Implementation of mobile learning strategies and their effect on English Language Teaching (ELT)

Implementación de estrategias de aprendizaje móvil y su efecto en la enseñanza del inglés

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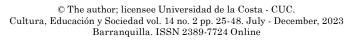yomis@outlook.com

Abstract

Introduction: Mobile learning strategies are related to remote learning because they motivate learners to use technological devices such as computers, tablets or smartphones for academic purposes. As a result, greater indexes of compromise, learning, and development of communicative competencies in a foreign language are generated. **Objective:** This study explores how to boost the level of English proficiency among professors by implementing m-learning strategies as a response to the university's foreign language policy. **Methodology:** The study was based on action research with data collection instruments such as an entry test, forums, perception surveys, and students' learning products. **Results and discussion:** m-learning strategies were used to foster the attainment of academic goals by participants and to enrich their professional growth as teachers and students. Furthermore, they were prompted to update and incorporate technological resources while the didactic teaching process. **Conclusions:** participants developed a metacognitive process when using m-learning strategies so that they could make autonomous learning decisions and enhance their pedagogical practice.

Keywords: English as a Foreign Language (EFL); information technology; higher education; mobile learning

Resumen

Introducción: Las estrategias de aprendizaje móvil se relacionan con el aprendizaje remoto porque propician el uso de dispositivos tecnológicos como computadores, tabletas o teléfonos inteligentes con fines académicos. Como resultado, se generan mayores índices de compromiso, aprendizaje y desarrollo de competencias comunicativas en una lengua extranjera. **Objetivo:** Este estudio explora cómo impulsar el nivel de dominio del inglés en los profesores a través de la implementación de estrategias de aprendizaje móvil como respuesta a la política universitaria de lenguas extranjeras. **Metodología:** El estudio se basó en los parámetros de la investigación acción, y usó como instrumentos de recolección de datos una prueba de ingreso, foros, encuestas de percepción y productos de los estudiantes. **Resultados y discusión:** Se utilizaron estrategias de aprendizaje móvil para fomentar el logro de metas académicas de los participantes y enriquecer su propio crecimiento profesional como docentes y estudiantes. Además, se les motivó a actualizarse e incorporar recursos tecnológicos durante el proceso didáctico de enseñar. **Conclusiones:** Los participantes desarrollaron un proceso metacognitivo al utilizar estrategias de aprendizaje móvil para tomar decisiones de aprendizaje autónomo y potenciar su práctica pedagógica.

Palabras clave: Enseñanza de inglés como lengua extranjera; tecnología de la información; educación superior, aprendizaje móvil

INTRODUCTION

The increasing use and relevance of mobile devices in everyday life have contributed to their inclusion in different educational settings. In this sense, mobile devices have undoubtedly expanded the range of activities that may be developed in English as Foreign Language (EFL) classrooms and have also provided a myriad of opportunities for both students and teachers. In this regard, Cicih et al. (2022) define Mobile-Assisted Language Learning (MALL) as a strategy that is associated with the use of technology, especially mobile phone technology in the field of language learning to improve different communicative skills.

Similarly, Criollo-C et al. (2021) and Vera and Shpak (2021) emphasize how mobile technologies expand learning opportunities and contribute to the development of students' autonomy and the attainment of goals. Furthermore, extensive research and conceptual frameworks have been developed concerning key features of MALL environments (Alkhudair, 2020; Yu, 2022; Palalas & Wark, 2020; Rajendran & Yunus, 2021), and they are under the following premises: MALL environments promote social interaction, motivation, and engagement. They also provide good quality lessons and authentic materials by adding a contextual layer to the language learning process.

In Colombia, some research studies have been conducted that shed light on the relevance of curating materials, ameliorating the learning experience mediated by MALL and the incidence of the methodological design (Chiappe-Laverde & Paz-Balanta, 2021; García et al., 2022; González et al., 2020; Pérez, 2021; Ramírez & Zambrano, 2020). As a result, MALL's contributions to EFL have been pondered from various perspectives and educational settings. García et al. (2022) concluded that MALL features could be capitalized by the embedment of training in self-regulation along with four weeks of temporary scaffolding and proximal goal attainment. Pérez (2021) highlighted the relationship between the good quality of mobile devices, the internet connection, and the student's progress in terms of motivation and autonomous learning.

Likewise, González et al. (2020) underlined MALL's contribution to autonomy; however, in line with Chiappe-Laverde and Paz-Balanta (2021), they declared that it depends on the teachers' mediation, pedagogies, and implementation:

> [...] adaptation and flexibility are factors that promote such personalization in both students and teachers, to the extent that it is possible to learn and teach at their own pace, with access to teaching materials potentially adjustable to their needs, interests, and abilities; as well as being able to expand the learning environments beyond what a classroom can provide, both in time and space (Chiappe-Laverde & Plaza-Balanta, 2021, p. 16).

With regard to the great potential of MALL-mediated EFL, Ramírez and Zambrano (2020) emphasized that MALL comprises more than technology and should be founded on a methodological design. Finally, Chiappe-Laverde and Paz-Balanta (2021) also highlighted some drawbacks of MALL-mediated EFL such as there is a pedagogical challenge in a mobile learning strategy implementation, learning settings might be complex, there is a risk of keeping students into different tasks, students with technological gaps necessary for teachers' implementation, among others.

Studies previously mentioned elucidate the requirements to conduct MALL-mediated EFL learning experiences as well as provide insights on the benefits and drawbacks that may arise in MALL implementation in EFL settings. At USTA (Universidad Santo Tomás) a preliminary study was conducted with undergraduate students to train learners with suitable MALL strategies to foster communicative competencies in English. As a result, both teachers and students could become acquainted with online tools and apply the acquired knowledge in real situations and authentic contexts. In this manner, MALL in EFL settings had a more significant effect on students, as they were able to associate it with the opportunity to join in and participate in the global community (Rodríguez-Silva & Mendieta-Ramírez, 2020).

Former research on the topic was based on young EFL learners, conversely, the target population for the present study focused on higher education teachers who belonged to different faculties from a private Colombian university. Due to the institutional foreign language policies (USTA, Estatuto Docente, 2020a; USTA, Acuerdo 46, 2014), teachers were expected to certify their foreign language proficiency. Apart from the English courses offered at the university, MALL strategies seemed to be an alternative to assist them in learning English. Thus, the present study responds to a research gap regarding the implementation of MALL in EFL courses directed to higher education teachers and contributes to the discussion on benefits and pitfalls derived from MALL-mediated EFL learning experiences among adult learners.

Between 2015 and 2020, teachers at USTA took English diagnostic and placement tests and were involved in various English courses to foster teachers' communicative competence in English (USTA, 2020b). Despite the efforts made since 2015, teachers have not attained the desired level of proficiency (B2). According to the USTA Management Report 2015-2019, only 36,59% of the teaching staff (719 teachers) attained a B1 level or higher (USTA, 2019).

In this sense, it is necessary to update the English program directed to teachers at USTA to reach the goals proposed in the University action plan for the next 6 years. Consequently, the present research proposed MALL to contribute to the development of digital and communicative skills in EFL among teachers at USTA. This study aimed at responding to the following research question: To what extent may MALL contribute to the development of communicative competence in EFL among teachers at USTA in Bogotá, DUAD (Division of Open and Distance University) and Villavicencio? This article presents the context and participants as well as the research approach and methodology. Furthermore, it gives an account of the results and the subsequent conclusions.

Literature Review

Mobile devices as learning tools

As technology evolves, mobile devices such as smartphones, tablets, iPods, laptops, and iPads have gained space in the learning and teaching scenarios. Thus, they have become suitable tools for supporting English classroom activities mainly due to the outburst of Mobile Learning (m-learning). Mobile devices' features define most of the benefits

of education mediated by m-learning. In this sense, Adzifome and Agyei (2022), Teng et al. (2022) and Nafa (2020) have emphasized key aspects of mobile devices that are subsequently adopted by m-learning such as flexibility, mobility, portability, accessibility, immediacy, and interactivity.

As a result, mobile devices allow learners to learn anywhere and anytime (Mohammadi et al., 2020), as well as to plan and execute a learning program at a pace that they find comfortable with or to work intensively on some skills while avoiding others (Nafa, 2020). Furthermore, Ahmed et al. (2022) and Hawamdeh and Soykan (2021) highlight the promotion of authentic communication, whereas García et al. (2022), Lai et al. (2022), and Lei et al. (2022) stress how the use of mobile devices in the foreign language classes may positively impact self-regulation, motivation, and self-study.

MALL (Mobile Assisted Language Learning)

Nowadays technology provides students with digital tools as an alternative to grow as critical thinkers and problem-solving citizens. Additionally, students not only learn in a classroom, but they also have the possibility of accessing different sources to enable personalized learning. Due to globalization MALL has grown as an answer to worldwide cultural challenges in terms of communication. Arvanitis and Krystalli (2021) highlight several key MALL features that enhance learning motivation, provide learners with opportunities to communicate in real and virtual environments and boost the use of the target language through amusing activities.

Moreover, Okumuş et al. (2020) state that MALL benefits learners in terms of self-directed learning and autonomous possibilities due to the low costs of internet access. Aliakbari and Mardani (2022) point out that m-learning allows learners to have more access to material based on their own pace and preferences. Accordingly, mobile devices have two meaningful features such as connectivity through the wireless network at any time and everywhere, and portability which provides learners with the opportunity to have learning materials immediately. Okumuş et al. (2020) and Aliakbari and Mardani (2022) highlight that learning could occur at any place, even at work, at any time of the day, and through any areas of life such as work training, entertainment, and self-improvement through m-learning.

Technological devices may imply challenges for learners in terms of multimedia limitations, data storage, and screen sizes. Viberg and Gronlund (cited by Alkhudair, 2020) state that wireless internet could have a side effect due to the unstable connections learners may face in certain areas. Mobile tools entail a cost for the institution or the students to have suitable learning conditions. However, MALL could have countless improvements to suit learners' needs. Furthermore, Lei et al. (2022) point out that MALL promotes collaborative learning and interaction in the target language through a feeling of freedom whenever and wherever.

MALL also takes advantage of mobile technologies for encouraging language learning by MP3 players, mobile phones, electronic dictionaries, smartphones, personal digital assistants, and other gadgets, and at the same time, it creates an appropriate environment to share resources and communicate in a learning community (Aliakbari & Mardani,

2022). Likewise, Arvanitis and Krystalli (2021) highlight specific MALL benefits in terms of increasing the learner's motivation for using mobile devices, providing learners with possibilities to develop productive and receptive skills, enhancing the use of the target language to communicate meaningfully, promoting teachers' critical thinking when planning real teaching classes, motivating communication among the learners beyond the classroom and encouraging learning in an enjoyable path.

MALL emphasizes learner-centered teaching which allows students to become aware of how and what they are learning and empowers them to manage their learning process according to their pace. As a result, m-learning strategies provide students with access to a variety of digital learning devices. Indeed, m-learning is able to create the conditions for acquiring new information and motivate learners to engage in problem solving and reflective thinking. For instance, m-learning strategies can promote the use of interactive and engaging digital content material.

Likewise, they enhance technological competence and high order skills among students. As a consequence, these strategies encourage critical thinking skills by providing students with opportunities to analyze, evaluate, and synthesize information in several circumstances (Ahmed et al., 2022). Furthermore, these authors added that m-learning can promote student motivation and engagement, and support the development of self-directed learning skills, which are valuable elements of critical thinking.

METHODOLOGY

Research design

This qualitative research project aligned to the action research methodology involved a process of reflecting on how the teaching practice may be enhanced with the inclusion of new paradigms and, subsequently impact the learning process of the participant community. This research followed the four phases proposed by Rojas-Espinoza et al. (2022): observation, planning, action, and reflection. The first stage of the research focused on determining the range of participation of USTA teachers from Bogotá, Villavicencio (Colombia), and DUAD in the English training strategies offered by the University. Database files were revised, and it was evident that the strategies promoted by the university were applied only in Bogotá, partially in DUAD, and scarcely implemented in Villavicencio.

Furthermore, it is necessary to clarify that experimental methods in action research can be perceived as a complementary methodology, in which quantitative and qualitative methods are used to strengthen educational studies and analyze information (Dawadi et al., 2021). The main purpose of this study was to provide a complete insight into how to boost the level of English proficiency among professors by implementing m-learning strategies as a response to the university's foreign language policy. Indeed, the use of a control group and an experimental group allowed researchers to observe and compare the effects of a specific intervention in the university. In this case, teacher- learners from USTA participated in a Moodle course that fostered m-learning strategies focused on language learning while the control group from Fundación Universitaria del Área Andina (Colombia) was trained in m-learning tools for pedagogical purposes.

Consequently, USTA participants were able to verify the effectiveness of the intervention and the impact that this study had on their learning outcomes. What is more, the use of a control group helped to manage external variables and ensured that the results observed could be attributed to the intervention rather than to other elements. By using both, an experimental and control group, researchers were able to properly understand the effectiveness of their intervention and they could make informed decisions about future research projects when teaching English. Observation, planning, action, and reflection are the four essential stages of action research. The observation step dealt with observing and gathering data about the current situation to be studied. The planning stage involved analyzing the data collected and developing an action plan to address the project.

The action stage implied carrying out the plan and implementing the indispensable changes. The final step, reflection, involved evaluating the results of the actions conducted and considering any further modifications that may be required. This recurrent process of observation, planning, action, and reflection allows for continuous advancements and adaptation in addressing complex pedagogical and academic situations (Rojas-Espinoza et al., 2022). The use of action research in academic contexts emphasizes the relevance of involving all participants in the research process, including teachers, students, and administrative staff. Action research fosters the development of problem-solving skills among participants. Likewise, pedagogical and academic decision-making leads to more effective results in an institution. As a result of the observation phase, the following Figure 1 displays the percentage of teachers taking advantage of English training strategies according to their location:

FIGURE 1. *Percentage of participants in the English training courses.*

Source: Data obtained from the Language Department Office -USTA Bogotá.

This initial phase also included the teachers' participation in an English diagnostic test (Cambridge Empower Placement Test) to verify their level of communicative competence in English. The following Figure 2 shows the percentage of teachers who took the placement exam, their results, and their location.

FIGURE 2. *Placement test results.*

Source: Data obtained from the results of the diagnostic test.

Once the first stage finished, the planning phase began with a pedagogical intervention through the design of a training course on m-learning strategies to foster English communicative competencies through the implementation of m-learning. The course was developed in a blended modality and comprised synchronous work followed by independent and asynchronous work. As part of the instructional design, a set of applications and websites was selected to be implemented into the course. During the action stage of this study, a pilot course on m-learning strategies was conducted with USTA teachers.

Each module was intended to foster a specific language skill —grammar, reading, listening, and speaking— and to make the attendees become acquainted with different applications and digital tools to strengthen their communicative skills in English. Simultaneously, a tailored m-learning strategies course was designed and implemented with the control group from Fundación Universitaria del Área Andina. This course was intended to provide training on using the m-learning model for teachers of several disciplines. The strategy's effectiveness and impact in both courses were determined through a survey conducted at the end of the program proposed. Finally, a critical reflection was conducted to propose improvement actions in the language training plan for teachers at USTA.

Subsequently, to interpret the information gathered during the observation and action stages, a thematic analysis was implemented, which according to Castro et al. (2022), implies an objective description, systematic and quantitative analysis of the content and information obtained after the data collection. This analysis involved the implementation of the following stages:

1. Getting familiar with the data gathered during the observation and action stages. Researchers checked, verified, and interpreted data gathered in the placement test results (Figure 1 and Figure 2) and the surveys applied to the participants in terms of their English level, their opinions about foreign language learning, and the use of mobile devices to support a language learning process.

2. Encoding units of meaning such as words or sentences. Researchers set words or phrases that represented synoptically the meaning attributed to an object. Researchers designed a matrix with all data collected and then, similar words or phrases were highlighted to identify differences and commonalities.

3. Integrating codes into pre-selected categories according to their common properties. The main goal at this stage was to identify and regroup the data into possible categories.

4. Reviewing categories to verify if the data was consistently based on each category identified.

5. Defining and determining categories. At this point researchers defined two categories, they were named "navigation route" and "self-awareness of autonomous learning". The first category focuses on the participants' perception of mobile devices and m-learning, and the second category reveals the actual use of mobile resources in the academic or professional area. Both are presented and analyzed in the results section.

Participants

Participants in the study included two groups of teachers-students[1]. To validate the findings of this study, the group of teachers-students comprising 12 teachers from Universidad Santo Tomás-USTA (Bogotá and Villavicencio, Colombia) was determined as the experimental one, thus, they were exposed to all the proposed activities over the course of this study (Castro-Maldonado et al., 2023). In the observation phase, especially in the diagnosis stage, there were 97 participants, 24 from USTA Villavicencio, 33 from USTA Bogotá, 13 from DUAD, and 3 from USTA Bucaramanga. 24 teachers-students enrolled in the EdS degree in Education and Pedagogy at the Fundación Universitaria del Área Andina engaged in the control group. This group was set to analyze and compare the impact and scope of the pedagogical m-learning strategies implemented. This group participated in the diagnosis of English competencies level and a course on m-learning strategies.

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[1] The concept of teachers-students emerges from the teachers at USTA who participated as students in this project. It is also applied to students belonging to the EdS degree in Education and Pedagogy at Fundación Universitaria del Área Andina who are teachers of diverse fields of knowledge.

The following Table 1 displays more information about the participants who took part during the planning and action phases of the study.

TABLE 1. *Participants.*

Criteria	Experimental group	Control group
	USTA Villavicencio and Bogotá	Fundación Universitaria del Área Andina
Age	between 25 and 60.	between 25 and 45.
Gender	8 men.	12 men.
	4 women.	12 women.
Location	7 teachers at USTA Villavicencio.	24 teachers at national level.
	5 teachers at USTA Bogotá.	
Teaching level	Higher education.	Higher education.

Source: Own elaboration.

Data collection and trustworthiness

To guarantee the reliability of the instruments implemented, they were submitted for evaluation by external academic peers. Data were collected for three months, during which the surveys were available (Table 2).

TABLE 2. *Research Instruments and their objectives.*

Instrument	Objective
Databases provided by Unidad de Desarrollo Curricular y formación docente at Universidad Santo Tomás	To identify and diagnose the state of the participation of teachers from the USTA Bogotá, Villavicencio and DUAD in the English training strategies offered by USTA.
Perception survey	To determine teachers-students' use of m-learning strategies before the intervention.
English placement test	To diagnose teachers-students' English communicative competencies before the intervention.
Final survey	To evaluate the effectiveness of the m-learning model and ICT strategies applied to the teachers-students' English learning processes.

Source: Instruments used in the research project.

Ethical considerations

This research was guided by the ethical principles established by USTA and Colombian regulations regarding investigative processes involving human beings according to Resolution 33 of May 2013 and Resolution 48 of May 2018 (USTA, 2023), and ethics, bioethics and scientific integrity policy of Minciencias (Colciencias, 2017). Concerning

this legal framework, the research is classified as without any risk because the data collection instruments used were aimed at collecting information from the participants voluntarily and freely. Beforehand, the participants knew the methodological strategy to be implemented. As evidence of this socialization, an informed consent form for adults was filled out. This document abided by the confidentiality and anonymity of the information provided, which was treated solely for academic purposes.

Results and discussion

M-learning strategies have become increasingly well-known in recent years due to the widespread use of mobile devices and the rise of technology in educational contexts. These strategies are characterized by the use of mobile devices such as smartphones, tablets, and laptops, to deliver pedagogical content and facilitate learning. In this context, m-learning contributed to higher-order thinking skills such as critical thinking of participants in several ways. First of all, m-learning allowed learners to access educational content in English anywhere and at any time (García et al., 2022). This provided participants with the flexibility to learn a foreign language at their own pace and in their way. It became particularly useful for teachers-learners who could not attend traditional classes due to location or time constraints.
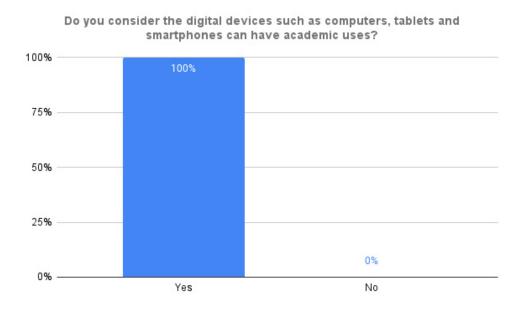
In the same way, m-learning provided teachers the access to educational content in English on their mobile devices, teachers could take advantage of any moment to learn and improve personal and academic competencies —social and language competencies—. In addition, m-learning offered various tools and applications that support English language development, such as grammar checkers, vocabulary builders, and pronunciation apps. These mobile resources provided participants with personalized feedback and opportunities to practice their language skills in an entertaining and interactive way. In the following lines, the relationship between action research stages with categories will be presented.

Action stage as a navigation route

During the planning stage, participants were enquired about their previous knowledge regarding m-learning strategies in order to identify the applications they had already used and determine the set of applications to be implemented with each group (experimental and control groups). 81 professors answered a perception survey about m-learning strategies. The instrument was submitted by email. First of all, participants were asked about the use of digital devices.

In Figure 3, 100% of the participants were aware of the use of digital devices such as computers, tablets, and smartphones for academic purposes. For this reason, they expressed their willingness to participate in the control and experimental groups respectively. Accordingly, Milheim et al. (2021) consider as a major priority that students have an internet connection in order to participate in m-learning practices, likewise, m-learning encourages students to have better results. Over the course of this research, students were able to have a stable internet connection, and they could also take advantage of their own mobile devices.
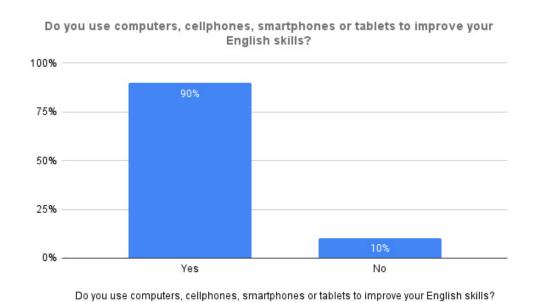
FIGURE 3. *Question 2. Perception survey.*

Do you consider the digital devices such as computers, tablets and smartphones can have academic uses?

Source: Data obtained from the perception survey.

In Figure 4, participants were asked whether they used computers, mobiles, or tablets to improve their English skills. 90% of participants expressed that they used this kind of technology while 10% of them did not. It means that most of them were acquainted with m-learning strategies. Chirino-García and Hernández-Corona (2020) state that m-learning provides more free access to a large volume of information in comparison to face-to-face training. Furthermore, researchers provided teachers with several m-learning opportunities to improve their level of proficiency in English.
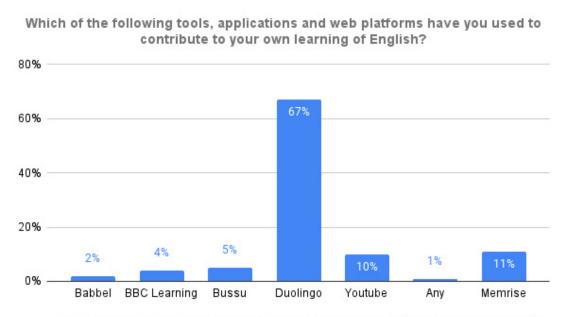
FIGURE 4. *Question 3. Perception survey.*

Do you use computers, cellphones, smartphones or tablets to improve your English skills?

Do you use computers, cellphones, smartphones or tablets to improve your English skills?

Source: Data obtained from the perception survey.

In Figure 5 participants were asked about the tools, applications, and web platforms they had used to learn English. 67% of the participants used Duolingo. 11% of the participants used Memrise, Quizzes, Mondly, and Wordreference, and 10% of them used Youtube. Likewise, other responses included tools such as Bussu, BBC Learning, and Babbel with percentages ranging from 5% to 2%, respectively. Furthermore, most of them had already used Duolingo as an autonomous path to achieve their learning goals due to pedagogical measures taken at their workplaces or for personal academic growth. In this sense, Milheim et al. (2021) highlight that m-learning strategies refer to the ability to use mobile technology in order to generate learning experiences, and they may be used in several fields not only for learning a foreign language, but they may also be applied in their own academic area as teachers.

FIGURE 5. *Question 4. Perception survey.*

Which of the following tools, applications and web platforms have you used to contribute to your own learning of English?

Which of the following tools, applications and web platforms have you used to contribute to your

Source: Data obtained from the perception survey.

In Figure 6, 72% of participants stated that they spent at least 30 minutes a day practicing English online. 18% of them practiced for less than 30 minutes. The lowest percentages focused on users who devoted from 1 hour to more than 2 hours practicing online; they obtained percentages from 6% to 2%, respectively. As a result, participants were engaged in improving their EFL proficiency level according to their preferences and time availability. Peláez et al. (2022) express the need of learning a foreign language to be competitive in a globalized world; hence, in the framework of this research participants grew aware of the importance of improving their English communicative skills not only for personal and academic development but also to use them in their pedagogical performance.
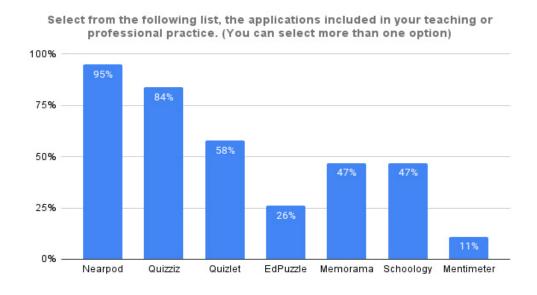
FIGURE 6. *Question 5. Perception survey.*

How much time do you spend practicing English per day?

Source: Data obtained from the perception survey.

Reflection stage as self-awareness of autonomous learning

During the final phase of reflection, the participants who belonged to the control group were not exposed to the dependent variable: English with m-learning strategies. They took an online course consisting of 4 session workshops focused on implementing m-learning strategies according to the colombian educational context. As the course concluded, they answered a survey. Their insights and perceptions of taking part in an m-learning course are displayed as follows:

FIGURE 7. *Question 1. Final perception survey.*

Select from the following list, the applications included in your teaching or professional practice. (You can select more than one option)

Source: Data obtained from the final perception survey.

In Figure 7, participants were asked to choose the applications used in their professional practice. 95% of them selected Neardpod as the most relevant for their professional practice. Indeed, Neardpod provides teachers with opportunities to respond to students' inquiries efficiently and it is appropriate for synchronous and asynchronous classes. 84% of participants selected Quizizz, which is a suitable tool for learning, providing assessment, and even self-assessment. 58% of them chose Quizlet, this tool encourages teamwork and collaborative assignments in a creative way.

47% of them selected Memorama and Schoology. Memorama is an innovative means for sharing images and concepts. Schoology fosters collaborative learning in a Moodle-similar environment. Chirino-García and Hernández-Corona (2020) point out that m-learning builds the spirit of innovation, cooperation, critical thinking, and technological skills to foster and strengthen collaborative learning. Consequently, participants grew aware of their learning and how they could achieve their learning goals. Moreover, m-learning boosted their professional identity and world citizenship.

FIGURE 8. *Question 7. Final perception survey.*

Source: Data obtained from the final perception survey.

In Figure 8, 84% of the participants expressed that the use of applications favored their teaching practice. Likewise, 14% of participants asserted that applications almost always positively contributed to their lessons. In this sense, participants were exposed to a great variety of m-learning resources and strategies to avail themselves of in their professional life. Similarly, Chirino-García and Hernández-Corona (2020) emphasize that the transfer of knowledge through different modalities based on m-learning contributes to fostering learning and teaching strategies. In consequence, m-learning strategies allowed students to overcome the limitations of time and space and became willing to interact with foreign cultures.

FIGURE 9. *Participants explained Question 7. Control group.*

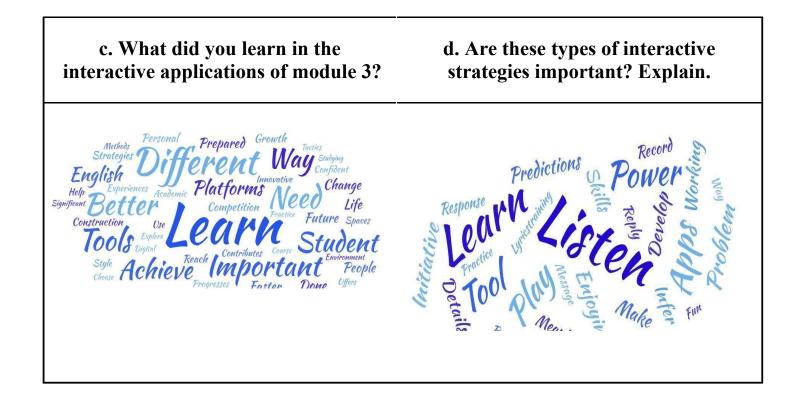

Source: Data obtained from the final perception survey.

In Figure 9, some keywords were presented to point out participants' perceptions regarding the effectiveness of using m-learning applications. The participants considered that m-learning applications provided a great variety of resources, they were also user-friendly, accessible, interactive, and useful to optimize resources at work or school. Indeed, they highlighted that technological applications were more accessible, engaging, and time efficient, and they enhanced continuous learning. Teng et al. (2022) stress that ubiquity, mobility, interactivity, adaptability, flexibility, accessibility, and universality are the main advantages of using this type of learning technology. Indeed, m-learning provides a wide range of opportunities for boosting the teaching and learning process in any training field in higher education. In this sense, these learning technological resources contribute to improving not only the institutional pedagogical processes but also the teachers' academic growth.

The experimental group was exposed to the dependent variable: English with m-learning strategies. 12 professors participated in a Moodle course aiming to improve their EFL communicative competence in terms of language use, reading, listening comprehension, and speaking production using m-learning tools. As a result, participants read on VOA learning English, BBC News, and the New York Times. Likewise, they worked on several applications such as Duolingo, Babbel, and Johnny Grammar's word challenge.

Then, they published their progress on Padlet. Furthermore, they used the Go Synth app, where they were able to interact by recording a thread. Participants also used the My Cake app, in which they could practice listening to short videos and pronouncing words or phrases. Finally, they recorded a video on Flipgrid and audios on Vocaroo.

Teng et al. (2022) assert that these strategies represent a commitment to a modern educational system to satisfy academic and personal needs in those regions where students are not able to attend on-site classes. For instance, research participants could have access quickly and easily to learning resources anytime and anywhere in different Colombian towns. Furthermore, participants in the experimental group, from the cities of Bogotá and Villaviencio shared their perceptions in a forum on the Moodle platform publishing a thread regarding m- learning strategies. They were asked about what they learned in the interactive applications of module 3 and if those types of interactive strategies were found relevant. Some perceptions are presented below (Figure 10):
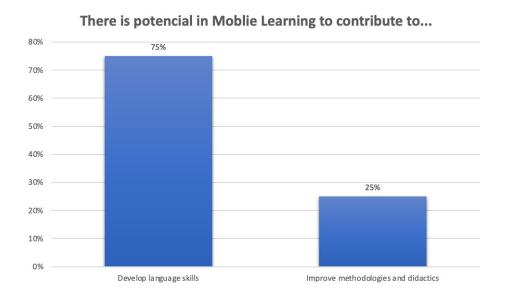
FIGURE 10. *Participants' answers in Moodle forum questions C & D- experimental group.*

c. What did you learn in the interactive applications of module 3?	d. Are these types of interactive strategies important? Explain.

Source: Data obtained from the Moodle platform forum.

In Figure 10, participants from the experimental group expressed a high degree of satisfaction with m-learning strategies as tools to develop listening skills and learn English. What is more, m-learning strategies enhance continuous learning language culture, which is relevant for student's retention and engagement. Furthermore, at the end of the implementation, they completed a final perception survey in which they were able to evaluate and share their opinions. They are displayed in Figure 11 where participants answered a second perception survey.

FIGURE 11. *Question 1. Second perception survey.*

There is potencial in Moblie Learning to contribute to...

In Figure 11, 75% of participants expressed how m-learning contributed to boosting their EFL skills once they were aware of how to use them appropriately. The remaining 25% of them highlighted that m-learning contributed to enriching innovation when teaching. Thus, considering the results and Criollo-C et al. (2021), it is evident that m-learning allows the inclusion of diverse learning models and leads them to become involved in the construction and development of their learning. Additionally, participants provided more insights (Figure 12).

FIGURE 12. *Question 1.1. Second perception survey.*
Please, indicate any other contribution of mobile learning.

In Figure 12, participants were required to refer to additional m-learning contributions. At this point, they highlighted some keywords in terms of *time*, *fun, availability*, *spaces*, *home*, *diversity*, and *flexibility,* among others. Furthermore, they described m-learning as an *opportunity* for *learning* and a *method* according to their own learning *pace*. Indeed, meaningful learning occurs when participants feel comfortable with their learning path. These results align with theory and previous research on the topic by considering that the quality of m-learning is vital for the effectiveness of upskilling and reskilling educational and professional development initiatives (Mystakidis, 2021).

FIGURE 13. *Question 3. Second perception survey.*
Concerning the development of communicative skills in English,
what do you see as the advantages of mobile learning?

Source: Data obtained from the second perception survey.

In Figure 13, participants emphasized the advantages of m-learning as an alternative for independent learning; thus, they used keywords such as *self*, *autonomous time*, *real regulation*, *better assessment* and *developing skills*, among others. Likewise, they underlined that they had the opportunity to motivate *interaction* in *real contexts* to develop *skills*. They also used Duolingo for checking language usage, MyCake for enriching vocabulary and pronunciation, Padlet for developing writing, Gosynth for enhancing listening and speaking, Vocaroo, and Flipgrid for improving oral skills. In fact, m-learning strategies are suitable for fostering autonomous learning and awareness when learning a foreign language.

To sum up, implementing m-learning strategies in the classroom is crucial in current education as these tools aid both teachers and learners to take responsibility for their personal growth (Kumar et al., 2018). Moreover, the benefits identified in this study rely on the type of institutions that participated, the population that took part and the permanent motivation of the teachers-students to use the tools autonomously to promote learning. In fact, they realized that online tools may be used not only for fun but for academic purposes as well. It is also evident that m-learning permits the consolidation of prior knowledge and adaptation of online resources according to the classroom needs and interests to construct knowledge.

Conclusions

MALL has several advantages that benefit students' learning such as mobility, portability, accessibility, immediacy, and interactivity. Likewise, the participants in this study highlighted that an English course mediated by m-learning strategies assisted them in managing their study time in a better way. Thus, it was plausible that they devoted time to strengthening their communicative skills in English as they were first introduced to some applications, and consequently, they managed to make their own decisions based on their needs, interests, and background knowledge.

In this sense, they appreciated the idea of not attending traditional classes and having immediate access to online resources wherever and whenever they could. This fact implied a transition from traditional and face-to-face learning to a more autonomous and self-paced one. Participants were aware of the simultaneous role of teachers and students and how they were able to have a broad and holistic experience when learning and teaching at the same time. Furthermore, participants recognized the benefits of including mobile devices and m-learning strategies to manage their foreign language learning process not only in the classroom but also in different locations depending on their needs and the availability of an internet connection.

In addition, participants found the tools and applications used during the research process innovative, convenient, and effective to foster the skills they were not good enough at. Likewise, with the implementation of m-learning strategies participants were able to practice all the language skills, acquire new knowledge, and reinforce the previous one. Finally, the participants mentioned that the mobile devices and m-learning strategies implemented throughout this research project favored a more agile, practical, and enjoyable learning process, in which they were able to focus on their needs by using different didactic and entertaining tools. In conclusion, they pondered the relevance of applying m-learning strategies because they promote asynchronous and autonomous learning processes.

Further research could be addressed to verify the impact of m-learning strategies in those areas where teachers have limitations of internet connection and attempt to foster students' communication through authentic materials and also build a suitable learning environment to favor the learner's autonomy. Indeed, this research study is just a starting point for future studies on the development of EFL and other academic subjects mediated by m-learning. As a final remark, there are some pedagogical implications of implementing m-learning strategies that require further study, such as how to integrate this model into the English curriculum as a way to improve autonomous learning processes, motivation, and flexibility. Also, the possibility of creating a customized application that allows the interaction of this particular group and context members, could be developed as a second stage of this study.

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