Teachers' perceptions and experiences with mobile apps to enhance literacy skills in the classroom

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ABSTRACT: The use of mobile applications in the educational field has experienced significant growth. It is crucial to understand teachers' perceptions regarding the use of these resources for improving literacy, as they play a crucial role in their implementation in the classroom. This qualitative exploratory study was conducted in the province of Granada with teachers from different educational institutions. A semi-structured interview was used to collect information, utilizing Atlas Ti for data analysis. The results revealed that teachers have diverse opinions regarding digital training, the benefits, difficulties, and criteria for selecting mobile applications. Benefits highlighted by teachers included student motivation and engagement, while difficulties were associated with digital training, limited access to technological resources, and the selection of appropriate applications. Regarding methodological strategies, emphasis was placed on the importance of consistent use of applications, establishing clear guidelines, and leveraging their interactive potential. In conclusion, this study contributes to understanding teachers' perspectives on the use of mobile applications to enhance literacy, providing valuable information for their effective implementation in the educational setting.
Keywords: Mobile applications, reading, writing, Primary Education, perceptions

Percepciones y experiencias docentes en apps móviles para potenciar habilidades lectoescritoras en el aula

RESUMEN: El uso de aplicaciones móviles en el ámbito educativo ha experimentado un crecimiento significativo. Es fundamental comprender la percepción de los docentes sobre el empleo de estos recursos para la mejora de la lectoescritura, debido a que desempeñan un papel crucial en su implementación en el aula. Este estudio cualitativo exploratorio se realizó en la provincia de Granada con docentes de diferentes centros educativos. Se utilizó una entrevista semiestructurada para recopilar información, haciendo uso de Atlas Ti para el análisis de datos. Los resultados mostraron que los docentes tienen opiniones diversas sobre la formación digital, los beneficios, las dificultades y los criterios de selección de las aplicaciones móviles, destacando la motivación y participación de los estudiantes como beneficios, mientras que las dificultades se relacionaron con la formación digital, el acceso limitado a recursos tecnológicos y la selección de aplicaciones adecuadas. En cuanto a las estrategias metodológicas, se enfatizó en la importancia de utilizar las aplicaciones de manera constante, establecer normas claras y aprovechar su potencial interactivo. Finalmente, este estudio

contribuye a comprender la perspectiva de los docentes en el uso de aplicaciones móviles para la mejora de la lectoescritura, proporcionando información valiosa para su implementación efectiva en el ámbito educativo.
Palabras clave: Aplicaciones móviles; lectura; escritura; Educación Primaria; percepciones

1. Introduction

In recent years, there has been a notable increase in the adoption of mobile applications in the field of education, offering new opportunities to enhance the teaching and learning of various skills, including literacy (Szymkowiak et al., 2021). Reading and writing are fundamental competencies in the educational process, and their mastery is essential for academic success and the personal development of students (Suárez, 2021; Soto et al., 2023).

In this context and following the findings of various studies such as those proposed by Konerding et al. (2021) and Daza-González et al. (2023), mobile applications specifically designed to improve literacy are presented as promising and accessible tools that can complement and enrich traditional educational practices. These applications offer a wide range of resources and interactive activities aimed at facilitating the learning of reading and writing in a playful, engaging, and personalised manner.

The proliferation of mobile devices, such as smartphones and tablets, has made these applications readily available to most teachers and students at any time and place (Sola-Reche et al., 2019). Furthermore, their versatility and adaptability across different educational levels and learning styles make them potentially effective tools for addressing individual student needs, fostering motivation, and improving academic outcomes in literacy (Gallardo et al., 2021; Gumbheer et al., 2022Z, hang & Zou, 2022).

Despite the accessibility of these applications on mobile devices and their potential to meet individual student needs (Zuppardo et al., 2019), facilitate collaboration, enhance motivation, and elevate academic performance in literacy, it is crucial to strike a balance in their classroom use (Troussas, 2020). In this regard, they should not completely replace traditional practices, such as reading printed books or handwriting. It is essential to integrate applications as a complement or reinforcement to conventional activities, allowing students to explore a variety of approaches and learning methodologies (Hamilton et al., 2021).

It is fundamental to understand teachers' perception of the use of these mobile applications in the educational context since, under certain circumstances, some educators express reluctance to incorporate technologies into the educational environment (Arancibia et al., 2019). Teachers play a crucial role in implementing these resources in the classroom and are the ones who directly interact with students, guiding them in their learning process (Sánchez-Prieto et al., 2019; Morales et al., 2020). Therefore, this work assumes that the views, experiences, and opinions of teachers are of paramount importance to evaluate the effectiveness and potential impact of such applications in promoting the teaching-learning process, particularly in literacy skills.

The use of mobile applications for improving literacy in the educational context is a topic of great relevance for current education. Among the main arguments supporting this issue is the promotion of digital literacy. Following the arguments put forward by relevant authors in the field such as Churchill (2020) and Lin et al. (2023), in the digital era we live in, it is essential for students to acquire digital literacy skills alongside traditional literacy skills.

Within this framework, it is important to highlight that the use of mobile applications promotes the development of digital competencies by combining literacy practice with the use of technology (Hao et al., 2019; Máñez-Carvajal and Cervera-Mérida, 2021). These digital programmes allow content and activities to be tailored to the individual needs of students. By providing immediate feedback and interactive activities, a personalised approach tailored to each student's pace and level is offered, thereby increasing motivation and commitment to literacy (Zhyhadlo, 2022).

In the same vein, research studies proposed by Lin et al. (2020) and Bourekkache and Kazar (2020) assert that mobile applications provide an opportunity for students to actively engage in their own learning process. Through innovative activities, games, and challenges, students can participate more actively and practically in improving reading and writing skills, which can increase their autonomy and self-confidence in learning a second language.

Mobile applications offer a wide range of resources and educational materials to promote literacy, including digital books, dictionaries, vocabulary activities, and grammar exercises, in order to broaden access to educational material in different formats and enrich students' learning experience (Yu et al., 2023). Likewise, these applications can support students with Specific Educational Support Needs (SEN), being especially beneficial for those experiencing difficulties in the area of literacy. These applications can provide visual, auditory, and tactile supports that facilitate the learning and practice of reading and writing skills, offering a more inclusive and personalised environment (Vander & Power, 2021).

In the context of contemporary education and following a thorough analysis of scientific research, there has been observed an increased popularity in the use of mobile applications for educational purposes (Aznar-Díaz et al., 2021). These applications provide a diversity of resources and interactive activities designed to stimulate the development of students' skills, including applications focused on reading and writing (Amin and Sundari, 2020).

In this scenario, the relevance of acquiring digital competencies is emphasised (Fernández-Batanero et al., 2020). However, it is essential to understand the perspective of teachers, who are responsible for applying these tools in the classroom and leading the learning process. To address these challenges, it is fundamental for educators to access appropriate opportunities for their professional development and training in this field (Falloon, 2020). This includes the implementation of training programmes in digital skills, facilitating collaborative learning sessions, providing online resources as support, and encouraging the creation of communities of practice where teachers can share experiences and knowledge.

It is imperative to have policies and strategies at institutional and governmental levels that promote training in digital competencies and facilitate access to technological resources in educational environments (Sá and Serva, 2020). These policies can play a fundamental role in supporting digital transformation in education and in preparing teachers to face challenges and seize opportunities offered by the digital era.

Based on these considerations, the objective of this study was to better understand how teachers use mobile applications to promote the acquisition of literacy skills in students. By obtaining information on teachers' opinions, beliefs, attitudes, and experiences, a more comprehensive and contextualised view of how these applications are integrated into teaching practice and how they perceive they influenced the teaching-learning process of literacy could be obtained.

The research questions posed were as follows:

- What is the teachers' opinion on the effectiveness of mobile applications in enhancing students' literacy skills?
- What benefits and limitations do they encounter in the use of mobile applications in the classroom?
- How do they perceive the influence of teachers' perspectives on the integration and adoption of mobile applications for improving literacy in their teaching practice?
- What are the barriers or challenges that teachers face when using mobile applications to enhance literacy in the classroom?
- What recommendations or suggestions do teachers have to optimise the use of mobile applications in teaching literacy?"

2. Methodology

2.1. Design and participants

A qualitative exploratory methodology was employed for participant selection, based on specific criteria derived from teaching experience to ensure the inclusion of both novice and experienced educators, spanning across different educational levels, with a particular focus on those teaching at the Primary Education stage. The sample comprised 10 Primary Education teachers working in the cities of Granada, Almería, Cádiz, and Málaga. These teachers were carefully chosen to address the research from diverse perspectives and educational contexts. The detailed description of the interviewees (E) is as follows:

- E1: Female, 51 years old, with 15 years of experience, currently in her fourth year of teaching Primary Education at a public school in a village in Granada.
- E2: Female, 43 years old, with 20 years of experience, teaching 3rd and 4th grades at a public school in Granada city.
- E3: Male, 25 years old, with 2 years of experience, teaching 4th grade at a private school in Málaga.
- E4: Male, 45 years old, with 16 years of teaching experience, teaching 3rd grade at a public school in Granada city.
- E5: Female, 28 years old, with 5 years of experience, teaching 5th and 6th grades at a public school in Cádiz city.
- E6: Female, 27 years old, with 2 and a half years of experience, teaching 2nd grade at a private school in a village in Málaga.
- E7: Female, 41 years old, with 18 years of experience, experienced in teaching 4th and 5th grades at a public school in a village in Granada.
- E8: Male, 28 years old, with 2 years of experience teaching 4th grade at a public school in a village in Granada.
- E9: Male, 29 years old, with 4 years of experience teaching 1st and 2nd grades at a public school in central Almería.
- E10: Female, 27 years old, with 3 years of experience teaching all grades of Primary Education, Special Education Teacher (SET), at a public school in central Almería.

2.2. Instrument and data analysis

The semi-structured interview allowed for the retrieval of the most pertinent information concerning the research questions. Clear and easily understandable language was employed, avoiding any influence on responses. Participants were requested to allocate an hour of their time to ensure completion of the interview and obtain comprehensive answers; all interviews were conducted during May 2023.

The selection of this instrument was justified due to its flexibility and feasibility in addressing the study's main objective, focused on teachers' perceptions and experiences regarding the use of mobile applications to enhance literacy. The semi-structured interview facilitated a more dynamic interaction between the interviewer and participant, offering the opportunity to delve deeply into relevant topics while maintaining certain predefined guidelines or themes (Adeoye-Olatunde & Olenik, 2021). Moreover, it provided the chance to delve into subjective and contextual aspects of participants, enabling a more comprehensive understanding of their perspectives and perceptions on the study topic (Allan, 2020).

Furthermore, the decision was made to utilise Atlas Ti version 23.1.2.0 software to facilitate the interpretation and classification of information, as well as to categorise provided responses. A content analysis was conducted through the grouping of written information into units of meaning. To preserve anonymity, an alphanumeric code was assigned to each identified narrative.

2.3. Structure of the instrument

The interview script was framed around two dimensions: Mobile Application Usage (MAU) and Pedagogical Skills (PS). These dimensions were further divided into categories (Table 1).

Dimension 1, Mobile Application Usage (MAU), encompassed the following inquiries: What has been your experience regarding the training received to effectively use mobile applications?; What are the main benefits you have observed when using mobile applications to enhance literacy skills in your students?; Have you encountered any challenges or noticed difficulties when using mobile applications in teaching literacy?; How do you select the mobile applications you use in your literacy classes? What criteria do you consider?

Dimension 2, Pedagogical Skills (PS), comprised the following questions: What methodological strategies do you employ to engage students and foster active learning through mobile applications?; What additional support or resources do you consider necessary to effectively use mobile applications in enhancing literacy?; How do you assess the progress and performance of your students in literacy when using mobile applications?; What recommendations or advice would you offer to other teachers interested in using mobile applications for literacy instruction?

Table 1. *Deductive dimensions and categories*

DIMENSIONS	CATEGORIES AND CODES
Use of Mobile Applications (UMA)	Training (T) Benefits (B) Difficulties and Challenges (DC) Selection Criteria (SC)
Pedagogical Skills (PS)	Methodological Strategies (MS) Supporting Resources (SR) Evaluation Processes (EP) Didactic Recommendations (DR)

3. Results

The results of this study are presented considering the most relevant contributions of the participants in line with the categorization process and the established research questions. The most significant contributions of the teachers are highlighted, ensuring coherence among the findings.

Through content analysis, a visual representation of the semantic relationship between the different categories has been generated, where the macro-category "Mobile Application Experiences (MAE)" is positioned as the central nucleus that links with the rest of the identified categories.

The semantic network (Figure 1) illustrates the connections between the categories, highlighting the relationships and dependencies among them. These connections demonstrate how methodological strategies, didactic recommendations, support resources, evaluation processes, benefits, difficulties and challenges, selection criteria, and training are interrelated and mutually influence each other in the context of mobile applications in education.

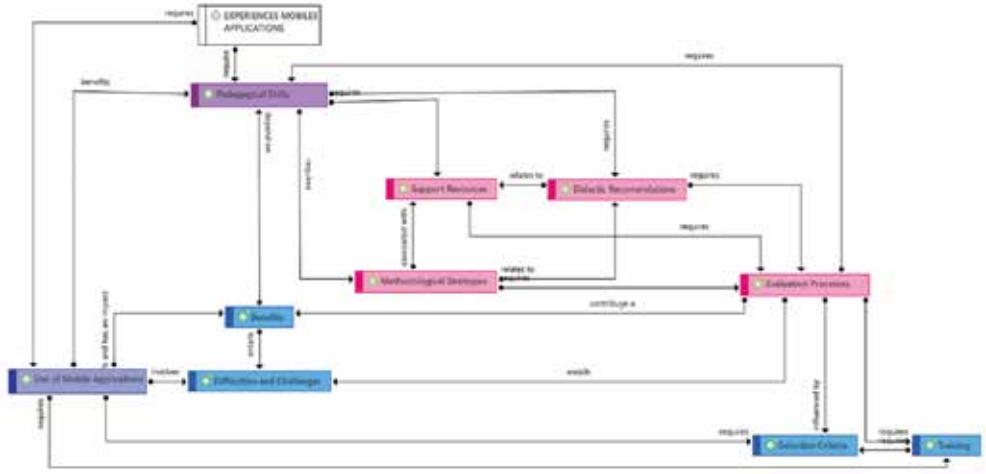

Figure 1. *Relationships between dimensions and categories*

Methodological strategies are related to didactic recommendations, support resources, and evaluation processes. They are closely associated with didactic recommendations, as both focus on the design and implementation of effective pedagogical approaches. They provide specific guidance and guidelines on how to apply different methodological strategies to promote meaningful learning and achieve educational objectives. Didactic recommendations are linked to methodological strategies and support resources and require evaluation processes. They are connected to methodological strategies as they offer specific guidelines on selecting, adapting, and implementing different pedagogical approaches.

Support resources are related to methodological strategies and didactic recommendations and require evaluation processes. Methodological strategies may require the use of specific resources to achieve their educational objectives. Didactic recommendations include suggestions on the appropriate use of support resources in the classroom. Such recommendations provide guidance on which resources are most suitable. Support resources need to be evaluated to determine their suitability and effectiveness in the educational context.

Evaluation processes require methodological strategies, didactic recommendations, and support resources. Didactic recommendations provide guidelines on how to assess student learning validly and reliably. They may require the use of support resources to effectively gather evidence. Additionally, they entail difficulties and challenges, such as selecting appropriate methods, managing time, interpreting results, and communicating feedback to students.

On the other hand, the selection criteria for mobile applications for educational use are influenced by the results of evaluation processes. Evaluating mobile applications helps identify those that meet pedagogical standards, are appropriate for curriculum content, and align with educational objectives.

Below, the most relevant information is presented regarding the relationship between the eight categories, their frequency of occurrence, and the corresponding evidential excerpt (Table 2).

Table 2. *Relationship of categories with repetition frequency and evidential fragment*

DIMENSIONS	CATEGORIES AND CODES	FREQUENCY OF REPETITION	EVIDENCE FRAGMENT
Use of Mobile Applications (UMA)	Training (T)	11	E. 10: "In the training received, the instruction on using mobile devices in the classroom has been very limited, barely covering the use of QR codes and scanning on the phone to complete tasks. But overall, the training in this aspect is very poor and insufficient, something that should be rectified because the use of mobile phones in the classroom can be very interesting and motivating for the students"
	Benefits (B)	37	E. 1: "This stimulates critical thinking and allows them to reflect on what they have learned"
	Difficulties and Challenges (DC)	20	E. 5: "Among the challenges, I highlight the low digital competence I have and the limited access to digital resources"
	Selection Criteria (SC)	15	E. 8. "I always consider the level my students have, the format that TIC tool presents, the time I have available to use them, and if that TIC tool is adapted to the course in which I teach"

Pedagogical Skills (PS)	Methodological Strategies (MS)	16	E. 5. "I use micro-teaching when any student knows the app, problem-based learning, and also cooperative work"
	Support Resources (SR)	12	E. 6. "Activities such as letter identification, image and word association, auditory matching between sounds and words, word completion, and word writing using virtual tools are some of the activities I consider effective"
	Evaluation Processes (EP)	16	E. 8. "I assess the entire process through rubrics, checklists, rating scales, anecdotal records. The level of reading comprehension and reading fluency is also evaluated, whether using ICT tools or not"
	Teaching Recommendations (TR)	27	E. 3. "Before using mobile applications as an educational resource in the teaching-learning process, it is essential to have the necessary skills to use them with students. Therefore, it is highly recommended to use the applications beforehand in order to gain proficiency in their use"

3.1. Deductive Dimension Mobile Application Usage (MUA)

In the "Digital Training (DT)" category, there is a variety of opinions among the interviewees. Eighty percent mention having undergone digital training, albeit limited, and affirm the need to acquire knowledge through other means, such as in opposition academies, the use of social networks, self-directed exploration, and/or webinars (E. 8 "All learning in this field has been through opposition academies, self-training, or with the help of other teachers."). The remaining two interviewees believe that the digital training received has been nonexistent, meaning they have not had the opportunity to attend training courses on the subject.

In the "Benefits (B)" category, the interviewees express opinions related to student motivation and engagement through the use of ICT, although literacy is not specified as the primary focus. Only two of them share the opinion about the motivation, participation, and improvement of students' academic performance when using mobile applications for literacy (E. 9 "...show greater motivation and participation in literacy activities. They find it appealing and fun to work with screens...").

Regarding the "Challenges and Difficulties (CD)" category, nine out of ten participants express concerns related to digital competency training, limited access to technological resources, and difficulties associated with implementing mobile applications in the classroom (E. 2 "Little training, few digital resources"). One of them also refers to the problem of finding suitable applications that meet the needs and abilities of students and internet connectivity in the classroom, and another mentions that the font types used in the applications are different from those taught in the early years of primary education, considering that, depending on the font type, it may negatively influence students' literacy learning.

Regarding the "Selection Criteria (SC)" category, the interviewees provide quite diverse responses. Five of them consider that to choose an application, it must adapt to the level and needs of the students, as well as the quality of the content and its alignment with the learning objectives. Three of the interviewees consider existing reviews and comments about mobile applications as a relevant factor when selecting an appropriate application (E.4 "... according to age and the reviews or comments it has..."). Another ensures that when choosing the application, it is linked to learning objectives and curriculum content mandated by laws.

Furthermore, they consider the usability and interface of the application and take into account recommendations from other teachers or education experts who have had prior experience with using applications in the classroom. Lastly, one of the interviewees claims not to have selection criteria due to the lack of practical training, adding that this situation is due to the absence of training opportunities that would enable them to acquire the knowledge and skills necessary to establish appropriate criteria in the selection of mobile applications.

3.2. Pedagogical Skills (PS)

In the category of 'Methodological Strategies (MS),' some interviewees share similar perspectives and methodological strategies. Two of them emphasize the importance of consistent and conscious use of applications, establishing clear norms and guidelines, and leveraging feedback and discussion moments (E.1 '...important that they are used consistently and consciously...'). Another five mention cooperative work and the balance between the use of applications and other activities in the classroom. The remaining interviewees mention the use of specific activities to improve phonological awareness and word reading.

Regarding the category of 'Assessment Processes (AP),' four of the interviewees mention evaluation through observation and/or written texts as the main method. Two others use mobile applications to assess students' progress and outcomes, complementing with other forms of assessment. Two of them mention the use of rubrics as part of their assessment, although one also uses the Séneca notebook. The remaining interviewees mention the combination of traditional assessment methods and digital resources, such as written exams and mobile applications.

In the category of 'Didactic Recommendations (DR),' it is noteworthy that two interviewees emphasize the importance of using mobile applications as a complement and accompaniment to traditional learning. They also emphasize the importance of not neglecting the role of paper and pencil in favor of technology, recognizing its relevance in the educational process (E.4 'a mix, digital and paper, better hand in hand'). A minority also emphasize this latter point, the importance of teachers' digital competence, and not being afraid to use mobile applications in the classroom. Two participants highlight the importance of actively involving students and carrying out interactive activities using mobile applications. These participants emphasize the relevance of promoting active student participation and interactive experiences through the use of these applications. From their perspective, it is essential for students to engage actively and practically in learning, using the interactive features offered by these mobile applications. Additionally, they highlight the need to have basic knowledge about the content and skills taught, as well as digital skills to select the appropriate applications.

Regarding 'Supporting Resources (SR),' connections are established between responses and interviewees who share similar ideas about the additional resources or supports needed to effectively leverage mobile applications. In this regard, three participants agree on the importance of using manipulative resources and adaptations for students with difficulties.

Likewise, two of them emphasize the need for a wide variety of high-quality educational applications, as well as complementary resources. Two other interviewees agree on the idea of using additional resources, such as the use of reading booklets and paper, in addition to combining QR codes with mobile applications to improve literacy skills. These connections

between responses reflect the shared appreciation of the relevance of having adequate support resources to optimize the use of mobile applications in the educational context.

4. Discussion

In relation to digital training, interviewees consider it insufficient or lacking opportunities for specific training courses in this area. There is a need to acquire additional knowledge through different avenues, such as opposition academies, the use of social networks, self-exploration, and participation in webinars. As relevant authors in the field indicate, many teachers have not received adequate training regarding the use of technology and mobile applications in the classroom (Fernández-Batanero et al., 2020). This may be due to various reasons, such as the lack of specific training programs, insufficient resources and time devoted to digital training, or the absence of constant updating in a constantly evolving technological environment. Thus, limited digital training can create barriers for teachers when attempting to use mobile applications to improve literacy skills. Consequently, technical difficulties may arise in handling applications, challenges in selecting the best options for their students, and difficulties in effectively integrating applications into the curriculum and class activities (Morales et al., 2020; Szymkowiak et al., 2021).

Following the above, the main difficulties and challenges identified by the interviewees revolved around the importance of acquiring digital competencies. To address these issues, it is essential to provide educators with adequate opportunities for professional development and training. This involves offering training programs in digital skills, facilitating collaborative learning sessions, providing online support resources, and promoting the creation of communities of practice where teachers can exchange experiences and knowledge. Additionally, it is important to have institutional and governmental policies and strategic plans that promote digital competence training and facilitate access to technological resources in educational environments (Falloon, 2020).

Regarding the benefits of using digital technologies in education, most interviewees highlighted the motivation and engagement of students when it comes to using applications in the classroom. Following the findings of Yu et al. (2023), the interactive, playful, and attractive design of these applications actively engages students and increases their motivation to participate in classroom activities. Additionally, Zhang and Zou (2022) and Gumbheer et al. (2022) affirm that mobile applications offer resources and activities that adapt to the individual needs of students, allowing them to progress at their own pace and address specific areas of improvement. By providing immediate feedback, applications allow students to assess their progress and receive virtual rewards, such as points or unlocked levels, reinforcing their intrinsic motivation.

Regarding methodological strategies, different approaches are highlighted, mentioning cooperative work and the balance between the use of applications and other activities in the classroom. Following Troussas (2020), cooperative work fosters collaboration, communication, and joint learning among students. When using applications and technologies in the classroom, it is beneficial to promote teamwork or group work, where students can interact, share ideas, and solve problems together. This helps develop social and teamwork skills while leveraging the potential of applications to improve student participation and engagement.

On the other hand, according to the perspective of some interviewed subjects and Hamilton et al. (2021), it is essential to find a balance between the use of applications and other activities in the classroom. Mobile applications can be valuable tools for improving literacy, for example, but should not completely replace traditional activities, such as reading printed books or handwriting. It is important to use applications as a complement or reinforcement of existing activities, allowing students to experience a variety of approaches and learning practices.

The teachers who were interviewed, based on their training as indicated by the results obtained by Zhyhadlo (2022), held a positivist perspective regarding evaluation, emphasizing the quantification of knowledge rather than fostering self-discovery and student motivation. This professional leaned towards a traditional evaluative approach, focused on measuring tangible and objective outcomes, without giving enough importance to the holistic development of the student or their intrinsic motivation for learning. Consequently, there was a lack of attention to the knowledge construction process and the stimulation of curiosity and autonomy in the students.

5. Conclusions

Mobile applications offer opportunities to enhance students' literacy skills through personalized and motivating experiences. However, it is crucial to consider teachers' perspectives and address the challenges associated with their implementation. To optimize their effectiveness, careful selection of suitable applications, providing training and guidance to both teachers and students, and fostering their integration into broader teaching and learning activities are necessary. It is important to note that while mobile applications are valuable tools to complement literacy teaching, they should not be considered a total replacement for human interaction or the fundamental role of the teacher in the educational process. Personalized interaction, direct feedback, and emotional support provided by a teacher are essential elements for students' holistic development.

This study has addressed the objective and research questions. Therefore, when using mobile applications in the context of literacy, the individual needs of students should be taken into account, adapting learning experiences to promote autonomy and motivation. Additionally, continuous assessment and effective feedback are necessary to measure progress and make relevant adjustments.

Despite the significant findings of this research, it is important to recognize some limitations that may affect the generalization of the results. Firstly, the sample of interviewees was limited to a specific group of teachers, which may not fully represent the diversity of perspectives in the field of education. Data collection focused on a particular geographical region, which could influence the applicability of the results to other geographical areas with different educational contexts and available resources. Furthermore, the qualitative approach used in this study relied on semi-structured interviews, which may have limited the depth of participants' responses compared to more extensive research approaches. Teachers' perceptions and opinions may have been influenced by their personal experience and individual circumstances, which could have introduced biases in the responses.

As future lines of research, it may be suggested to explore more in-depth specific training programs for teachers in the field of educational technology. This could include evaluating

the effectiveness of different training approaches and identifying best practices in preparing teachers for the use of mobile applications. Additionally, it is crucial to investigate how institutional and governmental educational policies can support educators' digital competence training and facilitate access to technological resources in educational environments. A closer analysis of existing policies and their impact on teacher technology training could provide valuable insights for future policy decision-making. This research underscores the need to develop educational policies that promote teachers' digital training and support the integration of mobile technologies in classrooms. These policies should include resource allocation for training programs, fostering collaboration among teachers, and creating communities of practice in the educational field.

Finally, mobile applications can be powerful allies in the literacy teaching-learning process, as long as they are integrated in a balanced manner and the importance of the teacher's presence and guidance is recognized. The proper use of these tools, combined with a solid pedagogical approach and comprehensive support, can enhance students' literacy skills development and enrich their educational experience.

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7. References

Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the american college of clinical pharmacy*, *4*(10), 1358-1367. https://doi.org/10.1002/jac5.1441

Allan, G. (2020). Qualitative research. In *Handbook for research students in the social sciences* (pp. 177-189). Routledge.

Amin, F. M., & Sundari, H. (2020). EFL students' preferences on digital platforms during emergency remote teaching: Video Conference, LMS, or Messenger Application? *Studies in English Language and Education*, *7*(2), 362-378. https://doi.org/10.24815/siele.v7i2.16929

Arancibia, M. L., Cabero, J., & Valdivia, I. (2019). Estudio comparativo entre docentes y estudiantes sobre aceptación y uso de tecnologías con fines educativos en el contexto chileno. *Apertura, 11*(1), 104-119. https://doi.org/10.32870/Ap.v11n1.1440

Aznar-Díaz, I., Romero-Rodríguez, J. M., Navas-Parejo, M. R., & Gómez-García, G. (2021). Analysis of good teaching practices with mobile devices at the university: design and validation of the APMU scale. *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje, 16*(1), 2-10. https://doi.org/10.1109/RITA.2021.3052482

Bourekkache, S., & Kazar, O. (2020). Mobile and adaptive learning application for English language learning. *International Journal of Information and Communication Technology Education (IJICTE), 16*(2), 36-46. https://doi.org/10.4018/IJICTE.2020040103

Churchill, N. (2020). Development of students' digital literacy skills through digital storytelling with mobile devices. *Educational Media International, 57*(3), 271-284. https://doi.org/10.1080/09523987.2020.1833680

Daza-González, M. T., Phillips-Silver, J., Gioiosa-Maurno, N., Fernaández-García, L., & Ruiz-Castañeda, P. (2023). Improving phonological skills and reading comprehension in deaf children: A new multisensory approach. *Scientific Studies of Reading, 27*(2), 119-135 https://doi.org/10.1080/10888438.2022.2095280

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development, 68*, 2449-2472. https://doi.org/10.1007/s11423-020-09767-4

Fernández-Batanero, J.M., Montenegro-Rueda, M., Fernández-Cerero, J., & García-Martínez, I. (2022). Competencias digitales para el desarrollo profesional docente. Revisión sistemática. *Revista europea de formación docente*, *45* (4), 513-531. https://doi.org/10.1080/02619768.2020.1827389

Gallardo, C.P., Rodríguez, A., Caurcel, M.J. y (2021). Apps for people with autism: Assessment, classification and ranking of the best. *Technology in Society, 64* (101474), 1-10. https://doi.org/10.1016/j.techsoc.2020.101474

Gumbheer, C. P., Khedo, K. K., & Bungaleea, A. (2022). Personalized and adaptive context-aware mobile learning: review, challenges and future directions. *Education and Information Technologies, 27*(6), 7491-7517. https://doi.org/10.1007/s10639-022-10942-8

Hamilton, D., McKechnie, J., Edgerton, E., & Wilson, C. (2021). Immersive virtual reality as a pedagogical tool in education: a systematic literature review of quantitative learning outcomes and experimental design. *Journal of Computers in Education, 8*(1), 1-32. https://doi.org/10.1007/s40692-020-00169-2

Hao, Y., Lee, K. S., Chen, S. T., & Sim, S. C. (2019). An evaluative study of a mobile application for middle school students struggling with English vocabulary learning. *Computers in Human Behavior, 95*, 208-216. https://doi.org/10.1016/j.chb.2018.10.013

Konerding, M., Bergström, K., Lachmann, T., & Klatte, M., (2021). Effects of the Computer-Based Grapho-Phonological Training Lautarium in Children with Developmental Dyslexia. *Praxis Der Kinderpsychologie Und Kinderpsychiatrie, 70*(4), 333-355. https://doi.org/10.13109/prkk.2021.70.4.333

Lin, C. J., Hwang, G. J., Fu, Q. K., & Cao, Y. H. (2020). Facilitating EFL students' English grammar learning performance and behaviors: A contextual gaming approach. *Computers & Education, 152*, 1-20. https://doi.org/10.1016/j.compedu.2020.103876

Lin, R., Yang, J., Jiang, F., & Li, J. (2023). Does teacher's data literacy and digital teaching competence influence empowering students in the classroom? Evidence from China. *Education and Information Technologies*, *28*(3), 2845-2867. https://doi.org/10.1007/s10639-022-11274-3

Máñez-Carvajal, C., & Cervera-Mérida, J. F. (2021). Mobile application for children with learning difficulties in automating the word recognition process. *Información tecnológica, 32*(5), 67-74. http://dx.doi.org/10.4067/S0718-07642021000500067

Morales, J. C., Ramírez, N. E., Vargas, S. H., y Peñuela, A. J. (2020). Uso de aplicativos móviles en el aula y sus factores determinantes. *Formación universitaria, 13*(6), 13-22. http://dx.doi.org/10.4067/S0718-50062020000600013

Sá, M. J., & Serpa, S. (2020). COVID-19 and the Promotion of Digital Competences in Education. *Universal Journal of Educational Research, 8*(10), 4520-4528. https://doi.org/10.13189/ujer.2020.081020

Sánchez-Prieto, J. C., Huang, F., Olmos-Migueláñez, S., García-Peñalvo, F. J., & Teo, T. (2019). Exploring the unknown: The effect of resistance to change and attachment on mobile adoption among secondary pre-service teachers. *British Journal of Educational Technology, 50*(5), 2433-2449. https://doi.org/10.1111/bjet.12822

Sola-Reche, J. M., García-Vidal, M., & Ortega-Navas, Mª.C. (2019). Las implicaciones del uso de dispositivos móviles en el proceso de enseñanza aprendizaje en alumnos de 5º y 6º de Primaria. Pixel-Bit. *Revista de Medios y Educación, 55*, 117-131. https://doi.org/10.12795/pixelbit.2019.i55.07

Soto, C., Gutierrez de Blume, A. P., Rebolledo, V., Rodríguez, F., Palma, D., & Gutiérrez, F. (2023). Metacognitive monitoring skills of reading comprehension and writing between proficient and poor readers. *Metacognition and Learning*, *18*(1), 113-134. https://doi.org/10.1007/s11409-022-09317-8

Suárez, S. (2021). Design and coordination of a MOOC on reading and writing in the field of Communications. *Revista panamericana de comunicación, 3*(1), 135-143. https://doi.org/10.21555/rpc.v0i1.2358

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, *65*, 1-10. https://doi.org/10.1016/j.techsoc.2021.101565

Troussas, C., Krouska, A., & Sgouropoulou, C. (2020). Collaboration and fuzzy-modeled personalization for mobile game-based learning in higher education. *Computers & Education*, *144*, 1-18. https://doi.org/10.1016/j.compedu.2019.103698

Vander, N., & Power, M. (2021). Teaching writing strategies with tiered supports for middle school students with and without special needs: a case study. *Prevention of school failure, 66*(2),167-174. https://doi.org/10.1080/1045988X.2021.2016568

Yu, Z., Xu, W., & Sukjairungwattana, P. (2023). Motivation, learning strategies, and outcomes in mobile English language learning. *The Asia-Pacific Education Researcher*, *32*(4), 545-560. https://doi.org/10.1007/s40299-022-00675-0

Zhang, R., & Zou, D. (2022). Types, purposes, and effectiveness of state-of-the-art technologies for second and foreign language learning. *Computer Assisted Language Learning, 35*(4), 696-742.

Zhyhadlo, O. Y. (2022). Application of digital game-based tools for formative assessment at foreign language lessons. *Information Technology and Learning Tools, 87*(1), 139-150. https://doi.org/10.33407/itlt.v87i1.4703