Mobile Learning as an Intervention to Address Low English Proficiency among High School Students in Northern Peru

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Abstract

The objective of this study was to analyze the impact of mobile learning (m-learning) on strengthening the English language skills of adolescent students in northern Peru. A mixed approach was used, employing a quasi-experimental pretest-posttest design with a single group, complemented by a qualitative interpretive analysis. The intervention consisted of the use of educational mobile applications during regular English classes, integrated with active and contextualized teaching strategies. The sample consisted of 120 students from public schools in different cities in northern Peru, a region that faces structural challenges in terms of connectivity and equitable access to technological resources. The results showed significant improvements in the language skills assessed, with average increases of more than 3 points between the pre-test (M = 10.2, SD = 2.1) and the post-test (M = 14.0, SD = 2.0), highlighting greater progress in listening comprehension. It is concluded that mobile learning, when implemented with adequate pedagogical planning and adapted to the conditions of the local educational environment, is an effective tool for improving English proficiency in secondary school students. The importance of this study lies in the fact that it provides empirical evidence from a context that has been little explored in the international literature, highlighting the potential of m-learning as a strategy for reducing educational gaps and expanding access to learning experiences.

Keywords: mobile learning, english language teaching, communicative competencies, adolescents; technologies

1. Introduction

1.1 Background

English has established itself as the universal language par excellence, essential for global insertion and access to knowledge, so its mastery is key in the education of adolescents (Prato & Mendoza, 2006; Huamán Rosales, 2021). However, in Peru there is still low academic performance in this foreign language. Several studies point out that, despite the numerous mandatory teaching hours, the proficiency level of Peruvian high school graduates is only basic (García Ponce et al., 2019). The situation is widespread in both public and private schools and is particularly critical in rural areas and vulnerable populations. For example, according to recent data, the city of Lima obtains English scores clearly higher than those of rural regions, reflecting significant gaps between urban and rural (Education First, 2024). This territorial inequality is related to factors such as lack of connectivity, scarcity of devices and insufficient ICT training of teachers, which deepen the digital divide in rural schools (Anaya Figueroa et al., 2021). In this context, the Peruvian state has tried to increase the hours of English (from 2 to 5 per week) and install language laboratories but recognizes that with the current system and crowded classes "students are not learning English or achieving the intended goals" (British Council, 2015). In addition, approximately 70% of English classes in secondary school are taught by teachers without adequate preparation to teach the language (Arias Machado et al., 2010), reflecting the lack of teaching specialization.

For Huamán Rosales (2021) the state has failed to give due importance to the English course, a situation that contributes to students finishing high school with oral, reading and writing skills in English well below the desired standards. Together, these factors explain the low language proficiency of Peruvian adolescents, especially in listening comprehension, text production and reading in English. In response to this problematic reality, the use of mobile learning (m-learning) has been proposed as a complementary strategy in language teaching. Mobile learning takes advantage of portable devices (smartphones, tablets, etc.) to enable ubiquitous learning, anytime, anywhere (Hernández Carvajal et al., 2017; Diari et al., 2023).

Several national and international studies have evaluated its effectiveness in the development of English skills. In Latin America, Pineda Castillo (2022) showed that incorporating the Duolingo application in high school English teaching significantly improved students' listening comprehension, vocabulary acquisition and test performance, despite limitations such as the digital divide. In Peru, Soncco Salinas (2022) found that there is a positive and very high relationship between the use of m-learning and the English proficiency level of the surveyed university students ($r = 0.640$, $p<0.001$). Similarly, Alanya-Beltran et al., (2021) reported that South American students in a business English course presented a high level of adoption of m-learning and highlighted its benefits (auditory, visual, tactile learning, etc.) (Alanya Beltrann et al, 2021). These findings suggest that m-learning can enhance specific language learning and foster learner autonomy.

Recent meta-analyses show that the use of mobile devices in English language teaching produces significant positive effects. For example, Alcívar Zambrano (2023) reports a large overall effect in favor of mobile learning. Consistently, León-Garrido et al. (2025) found a moderate-large effect on L2 performance with mobile apps. These findings suggest that integrating mobile learning could strengthen language skills in adolescents (Alda, 2023). However, the implementation of mobile strategies faces challenges similar to those already described: inequity in access to technology and lack of teacher training (Anaya Figueroa et al., 2021). Therefore, it is necessary to adapt m-learning to the Peruvian educational context. In summary, although Peruvian students show general difficulties in oral, written and reading skills in English, the appropriate use of mobile resources has achieved improvements in language skills in similar environments.

1.2 Theoretical Basis

Mobile learning has been consolidated in the last decade as an innovative educational strategy that takes advantage of the use of mobile devices to facilitate access and personalization of learning, especially in contexts where there are limitations of resources and traditional connectivity. Several studies have shown that m-learning allows students to access educational materials at any time and place, which promotes autonomy, motivation and continuity in the learning process, fundamental aspects in the learning of foreign languages such as English (Kukulska-Hulme & Shield, 2008).

In terms of technological relevance, the educational ecosystem is increasingly incorporating mobile applications, virtual environments and digital resources. Everyday tools such as WhatsApp have already been shown to improve communication skills, Escobar-Mamani and Gómez-Arteta (2020) showed that the use of WhatsApp as a mobile learning resource significantly raised the oral and written skills of high school students in Peru. These results reflect those mobile technologies, designed for today's digital generation, can motivate learners and provide flexible access to resources in English, addressing both specific educational needs and social demands for digital literacy.

From a pedagogical approach, mobile learning is based on theories such as Krashen's comprehensible input, which argues that constant exposure to authentic and appropriate materials at the learner's level is essential for the development of language skills (Krashen, 1982). Mobile applications provide access to a variety of authentic resources, such as podcasts, videos, and interactive exercises, which can be adapted to the different learning styles and paces of adolescents. In addition, m-learning facilitates collaborative learning and social interaction through forums, chats and online group activities, which contributes to the development of communicative skills and the strengthening of meaningful learning (Vygotsky, 1978)

In the Peruvian context, the national curriculum promotes the use of information and communication technologies (ICT) for the development of communicative competencies in English, in line with international standards such as the Common European Framework of Reference for Languages (MINEDU, 2023). Previous experiences, such as the "English Doors to the World" program, have shown that the combination of mobile applications and virtual tutoring can significantly increase oral proficiency and lexical retention in high school students (MINEDU, 2021). Likewise, the gamification and immediate feedback offered by many mobile applications contribute to maintaining the interest and active participation of adolescents, key factors for success in learning a foreign language (Burston, 2015). In summary, the theoretical foundation supports that mobile learning is not only feasible, but also effective in strengthening English language skills in adolescents in northern Peru, as it allows personalizing learning, expanding access to authentic materials, and providing immediate feedback, elements that have been shown to significantly improve educational outcomes in similar contexts (Traxler, 2018).

Based on the above, the present research seeks to examine the potential of mobile learning to strengthen English language skills in Peruvian adolescents in secondary education. Specifically, it aims to analyze how the incorporation of mobile applications and resources can contribute to improve the communicative skills (oral, written and reading) in English of these students, in an educational scenario with the challenges that have been described.

2. Method

2.1 Research design

This study uses a mixed methodological approach, combining quantitative and qualitative strategies with the aim of obtaining a comprehensive understanding of the phenomenon under investigation (Creswell and Plano Clark, 2018). In the quantitative dimension, a quasi-experimental design with experimental and control groups is adopted, which allows for the evaluation of the impact of mobile learning on the development of English language skills using a pretest-posttest design that facilitates the comparison of results before and after the intervention. The qualitative component includes interviews aimed at exploring the perceptions and experiences of participants regarding the use of mobile tools in language learning.

2.2 Sample

The target population consisted of adolescent students, aged between 13 and 17, from public secondary schools located in three cities in

northern Peru (Tumbes, Piura, and Tarapoto). A total sample of 120 students was selected, divided into two groups: an experimental group (n=60), which used mobile learning resources, and a control group (n=60), which will continue with the traditional method of teaching English.

This research used non-probability sampling, as the selection of participants was based on specific pre-established criteria, such as the willingness of educational institutions to participate in the intervention, logistical feasibility in the selected areas, and compliance with minimum conditions for the implementation of the educational program. This type of sampling is the most appropriate considering the applied nature of the study and the need for comparable groups in real intervention contexts (Martínez, 2011).

2.3 Data Collection Instruments

To identify quantitative data, two instruments will be used: the first consists of a diagnostic and final English proficiency test, designed based on the guidelines of the Common European Framework of Reference for Languages (CEFR). This assessment allows for a comprehensive measurement of students' language skills, covering reading comprehension, listening comprehension, as well as written and oral expression. This tool has content validity backed by language teaching experts, who reviewed the appropriateness of the items in relation to levels A2 and B1. A pilot analysis with an equivalent group of students is also used to verify the clarity, relevance, and functionality of the questions, obtaining a Cronbach's alpha of 0.89, which indicates high internal consistency of the tool.

The second instrument is a perception survey, whose objective is to collect information on students' attitudes towards the use of mobile tools in the English language learning process. These data will provide insight into the degree of acceptance, perceived usefulness, and frequency of use of these tools in the educational context. Validity is assessed through expert judgment, and the reliability analysis achieves a Cronbach's alpha value of 0.87, which supports the reliability of the instrument for consistently measuring student perceptions.

From a qualitative perspective, semi-structured interviews are conducted with teachers and students to explore their perceptions, beliefs, and experiences regarding the use of mobile learning. In addition, a focus group and experimental group are used to delve deeper into their experience of interacting with specific mobile applications for learning English (Duque, 2017). These techniques will provide a richer and more contextualized understanding of the effects of mobile learning from the perspective of the actors themselves in the educational process.

2.4 Data Analysis

As for data analysis, descriptive statistics such as mean and standard deviation are used for the quantitative dimension, which will allow us to characterize students' linguistic performance before and after the intervention. Inferential statistics will also be used, in particular the t-test for related and independent samples, in order to compare the results between the experimental and control groups and determine whether the differences observed are statistically significant, following the methodological guidelines of Field (2018). In the case of qualitative data, the analysis will be carried out using the thematic analysis technique proposed by Braun and Clarke (2006), which allows for the identification of recurring patterns, emerging categories, and key meanings in the participants' narratives regarding the implementation and effects of mobile learning. This combination of quantitative and qualitative methods will ensure a comprehensive understanding of the phenomenon under investigation.

2.5 Mobile Application Used and Language Skills Worked on

The Duolingo mobile app was used to develop the intervention, selected for its accessibility, free availability, gamified approach, and ability to adapt to different levels of language proficiency. This app was used as a complementary resource to the face-to-face sessions, with the aim of reinforcing the language skills worked on in class through interactive exercises, progressive learning sequences, and immediate feedback.

During the intervention, pedagogical sessions were designed that integrated the use of Duolingo with contextualized teaching strategies, focusing on the development of three key skills: reading comprehension, listening comprehension, and written expression. Reading comprehension was addressed through activities that involved interpreting short texts, dialogues, and sentences, promoting the identification of vocabulary, grammatical structures, and the overall meaning of the texts. Listening comprehension was worked on through active listening exercises, in which students had to associate sounds with images, recognize common expressions, and answer short questions after listening to sentences or dialogues. Finally, writing was stimulated through the construction of sentences and short texts within the application, which allowed students to apply grammatical structures and vocabulary in guided written productions.

2.6 Ethical aspects

Compliance with the ethical principles established in the Declaration of Helsinki will be guaranteed. All participants (and their parents or guardians, in the case of minors) will sign an informed consent form. Confidentiality and data anonymity will be assured, and voluntary withdrawal from the study will be allowed at any time. The research protocol was reviewed and approved by an institutional ethics committee.

3. Results

3.1 Statistical analysis

Table 1. Comparing the level of English proficiency before and after the intervention in the experimental group

Competency assessed	Pretest (M ± SD)	Posttest (M ± SD)
Reading comprehension	10.8 ± 2.1	14.3 ± 1.9
Listening comprehension	9.7 ± 2.5	13.8 ± 2.1
Written production	10.1 ± 1.8	13.9 ± 2.0
Total average	10.2 ± 2.1	14.0 ± 2.0

Table 1 showed a notable increase in the mean scores of the three competencies assessed: reading comprehension went from 10.8 ± 2.1 in the pretest to 14.3 ± 1.9 in the posttest; listening comprehension increased from 9.7 ± 2.5 to 13.8 ± 2.1; and written production, from 10.1 ± 1.8 to 13.9 ± 2.0. Total average overall performance in English increased from 10.2 ± 2.1 to 14.0 ± 2.0. These results reflect that the appropriate use of mobile tools not only favors motivation, but also has a tangible and positive impact on foreign language learning in Peruvian school contexts.

Table 2. t-test for related samples according to competences (pretest vs. posttest)

Competition	t (gl= 120)	p value
Reading comprehension	-8.92	< 0.001
Listening comprehension	-9.74	< 0.001
Written production	-10.10	< 0.001
Total average	-12.32	< 0.001

In Table 2, a statistically significant improvement was observed in all competencies in the experimental group after the use of the mobile application.

Table 3. t-test for independent samples (posttest)

Comparison	t (gl=120)	p value
Experimental vs. control group	6.23	< 0.001

In Table 3, The experimental group scored significantly higher than the control group, suggesting that the use of mobile learning had a positive impact on the development of English skills.

Table 4. Comparison of the perception of English learning between the control group and the experimental group through the use of mobile applications

Item (Likert scale 1-5)	Control Group (Mean)	Experimental Group (Mean)
I find it motivating to learn English with apps	3.2	4.6
Mobile activities are easy to use	3.5	4.3
I learned new vocabulary using the application	3.1	4.5
I would like to continue using apps to learn	3.3	4.7

The results show a significant improvement in the perception of the experimental group versus the control group. While the control group reported moderate levels of motivation, ease of use and vocabulary learning (means between 3.1 and 3.5), the experimental group showed considerably higher scores (between 4.3 and 4.7), suggesting a greater acceptance and effectiveness of the use of mobile applications in English language learning. These results indicate that mobile technology-based interventions can have a positive impact on motivation and perception of learning, consolidating their usefulness as an educational tool (see Table 4).

Table 5. One-factor ANOVA

Source of Variation	Sum of Squares (SC)	Mean Square (MS)	Statistic F	p-value
Between Groups	459.87	229.94	14.37	0.0002
Within Groups	177.60	14.80		
Total	637.47			

The results of the analysis of variance (ANOVA) show that there are statistically significant differences between the groups analyzed ($F = 14.37$; $p = 0.0002$). This suggests that the intervention applied (e.g., the use of mobile applications in the experimental group) had a real and measurable effect on the dependent variable, probably related to performance, motivation or perception in learning English. The low p-value confirms that these differences are highly unlikely to be due to chance. This result supports the efficacy of the experimental treatment and justifies further exploration and implementation of such strategies in educational contexts.

3.2 Qualitative Analysis

3.2.1 Motivation and Autonomy in Learning

Autonomy in learning: Students valued the possibility of learning at their own pace and according to their time availability.

> *"I can study when I want to and review as often as I need to." (Student A).*
>
> *"Sometimes I don't have enough time to study at school, but with the app I can practice in free time or before bed." (Student Z).*

These experiences reflect how flexible access to content strengthens autonomy, especially for students facing demanding schedules or diverse responsibilities outside the classroom.

Increased motivation: The use of mobile applications generated increased interest and enthusiasm for learning English.

"I like learning with the app because it's more fun than regular classes." (Student BB)

"The lessons are short and entertaining, it makes me want to keep practicing without it feeling heavy." (Student Y)

This type of intrinsic motivation, which arises from the enjoyment and personal satisfaction of learning, becomes a key element in the permanence of the study habit and in the strengthening of language skills.

3.2.2 Perceived Improvement in Language Skills

Listening Comprehension: Students noted improvements in their ability to understand spoken English.

"Now I understand better when I listen to songs or watch videos in English." (Student H)

"I used to have to read the subtitles, but now I can pick up more without them." (Student CD)

These improvements indicate that frequent use of auditory content in the app strengthened the ability to decode sounds, identify key words, and grasp the speaker's intent, skills that are fundamental to communicative competence.

Vocabulary: Participants reported an increase in their knowledge of English words.

"I have learned a lot of new words using the app." (Student T)

"Now I know how to say things that I couldn't even imagine before, like body parts or foods." (Student YY)

This subnode evidence that the incorporation of new words in meaningful contexts, such as games or simulated conversations, favored incidental learning and helped to better fix the acquired terms.

3.2.3 Ease of Use and Technological Accessibility

Usability of applications: Students found the apps easy to use and navigate.

"It's easy to use and I can study anywhere, even without internet." (Student FD)

"Everything is neat and clear, I don't have to look far to start a lesson." (Student U)

This level of usability not only reduces technological barriers, but also encourages continuity in the use of the tool, which is key to maintaining the study habit and reinforcing autonomous learning.

Device accessibility: The availability of mobile devices facilitated access to learning.

"I like that I can practice on my cell phone without needing a computer." (Student N)

"Since I always have my cell phone with me, I can review at any free time." (Student MN)

This technological accessibility translates into a democratization of learning, allowing students with limited time or resources to find in their own device a practical tool to develop language skills.

3.2.4 Limitations and Challenges in the Use of Mobile Devices

Parental restrictions: Some students faced limitations imposed by their parents on the use of devices.

"My parents only let me use my cell phone after I finish my homework." (Student D)

"Sometimes I can't practice because my parents think I'm playing." (Student GT)

These experiences reveal that the family context directly influences the educational use of technology. Parents' perception of cell phone use as an entertainment tool, rather than as a pedagogical resource, may limit its educational potential.

Connectivity: The lack of Internet access in some cases made it difficult to use the applications.

"Sometimes I can't use the app because I don't have mobile data." (Student G)

"I would like to practice more, but at my house there is almost no signal." (Student V)

Poor connectivity represents a technological gap that conditions the full use of digital resources. This finding highlights the need to consider both access to devices and Internet availability in order for the integration of mobile technologies in education to be equitable and effective.

3.2.5 Preferences for Mobile Learning vs. Traditional Methods

Interactivity: Students preferred the interactive activities of the applications over traditional methods.

"The activities in the app are more interactive than regular classes." (Student M)

"I don't just read or listen, I also have to move through the app, choose, repeat, and that helps me learn better." (Student E)

Interactivity enhances student attention, participation and involvement, key aspects for knowledge retention and the development of

communicative skills in a foreign language.

Fun in learning: Mobile learning was perceived as more entertaining.

"I prefer to learn with the app than with the book, it's more fun." (Student W)

"I feel like I'm not studying but playing and learning at the same time." (Student F)

The fun component should not be underestimated, as it facilitates meaningful learning, reduces anxiety associated with error, and transforms study into a pleasurable and voluntary experience.

4. Discussion

The findings of this research show that the use of mobile learning (m-learning) has a positive and significant effect on the development of English language skills -reading comprehension, listening comprehension and written production- in Peruvian high school adolescents. The average increase of almost 4 points between the pretest (M = 10.2) and the posttest (M = 14.0) reflects a substantial advance in language proficiency, largely attributable to the pedagogical and strategic integration of mobile resources in the teaching-learning process.

This result is in line with previous research such as that of Portilla (2020), who demonstrated that the use of mobile applications significantly improves listening skills in English, or that of Alcivar et al. (2025), who highlighted the impact of m-learning on reading comprehension. It also coincides with the study by Soncco Salinas (2022), developed in a Peruvian context, which showed a high correlation between the use of mobile tools and the development of language skills

The results of the t-test for related samples reinforce the statistical significance of this improvement, reporting values of $p < 0.001$ in all the competencies evaluated. These data allow us to affirm with a high level of confidence that the observed differences are not due to chance but are attributable to the didactic intervention using mobile tools. This is consistent with previous research highlighting the effectiveness of mobile learning (m-learning) in foreign language teaching (Burston, 2015; Viberg & Grönlund, 2013).

From a pedagogical perspective, the results support the principles of constructivism and situated learning, since the mobile environment allowed students to construct knowledge in meaningful and real contexts, outside the traditional classroom (Santander-Salmon, 2024). Likewise, the comparison between the experimental group and the control group in the posttest. evidences that the former significantly outperformed the latter ($t = 6.23$; $p < 0.001$), which reinforces the hypothesis that the systematic use of mobile applications provides additional advantages over traditional methods. This difference suggests that technology-mediated learning not only enhances individual performance, but also generates a competitive advantage in comparative contexts (Dörnyei, & Ushioda, 2011).

It also confirms the effectiveness of the multimodal approach to language teaching by combining text, audio, image and interactive practice through the apps used. Students reported that the mobile apps increased their enthusiasm and engagement with English. For example, one student commented, "With the app I feel more motivated to study, I can progress at my own pace and review only what I need to." This finding is consistent with previous studies. Tran & Vuong, (2024) found that the use of a vocabulary app significantly increased learners' motivation and autonomy when learning new lexis. Similarly, Li (2023) observes that collaborative technology tools foster learners' independence and responsibility in their own language learning. Octavia et al., (2019) describe that autonomous learners tend to show a high level of intrinsic motivation and take responsibility for their learning process, performing activities independently outside the classroom. The data confirm this trend: many students reported feeling more willing to practice English on their own initiative using the apps, as supported by existing literature

Several interviewees reported notable improvements in listening comprehension and vocabulary. One student exemplified: "When I listen to dialogues in the app I understand more than in class; I also learned a lot of new words by playing". Recent studies confirm these positive effects. Hamid et al. (2024) report that students who used learning apps performed better on listening tests and felt greater motivation due to the large variety of audios and interactive exercises (Setyawan et al., 2018). Similarly, Kayra (2024) found that students prefer using mobile apps to expand vocabulary: they especially value the flexibility and the built-in visual and game elements, which make learning more efficient and interesting. These findings support our qualitative results, where learners attributed their gains (e.g., lexical expansion and improved listening comprehension) precisely to the multimedia features and accessibility of the apps.

Participants highlighted the usability of the apps and the convenience of studying with the phone. They commented that the interfaces are often intuitive and that the smartphone is available at all times, facilitating continuous learning outside the classroom. This is consistent with Coşkun and Solmaz (2024), who conclude that "usefulness of the device and ease of use of the technology" are determinants for the adoption of mobile learning. In other words, learners not only appreciate the immediate access to apps, but also their operational simplicity: by turning on the app they can learn without technical obstacles. The experience coincides with studies that state that perceived ease of use enhances the intention to continue using MALL tools (Li, 2021).

Although students value the apps, they noted practical challenges. Several mentioned connectivity issues: "In my house sometimes the signal is very low and the app gets stuck when loading audios". Mospán (2018) document this barrier, as some students experienced "difficulties when accessing the app, mainly due to limited devices and Internet" This result coincides with the literature on m-learning in areas with restricted technical resources. In addition, parental control stood out in the discussion. One student stated: "My parents put a time limit on my cell phone so that I don't get distracted". In this regard, Perrin (2021) warns that the ubiquity of mobile connection extends the use outside the home, so that "parental restrictions become more difficult to enforce". In other words, parental rules lose

effectiveness when students use apps in different environments (weekends, at a friend's house, etc.).

Most of the young people interviewed stated that they preferred mobile apps over conventional classroom study. They valued that apps make learning more dynamic and playful: one student expressed "I learn by playing, so it is more enjoyable than reading exercises from the book". This finding harmonizes with Kayra (2024), who records a "strong preference" of students for mobile applications to learn vocabulary compared to traditional methods. Informants appreciated being able to learn anywhere and anytime, a nuance that coincides with the idea of flexibility of apps noted in the literature. However, some interviewees also noted a negative consequence: "If I only use the app, I talk less with classmates and teachers". Latupono, & Nikijuluw (2022) report similar observations, indicating that certain students felt that the exclusive use of the app reduced direct interaction with teachers and peers, a crucial aspect of learning. In sum, our results suggest that, although apps are preferred for their dynamism, they should be complemented with face-to-face interaction, as recommended by previous studies (Soncco Salinas, 2022).

4.1 Limitations

Despite the results obtained, it is important to recognize certain limitations that condition the interpretation of the findings. First, the study was conducted over a relatively short period of eight to twelve weeks, which limits the possibility of identifying sustained effects on the development of long-term language skills. Although an equitable intervention was sought, inequalities in access to technology arose, as some public-school students faced technical difficulties such as unstable connectivity and limited access to personal devices, which may have affected their full participation. Finally, rigorous control of external variables such as family support, time spent on extracurricular practice, or unsupervised use of educational applications was not achieved, factors that may have influenced the results without having been systematically controlled.

4.2 Practical Implications

The results of this research have important implications for educational policy and teaching practice in Peru, as they highlight the need to formally incorporate mobile learning (m-learning) into the school curriculum. It is recommended that schools promote the integration of mobile resources and educational applications as a complement to English language teaching at the secondary level, which could include the development of a validated list of applications by educational level and the implementation of continuing education programs for teachers to strengthen their didactic use.

In addition, it is essential to orient teacher training toward the development of digital skills in public schools, so that teachers are prepared to design active, multimodal, and contextualized pedagogical activities. Likewise, the success of m-learning depends largely on its adaptation to the characteristics of the environment, which requires the design of differentiated strategies that include asynchronous, offline, or low-data-consumption modalities suitable for contexts with limited connectivity.

Digital equity needs to be strengthened through policies that guarantee universal access to technological devices, connectivity, and technical support in schools, prioritizing the most vulnerable students. Finally, it is important to promote the development of contextualized educational applications that take into account the Peruvian linguistic and cultural environment, so that English language learning is linked to meaningful communicative situations that are relevant to the students' reality.

4.3 Theoretical Contribution

This research contributes theoretically to the field of foreign language learning by strengthening the evidence supporting the theoretical frameworks of mobile learning (m-learning) and language acquisition from a socioconstructivist approach. The results validate previous postulates that suggest that the use of mobile technologies can enhance learning by facilitating personalized, flexible, and contextualized experiences. In particular, this study confirms that access to mobile educational applications favors constant exposure to the language, promotes multimodal practice, and stimulates self-regulated learning, which are fundamental aspects in technology-mediated language acquisition models.

Variability in access to devices, limited connectivity, and uneven teacher preparation highlight that the benefits of m-learning depend on structural and pedagogical conditions that must be addressed. Thus, the study not only confirms the effectiveness of mobile learning in urban school contexts in Peru, but also broadens the theoretical discussion by highlighting the need to adapt these approaches to educational realities with technological limitations.

4.4 Conclusion

The findings of this research allow us to conclude that mobile learning had a significant impact on the development of students' language skills, as the ANOVA analysis showed statistically significant differences between groups with different levels of mobile tool use, with higher results in listening comprehension, reading comprehension, written expression, and oral expression among those students who used these technological resources more frequently.

In addition, a positive correlation was identified between the level of mobile learning use and English proficiency, indicating that the greater the use of these tools, the better the results in language learning. The quantitative data coincided with the qualitative perceptions gathered, in which students indicated that the use of mobile applications facilitated autonomous learning, allowing them to advance at their own pace and review content according to their needs, which reinforced their progress in learning English. Finally, it highlights the importance of continuing to research and select mobile applications that have proven their pedagogical effectiveness, with the aim of

adapting them appropriately to the local educational context and ensuring their relevance and effectiveness in the classroom.

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Authors' contributions

The authors RMH; HBGC and PJVQ were responsible for the design and review of the study. CLAV; ERT and WSV were in charge of the methodological review and theoretical support. RMH APV; SRC; CAFT and HMSR wrote the discussion and conclusions of the manuscript. All authors read and approved the final manuscript.

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