

The Impact of Mobile-Assisted Language Learning (MALL) on Second Language Acquisition

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Abstract: Mobile-Assisted Language Learning (MALL) has been a vibrant area of second language acquisition (SLA), which provides flexible and anywhere access to language learning materials. This paper surveys work on the role of MALL technologies such as mobile apps, multimedia tools, and context-aware systems on learning achievement and learner autonomy. It addresses how mobility and access impact language acquisition, especially vocabulary mastery, listening skills, and motivation. The survey sheds light on the pedagogical and technological issues experienced by learners and teachers and offers insights into future avenues for incorporating MALL in formal and non-formal language learning contexts.

Keywords: Mobile-Assisted Language Learning (MALL), Second Language Acquisition, Learner Autonomy, Learning Outcomes, Educational Technology.

1. Introduction

With the passage of time, the integration of mobile technology in language instruction has revolutionized second language acquisition (SLA) dramatically. Mobile-Assisted Language Learning (MALL), an extension of the Computer-Assisted Language Learning (CALL), utilizes mobile technologies such as smartphones, tablet computers, and wearable technology to facilitate flexible, contextualized, and learner-centered language learning environments[1][2]. With the increasing pervasiveness of digital mobility, MALL provides learners with access to authentic resources, real-time communication, and personalized feedback without the spatial limitations of the traditional classroom spaces[3].

What is distinctive about MALLs compared to their forebears is their concern with the element of portability, immediacy, and learner autonomy. MALL facilitates language acquisition in diverse situations-both formal and non-formal-to allow learners to integrate learning into daily life[4]. The transformation complements the perspectives on language learning as sociocultural theory which has an interest in interaction, learner autonomy, and practice in situ[5][6].

Notwithstanding its fast popularization, research controversy still exists as to the efficacy of MALL. The depth of learning possible on mobile devices has been questioned by opponents along with the issues of digital distraction, access equity, and instructional design[7][8]. Beyond this, the real influence of MALL on learner autonomy as well as long-term achievement is still under-investigated.

This review paper aims to synthesize current theoretical and empirical research on MALL, focusing specifically on how mobility and accessibility shape learning outcomes and learner autonomy in SLA contexts. Through an interdisciplinary analysis of recent studies, this paper highlights both the affordances and limitations of MALL and provides directions for future pedagogical and technological development.

To provide a comprehensive understanding of the impact of MALL on second language acquisition, this paper is structured as follows. Section 2 reviews the main theoretical frameworks that underpin MALL-related pedagogy,

including sociocultural theory and learner autonomy. Section 3 analyses the affordances and technology of the mobile platforms enabling language learning. Section 4 reflects on how accessibility and mobility impact learner outcomes and the autonomy of the learner. Section 5 pinpoints the most significant MALL implementation issues and shortcomings. Section 6 completes the survey by underscoring future study perspectives and the educational application implications.

2. Theoretical Framework

Mobile-Assisted Language Learning (MALL) is backed by a variety of theoretical perspectives that underpin its pedagogical value. Theories like these help to explain how mobile technology has an impact on second language acquisition with respect to input exposure, learner autonomy, and context.

(1) Krashen's Input Hypothesis(1985)

Stephen Krashen's Input Hypothesis maintains that language is best acquired when learners are provided with comprehensible input that is one step above their current proficiency level (referred to as "i+1"[9]). MALL modes allow learners extensive access to authentic materials (e.g., podcasts, videos, interactive activities) that students can view with authentic contextual input in the target language. The mobile modality offers an increase in frequency and variety of input, making it a good fit in Krashen's framework. Push notifications, spaced repetition apps, and mobile-friendly reading applications offering myriad sources of educational input further support sustained exposure in diverse formats.

(2) Vygotsky's Sociocultural Theory(1978)

Lev Vygotsky's Sociocultural Theory highlights the role of social interaction and mediation in cognitive development, including language learning[5]. According to Vygotsky, everyday learning is mediated to varying degrees by social interaction. Vygotsky observes that we can learn to some extent socially simply by observing, learning can be elevated levels of performance with the help -- guidance -- of socially competent others. Such mobile learning tools as texting and messaging, collaborating programs and applications, and social networks, all provide out of abilities to foster interaction in the target language. These ways of using technology allows learners to interact synchronously with peers, tutors, or native

speakers, engaging in language development in their Zone of Proximal Development (ZPD). As such MALL provides situated and socially mediated learning experiences.

(3) Learner Autonomy(1991)

Learner autonomy, described by Little as the capacity to take responsibility for one's own learning, is an important idea in language education and is most useful when working in MALL contexts[10]. Mobile technologies allow learners autonomy by allowing them to decide when, where, and how they engage with language content. Employing self-paced lessons, learning analytics, and goal-setting capabilities encourages learners to take charge of their language-learning path. Studies have shown that mobile platforms can enable autonomy that can lead to increased motivation and self-regulation[4].

(4) Technological Pedagogical Content Knowledge (TPACK)(2006)

Mishra and Koehler's TPACK framework highlights the interrelation of technology, pedagogy, and content knowledge necessary for effective teaching in a digital space[11]. In such a MALL context, instructors and designers must thoughtfully integrate mobile tools with effective pedagogical techniques to create meaningful language content. Considering how to navigate between usability, accessibility, and instructional value is paramount in leveraging the potential of MALL on learning.

3. Technological Affordances of MALL

Mobile-Assisted Language Learning (MALL) is effective mainly for the technological affordances that mobile devices provide. Technological affordances refer to the possible actions that may be initiated with a particular technology. In the case of MALL, mobile technologies provide potential actions in language learning that are personalized, interactive, and about specific contexts. In this section we highlight some key technological affordances of MALL technologies that have pedagogical affordances.

(1) Portability and Ubiquity

Mobile devices are small and lightweight, allowing learners to learn with language resources in a variety of situations while leveraging the "anytime, anywhere" aspect of learning[1]. Mobile devices have a mobile and ubiquitous aspect that allows learners to take advantage of microlearning, or short frequent study opportunities that can accumulate into a considerable amount of language learning[3].

(2) Multimedia and Multimodal Input

Mobile platforms support a multitude of types of multimedia content, including text, audio, video and interactive simulations. Having access to multimodal input is particularly effective in second language acquisition contexts because it allows the learner to enhance comprehension and retention through dual coding and contextual supports[12]. For example, learners can engage with multimodal content inside only one application environment (e.g., a video to watching with captions, a pronunciation model to listen to, and interactive vocabulary task).

(3) Context-Awareness and Personalization

The progression of mobile sensing technologies (i.e., GPS, accelerometers) has brought forth context-aware learning, where content may be customized based on the learner's physical surroundings or the learner's embedded experience. Context-aware mobile assisted language learning (MALL) applications may present language input based on a learner's location or actions-an example of this would be context-aware

mobile applications providing travel-related vocabulary while at the airport[13]. Similarly, leveraging analytics from mobile technology now allows for the option of user paths based on the data of usage, which can encourage learner engagement, efficiency and effectiveness.

(4) Interactivity and Real-Time Feedback

Mobile applications allow for real two-way interaction between the learner and the system, often enabled by features of immediate feedback, adaptive quizzes and gamified experiences. For instance, if a learner is able to upload their pronunciation for a word, and the application allows for immediate correction, this is an advantage over traditional learning. Other possibilities would include error analysis in relation to grammar or vocabulary drill, or live peer communication in the target language (via messaging or voice chat). Mobile applications allows for enhanced learner responsiveness, thus significantly decreases the cognitive delay (and increase in cognitive load) between performance and correction[14].

(5) Social Connectivity and Collaboration

Mobile technology promotes social features, such as discussion boards, messaging, peer challenge (i.e., provide motivation and engagement) and collaborative tasks that generate interactive learning. QR codes or augmented reality features in mobile platforms can connect learners, bring learners together culturally, and across locations to learn an[15]. Collaboration is an important part of the MALL experience as it promotes meaningful communication, peer feedback, and the co-construction of knowledge.

4. Effects on Learning Outcomes and Learner Autonomy

Mobile-Assisted Language Learning (MALL) has been the focus of a large number of studies for its effectiveness on learner outcomes and the development of learner autonomy. In this section we will review the empirical research findings on how MALL impacts particular language skills, and develop self-directed learning behaviours.

(1) Vocabulary Acquisition and Retention

Many of the studies focus on the effect of mobile applications on vocabulary learning. For example, a quasi-experimental study on learners using SMS-based vocabulary instruction found that SMS learners remembered significantly more words compared to students learning traditionally in classrooms.[16]. spSRSSs, like Anki or Memrise delivered via mobile, improve long-term retention by scheduling revision for later when forgetting is optimally timed based on forgetting curves.[17]. It could be possible that multimedia flashes, gamified quizzes, and push notifications give learners repeated exposure and recall.

(2) Listening and Pronunciation Skills

Several mobile learning tools rely on audio-based materials, like podcasts, interactive dialogues and speech recognition. This could give learners a way to improve their listening comprehension and pronunciation by repeated exposure and self-monitoring. For example, learners who engaged in mobile-based extensive listening activities demonstrated a greater improvement in their comprehension than control groups.[18]. Mobile learning apps also with speech analysis provide users feedback on their accuracy phonetic errors in real time which also gave learners a way to continue practice articulations more precisely.

(3) Reading and Grammar Proficiency

Though vocabulary and listening often garner greater attention, MALL also encourages reading and grammar development. Studies have shown that learners using mobile reading applications, including graded readers, with in-text glossaries, or direct translations instantly access, achieved increased reading fluency[19]. Grammar-focused apps using gamification (e.g., Duolingo) promote repeated practice and immediate error correction, which has been linked to increased learner motivation and accuracy over time[20].

(4) Promotion of Learner Autonomy

Perhaps one of the most profound impacts of MALL is its facilitation of learner autonomy. By giving learners control over pace, time, and mode of engagement, MALL environments support self-regulated learning. Research found that university students who engaged in mobile learning outside of class developed stronger goal-setting and self-monitoring behaviors[21]. The convenience and flexibility of mobile platforms encourage learners to integrate language learning into daily life, such as during commutes or waiting periods, thus increasing exposure time and intrinsic motivation.

(5) Individual Differences and Learning Styles

MALL also accommodates diverse learner preferences. Visual learners benefit from rich graphical interfaces, auditory learners from podcasts and dictation tools, and kinesthetic learners from interactive touch-based activities. Adaptive learning systems further personalize content based on learner performance, increasing engagement and effectiveness[22].

5. Challenges and Limitations

MALL offers many strong benefits for second language acquisition, but it also presents a range of challenges. These challenges risk reducing the effectiveness and accessing levels of MALL implementation in the classroom. This section identifies the primary challenges to consider in terms of technological infrastructure, pedagogical practice, student agency, and the digital equity divide.

(1) Technical Constraints and Usability Issues

While technology has advanced at a rapid pace, many MALL platforms suffer from poor usability or limited cross-device compatibility that may lead to side-loading or unstably accessing content. The reduced graphical capabilities of low-spec mobile devices, small screen sizes, capacity to input (writing), connection issues, or battery life have harmful impacts on sustained engagement[23]. For example, in developing parts of the world or rural areas where connectivity is poor, an attempt to access materials/applications in real-time are impacted and reduced access to real-time content studying, has the effect of undermining the flexibility that was intended for the mobile learning "package".

(2) Pedagogical Misalignment

A major issue for the implementation of MALL is the pedagogically weak relationship between the instructional objectives and the features of technological devices themselves. Many mobile applications are designed around rote memorization or gamified repetition, where such use of technology does not connect to more meaningful learning; this is often occurs without any reference to the overarching curriculum[3]. In addition to not having the necessary training to select appropriate Mobile Assisted Language Learning tools, as well as time to design appropriate learning tasks, teachers often utilize MALL for superficial uses and are

unable to design for engaging activities that develop language meaningfully[24].

(3) Learner Distraction and Shallow Engagement

Mobile phones also offer a great deal of functionality, which can lead to distraction. While studying, learners may engage with social media, play games, or watch videos that have nothing to do with their studies. These distractions can language learning impact, resulting in shallow cognitive processing, and fewer learning gains[25]. Moreover, there is also a worry that learners depend on the app-based rewards (badges and leaderboards) as their primary source of motivation, which can undermine deep learning and more complex learning strategies.

(4) Digital Divide and Accessibility

While claiming to make learning more accessible, MALL is more likely to highlight existing inequality. As an example, the mobile learning of learners from lower socio-economic backgrounds may be limited by a lack of smartphones, no high-speed internet, and limited data plans[2]. In addition to that, learners with disabilities may experience a lack of interface accessibility, especially because many mobile learning apps do not include support for screen readers, captioning, or tactile input. Issues of accessibility can be resolved with adherence to universal design, otherwise MALL risks further alienating vulnerable user groups.

(5) Data Privacy and Ethical Concerns

Data collection is standard with many mobile applications, from location data to usage data and personal learning data. Language learning apps operate in a space with limited transparency to the user and little to no privacy policy, which creates opportunity for learner data to be stored, shared, or monetized[26]. Such data practices may negatively influence user trust, especially in educational contexts where ethical use of data is integral to a positive learning environment.

6. Conclusion

Mobile-Assisted Language Learning (MALL) has ushered in significant developments in second language acquisition (SLA) due to its ability to provide learners with more flexibility, accessibility and autonomy to learn. As has been characterized in earlier sections of this review, the technological affordances offered by mobile devices that stand out most in comparativism to traditionality (i.e., portability, real-time feedback and multimodal content), are most relevant and similar to established theories of second language learning and development, and have positive benefits for vocabulary, listening, and engagement learning potential in SLA. MALL also enhances learner autonomy through personal, self-pacing, self-directed, context-aware learning.

Despite this, the wide-scale acceptance of MALL is limited. Technical distance and pedagogical distance, as well as technological inequities, are all obstacles to comprehensively understanding the positive impacts of MALL. Problems associated with distraction, surface engagement, and a lack of meaningful use are further complicating more responsible and research-informed use of mobile devices in education from SLA practices and perspectives.

Future research can also explore the lasting effects of MALL on learning outcomes in varied language contexts and cultures, in addition to artificial intelligence's involvement in adaptive language learning. From a pedagogical viewpoint, focus should be shifted toward more considerable teacher training and more extensively embedding MALL into

curriculum design so that it is used more sustainably and significantly. From a policy standpoint, ongoing concern for digital access and equity must be emphasized so that representing disadvantaged learners does not receive lesser priority than the research focus.

To summarize, MALL does not offer a permanent fix for language learning, but it does serve as a highly viable complement to conventional language learning practices. When used with clear intention and purpose, MALL has the potential to improve the efficacy and inclusivity of second language learning in formal and informal environments.

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