, one sensitive to contexts that align to national goals, be implemented. These will require regular evaluation and strong institutional support, as well as ethical and methodological rigor, but will require thorough documentation.

Similarly, as new technologies are developed and implemented in the classroom, new concerns have arisen in MALL, specifically in the context of artificial intelligence and AI-powered language learning tools. Increasingly used in language learning settings, Selvam & Vallejo (2025) explored these contemporary concerns in their literature review and found the following key issues. The primary issue the authors wish to tackle is algorithmic bias and fairness, explaining that these biases arise when datasets used to train an AI model overwhelmingly represent specific linguistic patterns, accents, and their cultural contexts. Not only does this lead to discrimination against what they term "underrepresented linguistic groups," but it also reinforces pre-existing educational inequalities. These concerns over biases and fairness are demonstrated by an example scenario in which an AI speech recognition tool

will struggle to process non-native accents, asserting that fairness must be ensured through continuous audits of biases and fairness-aware algorithms, which adjust their recommendations based on a varied set of linguistic profiles.

Beyond pedagogical and institutional concerns, data privacy concerns remain critical. Selvam & Vallejo (2025) explain that language learning models powered by AI collect significant amounts of sensitive user data, such as voice recordings, written responses, and logs recording user interactions. It is acknowledged that data is necessary to create a personalized learning experience, but the authors caution that security risks persist. Data breaches and unauthorized access may expose a learner's personal data, especially when stored on platforms such as the Cloud, which the authors note as being vulnerable to cyberattacks. To better protect user data, the authors suggest implementing a combination of security measures. These include continuous security audits, encryption, and authentication.

Consequently, Selvam & Vallejo (2025) highlighted that informed consent and student profiling are potential issues. When tools powered by artificial intelligence gather user data, their users may not be aware and therefore unable to provide any meaningful consent. Students may lack full awareness over how their data is handled, which includes its storage, use, and processing. This lack of full awareness extends to how their data is handled, which includes how it is stored, where and how it is used, and how it is processed.

Conclusion

To summarize, this article establishes a synthesized overview and exploration of Mobile-Assisted Language Learning. This article examined the theoretical frameworks that underpinned MALL, assessed the prevailing attitudes towards its role as a facilitator of language learning in higher education, and examined challenges to implementing MALL. Theories such as Constructivism emphasized person-to-person interactions among language learners and viewed MALL-based learning as a facilitator of this socialized learning approach. TAM and UTAUT explored and predicted how people adapted to a new technology system based on perceptional determinants. TAM's predictive basis was on perceptions, while UTAUT expanded upon its predictions by including a social and environmental factor in its approach. Similarly, MALL's contemporary issues were explored, from technical, pedagogical, and institutional concerns to recent issues arising from AI-powered language learning tools. Data privacy, informed consent, AI biases stemming from nonrepresentative datasets, and ethics can be addressed through a scaffolded institutional support system. Ultimately, the success of MALL depends less on the positive perceptions of a receptive student and educational body but requires support across the institutional, pedagogical, and technical levels.

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