Chabahar Maritime University
Iranian Journal of English for Academic Purposes ISSN: 2476-3187
IJEAP, 2025, 14(1), 1-26 (Previously Published under the Title: Maritime English Journal)

Enhancing L2 Reading Comprehension through Mobile-Assisted Language Learning: Short Stories in the Sayra Language Learning App

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Research Paper IJEAP- 2412-2103 DOR: 20.1001.1.24763187.2025.14.1.1.3
Received: 2024-12-31 Accepted: 2025-02-04 Published: 2025-02-23

Abstract: Mobile language learning applications have become the integral part of modern life in recent years. However, evidence on their effectiveness on L2 learning outcomes remains limited. Due to the important role of reading comprehension in the foreign language learning process, this study aims to investigate the impact of a mobile language learning app, Sayra, on Iranian EFL learners' reading comprehension. The research was conducted at Iran Language Institute in Iran. A total of 57 intermediate-level students were randomly assigned to either a treatment group (N=30) or a control group (N=27). Focusing on short story comprehension, the experimental group was trained using the Sayra Language Learning App, while the control group continued with traditional classroom instruction. Both groups underwent pre- and post-tests to assess their reading comprehension. The results obtained showed improvements in reading comprehension skill for both groups. However, the treatment group achieved significantly better results than the control group on the post-test. With respect to the students' perceptions, the students perceived Sayra's user-friendliness, gamification, and competitive nature as its benefits. These findings suggest that incorporating MALL apps, like Sayra, into language instruction can be a valuable complement to traditional methods.

Keywords: English as a Foreign Language (EFL), Mobile-assisted Language Learning (MALL), Sayra Application, Short Stories, Technology-enhanced Learning.

Introduction

In recent years, the integration of mobile applications into reading instruction has been part of a broader trend of using technology to enhance language learning, known as Mobile Assisted Language Learning (MALL). O'Malley et al. (2005) describe MALL as any form of learning that occurs when the learner is not confined to a fixed location and takes advantage of learning opportunities presented by mobile technologies. Rahimi and Miri (2014) characterize MALL as any language learning activity that is conducted through mobile devices. MALL is perceived as an innovative and engaging method for acquiring a new language (Azar & Nasiri, 2014), offering a convenient and practical way to enhance ESL learning (Soleimani et al., 2014). It is considered a valuable solution to overcome constraints of time and place in foreign language learning (Miangah & Nezarat, 2012).

Aligned with traditional education, the integration of mobile devices in language learning, now termed MALL, has gained much popularity (Hwang & Fu, 2019; Kiernan & Aizawa, 2004), being incorporated into foreign language curricula and providing new learning tools to the digital generation

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(Oblinger & Oblinger, 2005). MALL has garnered considerable attention due to its provision of authentic and contextual language learning experiences (Cheng & Chen, 2022; Chinnery, 2006; Kukulska-Hulme, 2009; Shadiev et al., 2017) and has been widely embraced as an effective instructional approach addressing the challenges of traditional language learning methods (Burston, 2015; Hsu, 2013).

The most important purpose behind employing such a strategy in teaching L2 students is to find an effective combination of different learning methods which can motivate students to participate both inside and outside the classroom environment (Neumeier, 2005; Senffner & Kepler, 2015). In this regard, enhancing classroom teaching with technology-supported activities outside the classroom allows students greater independence for conducting self-directed learning and fosters the development of autonomy which is a valuable educational asset (Rahmani et al., 2022; Xodabande & Atai, 2022). Regarding this, mobile technology has emerged as a suitable educational approach, as smartphones and other portable Wi-Fi devices blend traditional and innovative learning methods, aligning well with educational objectives (Kukulska-Hulme, 2009). In this respect, Klímová (2017) contends that characteristics like portability, individuality, unobtrusiveness, availability, adaptability, persistence, usefulness, and usability position mobile devices as ideal tools for language learning.

Furthermore, the rapid increase in smartphone ownership among students has fueled the popularity of mobile technology in education, particularly in English as a Foreign Language (EFL) learning. Moreover, there has been a rising interest in the utilization of mobile-assisted language learning (MALL) among English language learners globally, including in Iran (Ghorbani & Ebadi, 2020). Mobile devices have seamlessly integrated into traditional classroom settings and are increasingly utilized by English language learners (Fathi et al., 2021; Hwang & Fu, 2019; Liu et al., 2018; Looi et al., 2010; Nasab & Taki, 2016; Rassaei, 2019; Wang et al., 2017). Additionally, mobile learning (m-learning) empowers learners to take charge of their learning advancement (Liu & Hwang, 2010), leading to enhanced learning outcomes based on learners' preferences and needs with tailored features using a mobile phone (EL-Bishouty et al., 2007; Hung et al., 2014; Wang et al., 2019). As the utilization of MALL in language learning has increased in recent years, some researchers have discovered compelling evidence showcasing its beneficial impact on learners' motivation (Kim et al., 2013) as well as on fostering collaboration and interaction among learners and between teachers and learners (Goh et al., 2012).

Studies have indicated that a mobile application designed based on students' needs and continuously supported by a teacher is effective in improving student performance and leading to positive learning outcomes (Klímová, 2017; Mahdi, 2017; Rezaei et al., 2013). Consequently, MALL applications have the potential to enhance various language skills of L2 learners (Burston, 2014; Burston, 2015; Hwang & Fu, 2019; Li & Hafner, 2022; Shadiev et al., 2020), particularly L2 reading comprehension (e.g. Gutiérrez-Colón et al., 2020; Klimova & Zamborova, 2020; Lin et al., 2020; Moon et al., 2021).

Furthermore, it is believed that exposing language learners to authentic materials adapted to their levels and interests extensively can heighten their sensitivity to the target language. Literature, providing authentic input for language learning, holds the potential to cultivate high-quality language skills in reading, writing, speaking, and listening, aligning well with Communicative Language Teaching principles (Bakhshizadeh Gashti, 2018; Belcher & Hirvela, 2000). Among various literary texts, short story stands out as a compelling tool for effectively achieving language teaching and learning objectives (Arjmandi & Aladini 2020; Belcher & Hirvela, 2000). Authentic materials such as short stories are favored for their realistic nature and relevance to learners' cognitive levels and experiences (Gardner & Miller, 1999; Heidari et al., 2020). Specifically, in reading, short stories enable learners to practice speed-reading techniques such as skimming, scanning, and identifying main ideas efficiently (Arjmandi & Aladini, 2020). Not only do short stories support language learning objectives but they also accelerate the language learning process (Shang, 2006). Therefore, using short stories in MALL helps EFL students in enhancing different language skills particularly reading comprehension skill.

Research on the use of MALL for L2 reading comprehension is crucial because a better understanding of its effects will inform reading pedagogy (Li, 2022). While many researchers (e.g. Keezhatta & Omar, 2019; Mays et al., 2020; Sofiana & Mubarok, 2020) have empirically explored the pedagogical benefits of MALL for L2 reading comprehension and identified positive outcomes such as increased reading frequency, peer interaction, sustained attention, and improved decoding skills (Lin et al., 2020), there is still a gap in synthesized empirical evidence regarding the use of mobile applications incorporating English short stories to teach English as a second language and its impact on reading comprehension.

Literature Review

Theoretical Framework

The theoretical framework for understanding the impact of Mobile-Assisted Language Learning (MALL) on EFL students' reading comprehension can be comprehensively grounded in several key theories one of which is Multimedia Learning Theory (MLT). Developed by Richard E. Mayer, MLT is a cognitive theory that examines how individuals learn more effectively from the combination of words and images than from words alone. Grounded in principles of cognitive psychology, MLT is based on the assumption that the human mind processes information through dual channels—visual and auditory—each with limited capacity (Mayer, 2005a). The theory emphasizes the importance of designing multimedia instructional materials that align with the brain's cognitive architecture to facilitate meaningful learning. Key principles of MLT include the *multimedia principle*, which states that learning is enhanced when words and images are combined (Mayer & Moreno, 2003); the *modality principle*, which suggests that using spoken text rather than written text with images reduces cognitive load (Mayer, 2005a); and the *coherence principle*, which advocates for excluding extraneous material to improve learning outcomes (Mayer, 2005b). These principles provide a framework for creating effective multimedia learning environments that optimize comprehension, retention, and transfer of knowledge. MLT has significant implications for education, particularly in the digital age, where multimedia tools are increasingly integrated into teaching and learning practices (Mayer, 2009).

MLT has been widely applied in language learning and teaching, demonstrating its effectiveness in enhancing comprehension, retention, and engagement. Research has shown that combining verbal and visual materials aligns with the dual-channel processing of the human brain, making it particularly beneficial for language acquisition. For instance, a study by Plass et al. (1998) found that learners who were exposed to multimedia materials combining text and visuals performed better in vocabulary acquisition and reading comprehension compared to those who relied solely on text-based materials. This supports the *multimedia principle*, which asserts that learning is more effective when words and images are integrated. Similarly, the *modality principle* has been applied in language learning through the use of narrated animations or videos, which reduce cognitive load by presenting auditory explanations alongside visual content. This approach has been shown to improve reading and listening comprehension and vocabulary retention in second language learners (Jones & Plass, 2002; Naderi Anari et al., 2019). These findings highlight the potential of MLT to optimize language instruction by leveraging multimedia tools that align with cognitive processing capabilities. In addition to vocabulary and comprehension, MLT has been applied to enhance grammar instruction and writing skills in language learning contexts. For example, a study by Al-Seghayer (2001) demonstrated that multimedia annotations, such as images, videos, and audio explanations, significantly improved learners' understanding of grammatical structures in English as a Second Language (ESL) contexts.

In addition, MLT provides a robust framework for understanding how language learning applications can effectively facilitate the acquisition of a new language. These applications often incorporate multimedia elements such as text, images, audio, and video, aligning with the *multimedia principle*, which posits that learning is enhanced when information is presented through both verbal and

visual channels (Mayer, 2005a). For example, apps like Duolingo and Babbel use a combination of written words, spoken pronunciations, and visual cues to teach vocabulary and grammar, thereby engaging both the auditory and visual processing systems of the brain. Research by Vesselinov and Grego (2012) found that learners using Duolingo significantly improved their language proficiency, particularly in reading and listening skills, highlighting the effectiveness of multimedia integration in language learning apps. This approach not only supports dual-channel processing but also reduces cognitive load by presenting information in manageable, multimodal chunks, consistent with the *modality principle* (Mayer & Moreno, 2003).

Moreover, language learning applications often leverage interactive and immersive features, such as gamification and virtual reality, to enhance engagement and retention. These features align with the *generative learning principle*, which suggests that learners actively construct knowledge by engaging with the material (Fiorella & Mayer, 2016). For instance, apps like Memrise and Rosetta Stone incorporate spaced repetition and interactive exercises that require learners to actively recall and apply new vocabulary and grammar rules, reinforcing long-term memory. Studies have shown that such interactive and immersive approaches not only improve language proficiency but also increase motivation and self-efficacy among learners (Godwin-Jones, 2014).

The Effect of MALL on Improving EFL Students' Reading Comprehension Skill

Several studies have been conducted that focus on the effect of using MALL on the improvement of EFL students' various language skills including vocabulary (Benlaghrissi & Ouahidi, 2023; Jedi-Sari-Biglar & Liman-Kaban, 2023; Lei et al., 2022; Namaziandost et al., 2021; Okumuş Dağdeler et al., 2020; Polakova & Klimova, 2022; Rahmani et al., 2022; Xodabande & Atai, 2022; Zakian et al., 2022) grammar (Ghorbani & Ebadi 2020; Kourang Beheshti & Sadeghi, 2019; Parsa & Anjomshoa, 2021), writing (Al-Shehab, 2020; Pingmuang & Koraneekij, 2022; Yoon & Na-Young 2022), speaking (Almadhady et al., 2020; Criollo-C et al., 2022; Shadiev et al., 2023), listening (Hasan & Shafiqul Islam, 2020; Mulyadi et al., 2022) and reading comprehension (Colón et al., 2020; Gutiérrez- Li, 2022; Lin et al., 2020).

With respect to reading skill, prior research has delved into readers' decoding processes, metacognitive strategies, L2 lexical accessibility, reading strategies, cultural influences, and subskills of L2 reading comprehension (Davis & Lyman-Hager, 1997; Singhal, 1998; Whitford & Joanisse, 2018). However, the advent of Mobile-Assisted Language Learning (MALL) technologies like cell phones, tablet PCs, and PDAs has transformed the conventional pedagogical approach to L2 reading (Chen et al., 2011; Lin, 2017; Wu et al., 2011), leading to researchers presenting varied and inconclusive outcomes regarding this shift.

On the one hand, several researchers (Alemi & Lari, 2012; Lin, 2014; Mays et al., 2020) have identified the supportive impact of Mobile-Assisted Language Learning (MALL) on second language (L2) reading comprehension. For example, Alemi and Lari (2012) conducted a quasi-experimental study to assess the influence of vocabulary learning through SMS (short messaging service) on L2 reading comprehension. The findings revealed that the experimental group demonstrated superior L2 reading performance compared to the control group. In a different quasi-experiment, Mays et al. (2020) investigated the use of mobile Audience Response Systems (ARS) with student-generated questioning to enhance EFL learners' reading comprehension. Results showed that the experimental group's question quality improved more significantly over time than the control group. Additionally, participants in the experimental group exhibited higher levels of collaboration and engagement than those in the control group.

On the other hand, some researchers (Chen et al., 2011; Lin, 2017) have reported limited effects of Mobile-Assisted Language Learning (MALL) on second language (L2) reading comprehension. For example, Chen et al. (2011) conducted a quasi-experimental study to compare the impact of direct access to digital materials via QR (quick response) codes with scaffolded questioning on enhancing EFL learners'

reading comprehension. The findings indicated that MALL technology did not significantly affect EFL learners' reading comprehension, whereas the traditional method with scaffolded questioning led to improved reading performance. Similarly, Lin (2017) also carried out a quasi-experiment to evaluate the efficacy of MALL technology on EFL learners' reading performance, with results showing no significant difference between the two groups.

Various studies examining the educational value of short stories in English as a Foreign Language (EFL) setting have yielded compelling findings showcasing their methodological advantages (Cameron, 2001; Ghosn, 2002; Pardede, 2011; Shrestah, 2008). These researchers have delved into the instructional effectiveness of short stories through meticulously designed research endeavors. However, the primary focus of these studies has predominantly revolved around establishing the authenticity of short stories. These investigations typically take an evaluative approach, employing content analysis to identify the occurrence and frequency of different speech acts in diverse short stories (Altikriti, 2011; Santoso et al., 2014; Susanti et al., 2019). Despite this, scant attention has been devoted to the utilization of short stories for teaching speech acts. AbuZahra and Farrah (2016), in their study on the attitudes of 135 university students towards the use of speech acts in EFL classes, revealed positive perceptions towards employing short stories in language instruction due to their realistic nature. Notably, the emerging trend of using short stories specifically for teaching speech acts underscores the efficacy of short stories as an effective pedagogical tool for instructing speech acts.

Prior research investigating learners' perspectives on Mobile-Assisted Language Learning (MALL) has unveiled favorable outcomes. Kennedy and Levy (2008) highlighted that many learners viewed MALL as beneficial and engaging for vocabulary acquisition. Todd and Tepsuriwong (2008) identified English language learners' positive reception towards "mobile mazes" as a captivating learning tool. Stockwell (2010) observed that students held optimistic expectations regarding the impact of MALL on language skills and were willing to tackle challenges associated with MALL device usage during learning activities. Corlet, et al. (2005) noted that while users did not perceive MALL via PDAs as highly effective for language learning, they displayed a positive attitude towards utilizing these devices for learning purposes.

Significance of this study lies in its exploration of mobile technology's integration in teaching English as a foreign language among Iranian learners through MALL applications, addressing the pressing need for empirical evidence regarding their impact on reading comprehension and learners' perceptions. While existing research highlights the potential of MALL, there is a notable gap in comprehensive large-scale studies and randomized controlled trials that validate their effectiveness, specifically within the Iranian context. Furthermore, the study acknowledges that the success of these tools may vary based on app quality, student characteristics, and instructional expertise, emphasizing that technology should complement—not replace—traditional teaching methods. This research aims to bridge these gaps by providing insights into effective application integration that balances technological innovation with meaningful interactions, ultimately contributing valuable knowledge for educators and policymakers focused on enhancing language learning experiences.

Considering the importance of mobile technology in teaching English as a second language, the following research questions guided this research:

Research Question One: Does using Sayra as a gamified mobile language learning application have any significant effect on the reading comprehension of Iranian EFL learners?

Research Question Two: What are the perceptions of Iranian EFL learners about Sayra as a language learning application?

Methodology

Participants

The present study employed a mixed-methods study to investigate the effect of a mobile learning application called *Sayra* on the process of language acquisition, specifically focusing on reading comprehension skill, in the EFL setting of Iran. Additionally, using semi-structured interviews EFL learners' perceptions about this app were explored.

A total of 57 Iranian EFL learners enrolled in an intermediate-level English language course at Iran Language Institute, ranging from 18 to 23 took part in the study, who are more likely to be familiar with and receptive to mobile technology. The original number of participants was 72 but 9 participants were excluded due to their marks in the placement test and 9 participants who were absent in at least one treatment session were excluded from the analysis (Table 1). The participants took part in the treatments as a part of course requirement in *Conversation I*. All of the participants were females and Persian was the first language of all participants. Their contact with English was mostly in school, three hours a week and at institute, twice a week.

Table 1

Initial and Final Number of Study Participants

	The initial Number	Final Number
Experimental	38	30
Control	34	27
Sum	72	57

While the participants were considered at the level based on the placement tests of the Iran Language Institute, it was necessary to assess their level of language proficiency. The criterion for selection was their marks in Oxford Quick Placement Test. According to the guidelines of this test, those who obtained 24-30 out of 40 (lower intermediate) were selected for the main study.

The participants constituted two classes which were assigned to a treatment (N = 30) and a control group (N = 27). The inclusion of control group was deemed necessary because the control group's performance was going to be an index against which to compare the performance of each of the experimental group.

Ethical Considerations were also observed in the process of collecting data. Informed consent forms were obtained from all participants. Participants were assured of anonymity and confidentiality throughout the research process and they were free to withdraw from the study at any time without penalty.

Materials and Instruments

Oxford Quick Placement Test (OQPT) as Pretest and Posttest

The Cambridge ESOL and Oxford University Press Quick Placement Test (QPT), a validated measure of English language proficiency tested with over 6,000 students across 20 countries, was used in this study. Known for its ease of administration and time efficiency, the QPT exists in both paper-and-pencil (P&P) and computer-based (CB) formats, the latter being an adaptive multiple-choice test scored automatically.

This research employed the two-part P&P version (detailed in Appendix D.1). All participants completed Part 1 (questions 1-40), with those scoring above 35/40 proceeding to Part 2 (questions 41-60). Since the target participants were lower-intermediate learners, only those scoring between 24 and 30 on Part 1 (indicating upper-intermediate proficiency) were included in the subsequent analysis. The QPT was

chosen for both pre- and post-testing primarily because the initial 40 questions rely heavily on cloze passages, requiring comprehension skills for accurate completion. The post-test, administered after 8 weeks under identical conditions to the pre-test, aimed to assess any gains in reading comprehension resulting from the intervention.

Short Stories

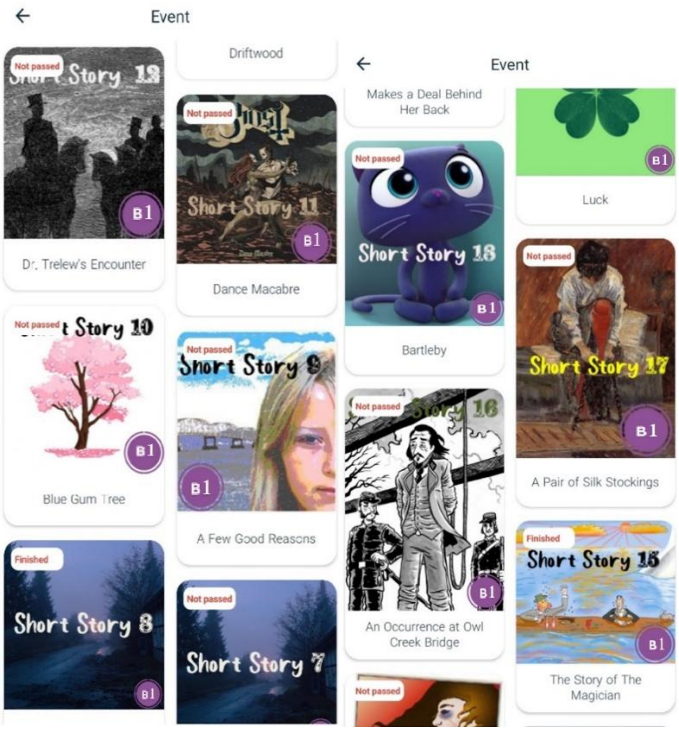
12 short stories with appropriate language level (i.e., vocabulary, structures) were selected (B2 level). For selection of short stories some criteria were considered. First, the length of each of the short stories was short enough to be handled within 40 minutes to helps the students to complete a given task and give the students a feeling of achievement and self-confidence (680-700 words). Besides, an attempt was made to select interesting and motivating genres that the learners enjoy. Genre Preferences of the participants were orally asked by the teacher **(**short stories, novels, and dramas).

Considering the afore-presented criteria, 12 short stories in the present study were selected by the authors of this study from various sources including these books: "Discoveries in Literature" (Christensen & Farrell, 1989), and "American Patchwork: A Collection of American Short Stories for Advanced Students of English as a Foreign Language" (Taska, 1993), "Perrine's Literature: Structure, Sound, and Sense" (Arp & Johnson, 1998).

The short stories have been included in the *events* section of the application. A selection of level based and engaging short stories chosen for their level of difficulty suitable for intermediate EFL learners. The stories were presented in a visually appealing format and included illustrations or pictures to enhance comprehension. Each short story had a corresponding *audio recording* by a native speaker (Figure 1).

Figure 1

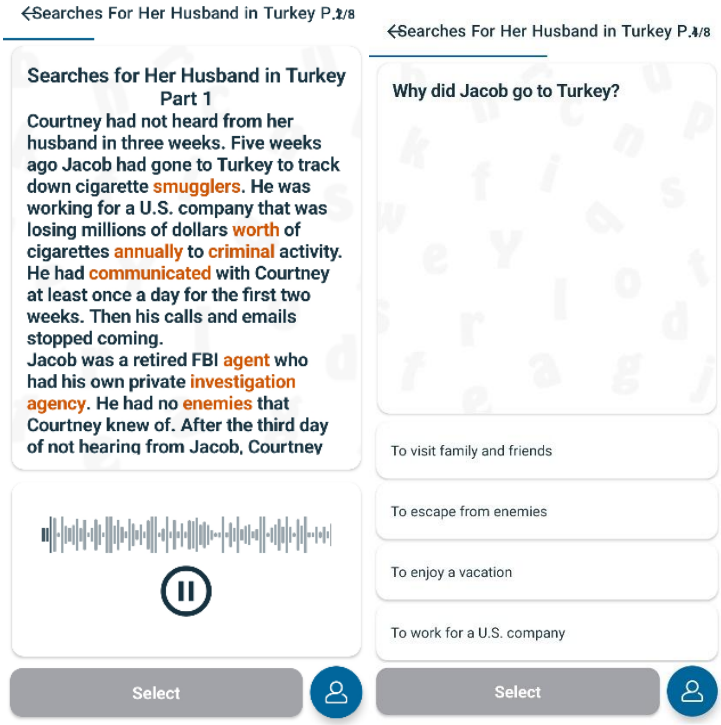
The Event Section of Sayra Application



Students were required to listen to the story being read aloud by a native speaker while following along with the text, improving their listening comprehension and pronunciation alongside reading. In order to enhance the vocabulary input, some important words of the texts were highlighted. In addition, the list of main words of the text, together with the translation of words, have been included after each text.

Figure 2

A Sample Short Story Text and Question



After each story, students were required to complete a short comprehension quiz to assess their understanding (Figure 2). These quizzes, depending on the complexity of the story, include multiple-choice questions and true/false statements and ask for main idea of the passage, purpose of paragraph, vocabulary, and inference.

Sayra Language Learning App

Sayra is an interactive mobile app that incorporates gamification, diverse question types, and test result feedback. At the time of conducting this study, it had 30000 users in Iran. It includes 44 various question formats including multiple-choice, matching, sentence construction tasks, image/audio recognition, speaking/listening exercises and so on. The logic for the inclusion of activities like drag-and-drop, image labeling, or voice recognition is that they can make learning more engaging and interactive (Wang & Wu, 2020).

In addition, lessons cover specific grammar points or introduce new vocabulary words in context, often building on previously learned material. Since this app is designed to teach English to Persian language learners, the target language(s) supported by Sayra are Persian and English. In order to motivate language learners some elements of Gamification are included in this application. The learners can earn points for answering the questions of lessons, quizzes, and event (i.e., answering each question correctly, they will earn one coin). By earning points, they can improve their position in the Leaderboard; this seems

to add a social and competitive element to learning (Sailesh et al., 2021). In addition, they will receive weekly and monthly rewards as diamonds (each diamond unlocks a new lesson) if they are among the top 10 users in the leaderboard. To see what they have done in the app the analysis section is designed. In this section, the users can see the learning time they have spent learning English with Sayra app, the number of words learned and the percent of the correct responses in each of the four skills (i.e., speaking, reading, writing, and listening) via a spider web chart (Figure 3).

Figure 3

Sayra's Performance Report

Interview

Semi-structured interviews were conducted with 10 participants to gather insights into their experiences with practicing reading comprehension through mobile apps during the 7-week treatments. The interviews were structured around the following four key questions designed to investigate the participants' perspectives about the Sayra app.

1. What were the advantages of the app for learning English?
2. What were the disadvantages of the app for learning English?
3. Will you use the app for further learning in the future? Why? Why not?
4. What is your overall attitude and feeling about the app?

Data Collection Procedure

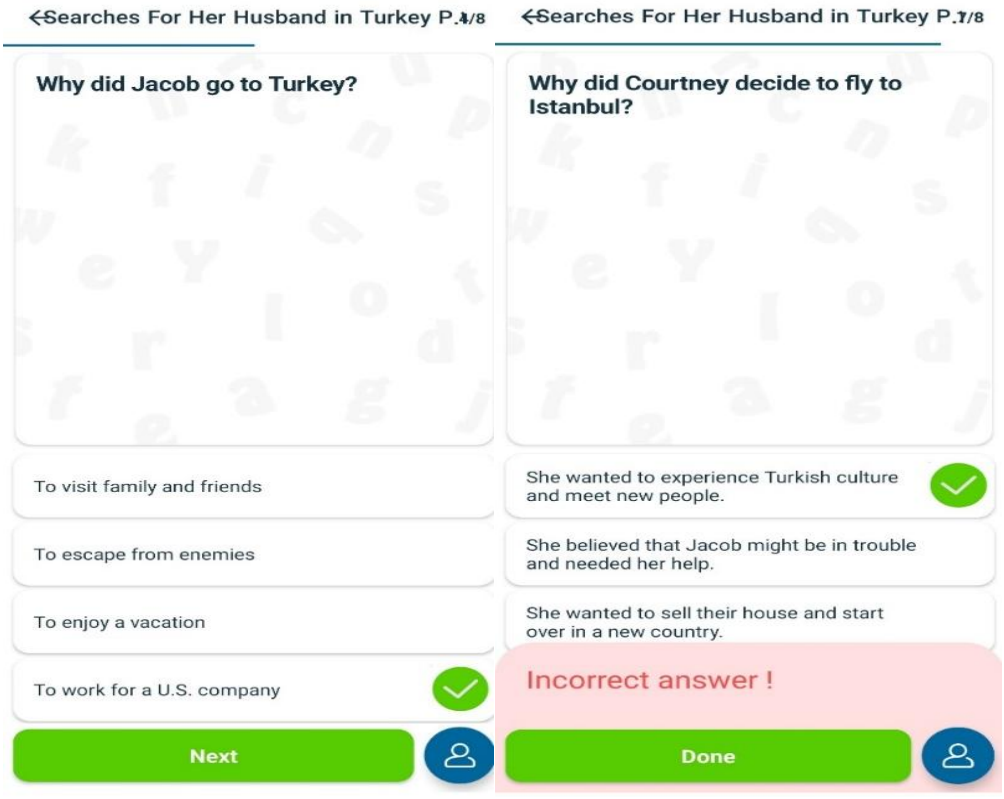
The study was conducted over a period of 8 weeks during the academic year of 2024 Iran Language Institute (ILI) in Gorgan. The students joined this study for the period of two months. Both groups received regular EFL instruction for the duration of the study, but their reading comprehension activities differed. The participants were divided into two groups: an experimental group (n=30) and a control group (n=27). Both groups received regular EFL instruction, but the experimental group was additionally exposed to the Sayra

mobile application for reading comprehension activities. Before the intervention begins, all participants completed the QPT test individually to establish a baseline of their current language level and pre-test reading skills.

In the *Experimental Group*, first, the students were instructed on how to use the mobile application at home and during a dedicated class session. This included navigating the app, accessing features like audio recordings, and completing comprehension quizzes. On a regular basis, the short stories were being included in the event section of Sayra and the students were expected to dedicate a set amount of time each week (e.g., 30 minutes, 2 or 3 times a week) to reading new assigned short stories on the mobile application outside of class time. They were encouraged to utilize the app's features strategically by listening to the audio recordings while reading the stories to enhance listening comprehension and pronunciation. Additionally, they are required to complete the comprehension quizzes in the form of multiple-choice test after each story to assess their understanding (Figure 4). Whether they answer the questions correctly of incorrectly, they received immediate feedback in the form of a pop-up text allowing students to self-correct and reflect on their understanding. Then, the instructor dedicated a portion of class time each week (e.g., 10-15 minutes) for a discussion or an activity related to the short stories from the mobile app. This could involve group discussions, short presentations on specific aspects of the story, or structure and vocabulary review exercises based on the encountered words. These activities aimed to reinforce comprehension and encourage collaborative learning.

Figure 4

Feedback Received for Correct and Incorrect Answers



In the control group, students followed a traditional approach to reading comprehension, using printed materials and classroom-based activities. They were assigned the same short stories as the experimental group but accessed them in printed form. Comprehension activities included answering questions in class, participating in group discussions, and completing vocabulary exercises. This group did not receive any

exposure to the Sayra app or its features, ensuring a clear comparison between traditional and MALL-based methods.

To complement the quantitative findings and explore student perceptions of Sayra mobile application as a learning tool, semi-structured interviews were conducted with 10 participants. Face-to-face interviews were conducted by one of the researchers at ILI language institutes. Drawing upon relevant literature, the interview questions were designed to facilitate comparison with existing research and subsequently served as a framework for data coding. The interviews ranged from 10 to 15 minutes in duration.

Results

Normality Assessment (Kolmogorov–Smirnov Test)

The Kolmogorov-Smirnov test was utilized to assess the normality of the data distribution. The results, presented in Table 2, indicate significance values exceeding .05 for both pre- and post-test scores. This finding suggests that the data do not violate the assumption of normality. Consequently, it can be concluded that the data are normally distributed, justifying the use of parametric statistical tests for subsequent analysis.

Table 2

Kolmogorov–Smirnov Test (K-S)

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Pretest	.121	57	.063
Posttest	.113	57	.069

a. Lilliefors Significance Correction

The Reliability

The reliability of the EI questionnaire was assessed by examining the internal consistency of the obtained scores using Cronbach's alpha coefficient (Table 3). This analysis yielded reliability coefficients of .85 for the experimental group and .71 for the control group.

Table 3

Reliability Statistics

	Cronbach's Alpha	N of Items
Experimental group	.859	12
Control	.712	12

The research question was to examine if using short stories in Mobile Assisted Language Learning had a significant effect on learners' language proficiency. Table 4 shows the descriptive statistics of the pre- and post-tests in the experimental and control groups.

Table 4

Descriptive Statistics of Experimental and Control Group

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest	Exp	30	26.73	5.245	.958

	Control	27	28.07	5.291	1.018
Posttest	Exp	30	33.07	4.989	.911
	Control	27	30.19	5.350	1.030

The descriptive statistics reveal pre-test mean scores of 26.73 for the experimental group and 28.07 for the control group. The control group (N=27) had a slightly higher mean score of 28.07 with a standard deviation of 5.291, suggesting that the control group started with a marginally higher baseline proficiency. The corresponding post-test means of 33.07 and 30.19 represents a gain score of 6.34 (33.07 - 26.73) for the experimental group and 2.12 (30.19 – 28.07) for the control group, suggesting a greater improvement in the experimental group and a more modest improvement. The smaller standard deviations in the post-test scores for both groups indicate that the variability in performance decreased after the intervention, suggesting a more consistent level of achievement among participants. To formally assess pre-existing differences between the groups, an independent samples t-test was conducted. Levene's Test for Equality of Variances was conducted to check the assumption of homogeneity of variances, which is a prerequisite for conducting an independent samples t-test. The results of Levene's test ($F = .043$, $p = .837$) indicated that the assumption of equal variances was met, as the p-value was greater than .05. Consequently, the t-test results for equal variances assumed were interpreted. The t-test results (Table 5) indicated no statistically significant difference between the pre-test scores of the experimental and control groups ($t(55) = -.960$, $p > .05$). Consequently, any observed post-test differences can be attributed to the differential interventions rather than pre-existing group disparities.

Table 5

Independent Samples Test of QPT Pre-test and Post-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variances assumed	.043	.837	-.960	55	.341	-1.341	1.397	-4.141	1.459
	Equal variances not assumed			-.959	54.270	.342	-1.341	1.398	-4.143	1.461
Posttest	Equal variances assumed	.084	.773	2.104	55	.040	2.881	1.370	.137	5.626
	Equal variances not assumed			2.096	53.336	.041	2.881	1.375	.125	5.638

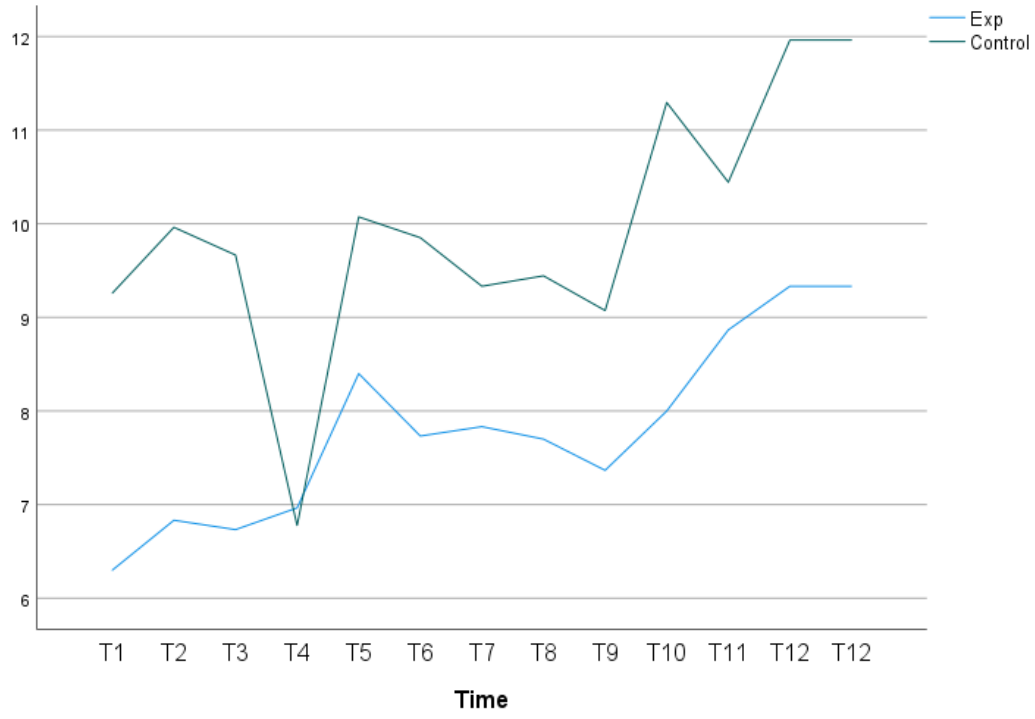
Then, to ascertain whether significant differences existed between the post-test scores of the experimental and control groups, an independent samples t-test was performed. The results, detailed in Table 4, revealed a statistically significant difference in mean EI post-test scores between the two groups ($t(55) = 2.10$, $p < .05$). This suggests that the integration of MALL into the curriculum had a positive and measurable impact on learners' reading comprehension skills.

Figure 5 illustrates the developmental changes in the mean scores of the experimental and control groups across 12 quizzes administered throughout the study. The figure provides a visual representation of the progress made by both groups over time, offering insights into the effectiveness of the intervention and the comparative performance of the two groups. As shown in Figure 5, both the experimental and control

groups exhibited an upward trend in their mean quiz scores over the 12 quizzes, indicating that both groups improved their reading comprehension skills over the course of the study. However, the rate and extent of improvement differed between the two groups, with the experimental group, which utilized the Sayra mobile application, demonstrating a steeper and more consistent upward trajectory compared to the control group. The experimental group started with a lower mean score in the initial quizzes but showed a marked and steady increase in performance as the study progressed. This upward trend suggests that the interactive and personalized features of the Sayra app, such as immediate feedback, multimedia content, and gamified activities, effectively supported learners in improving their reading comprehension skills. The consistent improvement in the experimental group's scores highlights the potential of MALL to enhance learning outcomes through engaging and adaptive learning experiences. The control group, which relied on traditional methods of instruction, also showed improvement in their mean quiz scores over time. However, the rate of improvement was more gradual and less pronounced compared to the experimental group. This suggests that while traditional methods can still contribute to skill development, they may not be as effective as MALL in fostering rapid and sustained progress. The slower rate of improvement in the control group could be attributed to the lack of interactive and personalized features that are inherent in mobile-assisted learning environments.

Figure 5

Developmental Changes in the Mean of the Two Groups



To statistically determine the significance of developmental changes in reading comprehension scores for both experimental and control groups, paired samples t-tests were conducted. These tests were performed to determine whether the observed improvements in pre- and post-test scores were statistically significant within each group, providing insights into the effectiveness of the respective interventions. As detailed in Table 6, the analysis revealed statistically significant differences between pre- and post-test scores for both the experimental group ($t(29) = -9.80$, $p < .05$) and the control group ($t(26) = -6.15$, $p < .05$). These results demonstrate a significant improvement in scores from pre- to post-test for both groups.

Table 6

Paired Sample T-tests for Pre and Post-test in Experimental and Control Groups

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
EXP	pretest - Posttest	-6.333	3.536	.646	-7.654	-5.013	-9.809	29	.000
Control	pretest - Posttest	-2.111	1.783	.343	-2.816	-1.406	-6.152	26	.000

Qualitative Data Analysis

This study utilized Braun and Clarke's (2006) thematic analysis framework to interpret interview data, providing a comprehensive understanding of participants' experiences with the Sayra mobile application. The thematic analysis process involved six phases: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. The initial stage involved multiple readings of transcripts to identify emergent themes and sub-themes. This analytical process was guided by the research questions, which investigated the benefits and drawbacks of using the Sayra app for language learning. In the next phase, illustrative quotations corresponding to the established themes were selected by both authors. This was followed by a process of theme refinement and naming. Upon finalization of the thematic structure, the report writing phase commenced. As summarized in Table 7, three themes emerged from the analysis: language-related themes, learners' emotional factors, and app-related factors. Each theme was further divided into subthemes, supported by illustrative quotations from the participants. These themes collectively highlight the multifaceted impact of the Sayra app on learners' reading comprehension and overall language learning experience.

1. Language-Related Themes: This theme captures the linguistic benefits reported by participants, particularly in terms of reading skills and vocabulary development.
   - Developing Reading Skills: Participants noted significant improvements in their reading comprehension abilities. For example, one participant stated, *"I no longer had fear of reading comprehension,"* indicating increased confidence in tackling reading tasks.
   - Vocabulary Expansion and Retention: Many participants emphasized the app's role in enhancing their vocabulary. One participant remarked, *"I think I could learn more words via Sayra,"* highlighting the app's effectiveness in facilitating vocabulary acquisition and retention.
2. Learners' Emotional Factors: This theme reflects the emotional and motivational aspects of using the Sayra app, which contributed to a positive learning experience.
   - More Fun, Enjoyable, and Less Stressful: Participants described the app as engaging and enjoyable, which reduced the stress often associated with language learning. One participant shared, *"Sayra fostered positive attitudes towards reading,"* suggesting that the app made learning more appealing and less intimidating.
   - Motivation: The app's interactive and gamified features were frequently cited as sources of motivation. For instance, one participant noted, *"Sayra's interactive and engaging nature, the gamified elements, and immediate feedback have made learning more rewarding and*

satisfying." This indicates that the app's design successfully tapped into learners' intrinsic motivation, encouraging sustained engagement.

3. App-Related Factors: This theme focuses on the technical and functional aspects of the Sayra app that contributed to its effectiveness.
   - User-Friendliness: Participants appreciated the app's simplicity and ease of use. One participant commented, *"It is simple, easy to use, and flexible,"* underscoring the app's accessibility for learners of varying technical proficiency.
   - Personalized Learning: The app's ability to tailor content to individual needs was highly valued. A participant stated, *"I appreciated the personalized nature of the app; it had tailored content and activities to my individual needs and learning styles,"* highlighting the importance of adaptive learning features.
   - Accessibility: The convenience of being able to practice English anytime and anywhere was a recurring theme. One participant remarked, *"I could practice English anywhere and anytime,"* emphasizing the app's role in facilitating flexible and autonomous learning.
   - Gamification: The gamified elements of the app, such as earning coins, diamonds, and competing on leaderboards, were particularly popular. Participants expressed enjoyment in these features, with one stating, *"I really enjoyed earning coins,"* and another adding, *"I really enjoyed the competitive nature of the leaderboard."* These elements not only made learning more enjoyable but also fostered a sense of achievement and competition.

Table 7

The Major Themes and Subthemes Extracted from the Interviews

Major themes	Subthemes
language related themes	Developing reading skills
	Vocabulary expansion and retention
	more fun, enjoyable and less stressful
Learners' emotional factors	Motivation
App related factors	User-friendliness
	Personalized
	Accessibility
	Gamification

Beyond the thematic analysis, all the interviewees stated that they would recommend Sayra to others since the easy access, clear arrangement, and fast learning were appreciated by them. This unanimous endorsement further underscores the app's potential as a valuable tool for EFL learners.

Discussion

The aim of present study was to assess the effectiveness of using Mobile language learning application on learners' reading comprehension and to check their feeling and perceptions. With regard to the first research question, although both groups enjoyed development in their RC abilities the results showed that the experimental group exhibited significantly higher levels of reading comprehension, suggesting that the use of mobile apps can be a valuable tool for improving students' reading skills. The qualitative findings align with the quantitative results, reinforcing the conclusion that the Sayra app significantly enhances reading

comprehension and overall language learning. The app's ability to address linguistic, emotional, and technical aspects of learning creates a holistic and engaging experience for users.

The results of this study align closely with the principles of Multimedia Learning Theory (MLT), which emphasizes the effectiveness of combining verbal and visual information to enhance learning outcomes. The significant improvement in reading comprehension (RC) observed in the experimental group, which utilized mobile language learning applications, can be attributed to the multimedia elements integrated into these apps. According to Mayer (2005a), the *multimedia principle* suggests that learners benefit more from materials that combine words and images, as these engage both the visual and auditory channels of the brain. Mobile apps often incorporate multimedia features such as text, audio, images, and interactive exercises, which likely contributed to the experimental group's superior performance. This is in line with Naderi Anari et al.'s (2019) findings showing the effectiveness of using multimodality in EFL learners' L2 reading and vocabulary retention. Furthermore, the personalized and adaptive nature of these apps aligns with the *generative learning principle* (Fiorella & Mayer, 2016), which posits that learners actively construct knowledge when they engage with tailored, interactive content. The immediate feedback provided by mobile apps, as highlighted by Stockwell (2010), further supports this by enabling learners to correct errors and consolidate knowledge in real-time, a feature that traditional methods often lack.

The qualitative findings of the study, which indicate a positive attitude toward mobile-based learning, also resonate with MLT principles. The *coherence principle* (Mayer, 2009) suggests that eliminating extraneous material and focusing on essential content enhances learning. Mobile apps often streamline language learning by providing targeted exercises and gamified activities, which not only reduce cognitive load but also increase engagement and motivation. The integration of gamification, as noted by Deterding et al. (2011), taps into learners' intrinsic motivation, making the learning process more enjoyable and interactive. This contrasts with traditional methods, which may rely on less engaging activities like rote memorization. The positive perceptions reported by learners in this study are consistent with findings by Gutiérrez-Colón et al. (2016), who also observed that mobile apps foster a more engaging and motivating learning environment. Overall, the results of this study underscore the potential of mobile-assisted language learning (MALL) to enhance reading comprehension and learner engagement, supported by the theoretical foundations of MLT. By leveraging multimedia elements, personalized learning paths, immediate feedback, and gamification, mobile apps provide a dynamic and effective alternative to traditional language learning methods.

Although he results of this study are not in line with the results obtained by some studies indicating limited effects of using MALL on reading comprehension (e.g., Chen et al., 2011; Lin, 2017); they are in harmony with the results of the research findings demonstrating that students who utilize mobile apps for reading comprehension tasks tend to outperform their peers who rely solely on traditional methods (e.g., Alemi & Lari, 2012; Gheytasi et al., 2015; Gutiérrez-Colón et al., 2020; Keezhatta & Omar, 2019; Lin, 2014; Taj et al., 2017). As for the qualitative results, it is suggested that mobile apps can serve as a valuable supplement to traditional instruction, offering students a more engaging and interactive learning experience and inducing more positive attitude towards using mobile based applications in the process of language learning. This is also in harmony with the results obtained by some studies (e.g., Gutiérrez-Colon et al., 2016).

One possible explanation for the superiority of the experimental group in these studies is the personalized nature of mobile apps. Many apps can adapt to individual students' needs and learning styles, providing personalized learning paths. This can help students to overcome challenges and build confidence in their reading abilities and to focus on areas where they need the most support and avoid wasting time on topics they already understand. Additionally, mobile apps often offer a variety of engaging activities, such as games and quizzes, that can make reading more enjoyable and motivating for students.

A key advantage of Mobile-Assisted Language Learning (MALL) over traditional language learning methodologies lies in the provision of immediate feedback. Unlike traditional classroom settings where feedback may be delayed or limited to summative assessments, MALL applications offer instant feedback on student responses, facilitating rapid error correction and knowledge consolidation (Stockwell, 2010). This immediate reinforcement is crucial for effective learning, as it allows learners to identify and address misconceptions before they become ingrained. This aligns with cognitive learning theories that emphasize the importance of timely feedback for skill acquisition and knowledge construction (Sweller, 1988). By providing immediate feedback, MALL environments foster a more dynamic and responsive learning experience, promoting learner autonomy and accelerating the learning process compared to traditional methods where feedback is often delayed and less personalized.

A significant advantage of MALL over traditional approaches is the integration of gamification. Many MALL applications incorporate game mechanics such as points, badges, leaderboards, and challenges, which can significantly enhance learner engagement and motivation (Deterding et al., 2011). These elements tap into learners' intrinsic motivation by providing a sense of progress, achievement, and competition (Prensky, 2001). The use of game-like features can transform potentially tedious language learning tasks into more enjoyable and interactive experiences, fostering a positive learning environment and encouraging sustained effort (Hamari et al., 2014). This contrasts with traditional methods that often rely on rote memorization and less engaging activities. By promoting a sense of accomplishment and friendly competition, gamification in MALL can encourage learners to actively participate, strive for improvement, and develop a more positive attitude towards language learning.

Conclusion and Implications

While current research highlights the potential of mobile applications to enhance reading skills, particularly for second-language learners, there is a pressing need for more comprehensive studies, including large-scale, randomized control trials with extended intervention periods. These studies would provide more robust evidence to validate the effectiveness of these tools. However, as promising as the findings are, it is essential to approach the integration of technology with caution to prevent overexposure, which could negatively impact students' connection to the real world. However, it is essential to acknowledge that the effectiveness of mobile apps may vary depending on several factors, including the quality of the app itself, the students' characteristics, and the way the apps are integrated into the overall curriculum. Some apps may be poorly designed or lack essential features, while others may not be suitable for all students. As, Petersen and Sachs (2016) claim "technology is not a substitute for instructional expertise" (p. 5) seems appropriate; therefore, mobile apps are a great supplement to your English learning, but they might not be a complete replacement for a structured course or practicing with a teacher or native speaker. The significance of integrating Sayra or similar language learning applications with traditional classroom instruction has been widely recognized. (Kukulska-Hulme & Viberg, 2018). It is therefore crucial for educators to carefully select and implement mobile apps that align with their students' needs and learning objectives. Striking a balance between leveraging technology and maintaining meaningful offline interactions and implementing more meaning-oriented or task-based activities that encourage learners to use language at a discourse level, rather than focusing solely on isolated sentences, would be highly beneficial.

The limitations of this study include a potentially narrow sample size and demographic diversity, which may affect the generalizability of findings, as well as methodological constraints such as reliance on self-reported data and the variability of MALL app effectiveness based on technology and internet access. Furthermore, the short-term focus may not capture long-term engagement impacts, and findings might not be applicable in different cultural contexts. One strength of this qualitative analysis is its depth and richness, capturing the nuanced experiences of learners. However, a limitation is the potential for researcher bias during theme identification and interpretation. To mitigate this, the study employed a rigorous thematic

analysis framework and involved two researchers in the coding process. Future studies could further validate these findings by incorporating member checking or triangulation with additional data sources. Nonetheless, the implications suggest that educators should integrate MALL applications alongside traditional methods, policymakers should support targeted training for effective implementation. While MALL has the potential to enhance reading comprehension, its effectiveness ultimately depends on the app's design and implementation. future research should explore longitudinal studies and app development tailored to diverse learner needs to enhance language learning experiences, focusing on optimizing these theoretical elements to maximize the benefits of MALL for EFL learners.

Acknowledgement

The authors thank the participants for their time and cooperation in this research.

Declaration of Conflicting Interests

The authors declare that they have no conflict of interest.

Funding Details

The research leading to these results received funding from Golestan University under Grant Agreement Number 1619.

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