TECHNICAL UNIVERSITY OF COTOPAXI

PUJILÍ EXTENSION

UNDERGRADUATE PROGRAM

DEPARTMENT OF NATIONAL AND FOREIGN LANGUAGE PEDAGOGY
ENGLISH MAJOR

MODALITY: RESEARCH REPORT

THEME:

"A MOBILE APPLICATION AS A STRATEGY TO IMPROVE ENGLISH LITERACY IN CHILDREN WITH DYSLEXIA"

Research report before obtaining the bachelor degree in National and Foreign Language Pedagogy, English Major

Authors:

Molina Villamarin Katheryn Alexandra

Imbaquingo Andrade Esmeralda Liceth

Tutor:

Nelly Patricia Mena Vargas, MSc.

PUJILÍ - ECUADOR

AUGUST 2025

DECLARACIÓN DE AUTORÍA

Molina Villamarín Katheryn Alexandra, con cédula de ciudadanía No. 050434620-6, Imbaquingo Andrade Esmeralda Liceth, con cédula de ciudadanía No. 045005004-2 declaramos ser autores del presente **PROYECTO DE INVESTIGACIÓN: "A MOBILE APPLICATION AS A STRATEGY TO IMPROVE ENGLISH LITERACY IN CHILDREN WITH DYSLEXIA"**, siendo la MSc. Mena Vargas Nelly Patricia, tutor del presente trabajo; y, eximo expresamente a la Universidad Técnica de Cotopaxi y a sus representantes legales de posibles reclamos o acciones legales.

Además, certifico que las ideas, conceptos, procedimientos y resultados vertidos en el presente trabajo investigativo, son de mi exclusiva responsabilidad.

Pujilí, 30 de julio del 2025

.

Molina Villamarín Katheryn Alexandra
C.C: 050434620-6

Imbaquingo Andrade Esmeralda Liceth
C.C: 045005004-2

AVAL DEL TUTOR DEL PROYECTO DE INVESTIGACIÓN

En calidad de Tutor del Proyecto de Investigación sobre el título:

"A MOBILE APPLICATION AS A STRATEGY TO IMPROVE ENGLISH LITERACY IN CHILDREN WITH DYSLEXIA", de Molina Villamarín Katheryn Alexandra; Imbaquingo Andrade Esmeralda Liceth, de la carrera de Pedagogía de los Idiomas Nacionales y Extranjeros, considero que dicho Informe Investigativo es merecedor del aval de aprobación al cumplir las normas técnicas, traducción y formatos previstos, así como también ha incorporado las observaciones y recomendaciones propuestas en la pre-defensa.

Pujilí, 30 de julio de 2025

MSc. Nelly Patricia Mena Vargas
C.C.: 050157429-7
TUTORA

AVAL DE APROBACIÓN DEL TRIBUNAL DE TITULACIÓN

En calidad de Tribunal de Lectores, aprueban el presente Informe de Investigación de acuerdo a las disposiciones reglamentarias emitidas por la Universidad Técnica de Cotopaxi, y, por la Extensión Pujilí; por cuanto, los postulantes: Molina Villamarín Katheryn Alexandra; Imbaquingo Andrade Esmeralda Liceth, con el título del Proyecto de Investigación: **"A MOBILE APPLICATION AS A STRATEGY TO IMPROVE ENGLISH LITERACY IN CHILDREN WITH DYSLEXIA",** ha considerado las recomendaciones emitidas oportunamente y reúne los méritos suficientes para ser sometido al acto de sustentación del trabajo de titulación.

Por lo antes expuesto, se autoriza grabar los archivos correspondientes en un CD, según la normativa institucional.

Pujilí, 30 de julio de 2025

Para constancia firman:

Msc. José Ignacio Andrade Morán
C.C: 050310104-0
LECTOR 1 (PRESIDENTE)

MSc. Fanny Mercedes Abata Checa
C.C: 050227874-0
LECTOR 2 (MIEMBRO)

MSc. Estuardo Vladimir Sandoval Vizuete
C.C: 050210421-9
LECTOR 3 (SECRETARIO)

GRATEFULNESS

I am deeply grateful to God for guiding me on the right path, supporting me, and inspiring me to be a good person.

I thank all my family, who support me economically and emotionally. Principally, my parents, Luis and Susana, were my inspiration to study and get a degree in this major. I thank all my friends who gave me their advice and every day made me laugh when I felt lonely.

I thank all the professors at the Technical University of Cotopaxi who were part of my training for sharing with me their knowledge and their experiences that motivated me to continue studying when I felt that I could not achieve that goal. Finally, I want to thank my tutor, Mena Vargas, Nelly Patricia, MSc., who made it possible for me to finish that research. Her suggestions, advice, and guidance helped us to improve our investigation.

Katheryn

DEDICATION

To God, for giving me hope in difficult moments, for illuminating my path, and for giving me the strength to continue when I felt like giving up.

To my parents, Luis Molina and Susana Villamarín, who have been my greatest pillar in every stage of this journey. This achievement is the result of your hands, of your silent efforts, of every sacrifice made to allow me to study and continue growing.

To my beloved grandparents, who have always been my best advisors and have guided me on the right path with their love and wisdom. Especially, to my grandfather Fausto Molina, who accompanies me from heaven and continues to be my inspiration. Thank you for teaching me the value of effort and for trusting me even before I did it myself. Today, I fulfill the promise I made to you in life. Thanks to each of my uncles, who did not let me give up on this long road I took; to my best friend Josselyn Lascano, for encouraging me, lifting me, and helping me to trust myself; and to all my cousins and close friends, for every smile and word of encouragement that pushed me to continue.

Katheryn

DEDICATION

I dedicate this research work primarily to God, for giving me strength and health in those moments of weakness; to my parents, Luis Imbaquingo and Mayra Andrade, for being my greatest motivation and support in difficult times, for their tireless love, and for teaching me that dreams are achieved with effort. Thank you for teaching me not to give up and for accompanying me with your heart every step of the way. To my brother, Oscar, who has always been by my side, supporting me and helping me achieve my dreams.

To my dear godparents, Martha and Federico, Martha and Federico, for their love, support, and constant guidance as they accompanied me on this path of growth and learning. To my aunts Hilda, Rosita, and Elsa, thank you for being a constant source of support and love in my life. For your words of encouragement, your advice, and your inexhaustible presence, to my beloved grandmothers, for their infinite love, their wisdom, and for being the pillars of our family, to all my family and friends, thank you for being my refuge, my support, and my joy, For every word of encouragement, every hug

Esmeralda

TECHNICAL UNIVERSITY OF COTOPAXI
DEPARTMENT OF NATIONAL AND FOREIGN LANGUAGE PEDAGOGY
ENGLISH MAJOR

THEME: A MOBILE APPLICATION AS A STRATEGY TO IMPROVE ENGLISH LITERACY IN CHILDREN WITH DYSLEXIA

Authors:
Imbaquingo Andrade Esmeralda Liceth
Molina Villamarín Katheryn Alexandra
Tutor:
Nelly Patricia Mena Vargas, MSc.

ABSTRACT

Dyslexia is a neurodevelopmental disorder primarily affecting learning to read and write. Students with this disorder experience difficulties with word recognition, reading fluency, and written expression. For this reason, this study aimed to analyze the perceptions of English teachers from Unidad Educativa Gabriela Mistral regarding the I Read mobile application as a strategy to improve English literacy in children with dyslexia. It focuses on the opinions of three English teachers who work with six fourth-grade students diagnosed with dyslexia. The research adopts a qualitative, descriptive approach. Data were obtained through semi-structured interviews based on a guide adapted from a validated doctoral thesis. The responses were examined using thematic content analysis. The findings showed that teachers perceive the mobile application "I Read" as both positive and negative. As positive teachers suggested, it is a useful tool for fostering motivation, attention, and engagement in students with learning difficulties. Nevertheless, teachers also identified negative aspects that include the risk of students becoming distracted and the possibility of accessing unrelated content. These disadvantages are primarily attributed to the fact that mobile devices may allow students to switch between applications or be interrupted by external notifications. In conclusion, the teachers recognize the pedagogical value of the mobile application "I Read and they emphasize that their effectiveness depends on structured implementation, active supervision, and proper adaptation to students' learning needs. Therefore, the integration of such tools must be accompanied by thoughtful planning and professional preparation.
Keywords: Mobile application, English Literacy, Dyslexia.

UNIVERSIDAD TÉCNICA DE COTOPAXI
DEPARTAMENTO DE LA CARRERA DE PEDAGOGíA DE LOS IDIOMAS NACIONALES Y EXTRANJEROS INGLÉS

TÍTULO: UNA APLICACIÓN MÓVIL COMO ESTRATEGIA PARA MEJORAR LA LECTOESCRITURA DE INGLÉS EN NIÑOS CON DISLEXIA

Autores:
Imnbaquingo Andrade Esmeralda Liceth
Molina Villamarín Katheryn Alexandra
Tutor:
Mena Vargas Nelly Patricia, MS.c

RESUMEN

La dislexia es un trastorno del neurodesarrollo que afecta principalmente el aprendizaje de la lectura y la escritura. Los estudiantes con este trastorno experimentan dificultades con el reconocimiento de palabras, la fluidez lectora y la expresión escrita. Por ello, este estudio tuvo como objetivo analizar las percepciones del profesorado de inglés de la Unidad Educativa Gabriela Mistral respecto a la aplicación móvil "I read" como estrategia para mejorar la lectoescritura en inglés en niños con dislexia. Se centra en las opiniones de tres profesoras de inglés que trabajan con seis estudiantes de cuarto grado diagnosticados con dislexia. La investigación adopta un enfoque cualitativo y descriptivo. Los datos se obtuvieron mediante entrevistas semiestructuradas basadas en una guía adaptada de una tesis doctoral validada. Las respuestas se analizaron mediante análisis de contenido temático. Los hallazgos mostraron que el profesorado percibe la aplicación móvil "I read" tanto como positiva como negativamente. Como profesoras positivas, sugirieron que es una herramienta útil para fomentar la motivación, la atención y la participación en estudiantes con dificultades de aprendizaje. Sin embargo, el profesorado también identificó aspectos negativos, como el riesgo de distracción y el acceso a contenido no relacionado. Estas desventajas se atribuyen principalmente a que los dispositivos móviles pueden permitir que los estudiantes cambien de aplicación o sean interrumpidos por notificaciones externas. En conclusión, el profesorado reconoce el valor pedagógico de la aplicación móvil "I read" y enfatiza que su eficacia depende de una implementación estructurada, una supervisión activa y una adaptación adecuada a las necesidades de aprendizaje de los estudiantes. Por lo tanto, la integración de estas herramientas debe ir acompañada de una planificación minuciosa y una preparación profesional.

Palabras clave: Aplicación móvil, lectoescritura en inglés, dislexia.

INDEX

TABLE INDEX

1. GENERAL INFORMATION

Theme: A mobile application as a strategy to improve English literacy in children with dyslexia.

Starting Date: April 2025

Ending Date: August 2025

Place of Research: Gabriela Mistral Educational Unit

Sponsoring Faculty: Faculty of Humanities and Education

Sponsoring Major: National and Foreign Language Pedagogy: English

Macroproject of the program: Formative Process in English Language Teaching, Learning, and its Academic Discourse.

Research Group: Katheryn Alexandra Molina Villamarín, Esmeralda Liceth Imbaquingo Andrade, and MS.c Nelly Patricia Mena Vargas

Knowledge Area: Education

Line of Research: Education, Communication, and Design for Human and Social Development.

Sub-lines of Research for the Program: Pedagogical, Curricular, and Inclusive Practices in the Areas of Knowledge

2. PROBLEM STATEMENT

Dyslexia is a neurodevelopmental disorder primarily affecting learning to read and write, with neurological and genetic origins. Students with this disorder experience difficulties with word recognition, reading fluency, and written expression, which therefore makes learning difficult.

According to Pezo Galdea et al. (2023), it is estimated that between 5% and 10% of school-aged students in Ecuador face learning difficulties, which means that approximately one to three students in each class have problems with reading and writing. This situation poses a significant challenge to the education system, as these difficulties affect not only students' academic performance but also their self-esteem, motivation, and social development. Therefore, educational institutions must support teachers in identifying these types of problems in time in order to employ strategies that adapt to the needs of each student.

One promising alternative is the use of mobile applications specifically designed to support students with dyslexia. Among them, the I Read application offers structured and adaptive literacy activities designed to improve reading and writing skills. However, there is still little evidence about how teachers perceive the usefulness of such tools in real classroom contexts. This study aims to address that gap by exploring teachers' perceptions of the I Read mobile application. It is possible to mention that the present study is aimed at answering the following research question: What are teachers' perceptions of the I Read mobile application as a strategy to improve English literacy in children with dyslexia?

3. OBJECTIVES

3.1. General Objective

- To analyze teachers' perceptions of the use of the I Read mobile application as a strategy to improve English literacy in six fourth-grade students with dyslexia.

3.2. Specific Objectives

- To explore theoretical foundations related to the use of mobile applications as a strategy to improve English literacy in children with dyslexia.
- To analyze teachers´ perceptions of the I Read mobile application as a strategy to improve English literacy in children with dyslexia.
- To establish conclusions and recommendations based on English teachers' perceptions of the impact of the I Read application on the reading and writing skills of students with dyslexia.

4. ACTIVITIES AND TASK SYSTEM IN RELATION TO THE OBJECTIVES PROPOSED

Table 1

Activities and task system in relation to the objectives

Specific Objective	**Activities**	**Activity Result**	**Verification Means**
To explore theories about mobile applications as a strategy to improve English literacy in children with dyslexia	Look for bibliographic resources. Review information about a mobile application as a strategy to improve English literacy for children with dyslexia.	Choose relevant information.	Theoretical framework
To analyze teachers´ perceptions of the I Read mobile application as a	Apply the interviews to the teachers.	Data collection	The interviews. Interpretative and reflective analysis of the data.

strategy to improve English literacy in children with dyslexia.			
To establish conclusions and recommendations based on English teachers' perceptions of the impact of the I Read application on the reading and writing skills of students with dyslexia.	Write conclusions and recommendations based on the perceptions of the I Read application by the English Teachers.	Results	Conclusions and recommendations

Note: The table provides information about activities and the task system in relation to the objectives

5. JUSTIFICATION

Dyslexia is a learning disorder of neurological origin that significantly affects reading and writing acquisition, especially in children learning English as a foreign language (International Dyslexia Association, 2020). In Ecuador, it is estimated that between 5% and 10% of school-aged children experience learning difficulties, including dyslexia, which often goes undiagnosed or unsupported in the classroom (Pezo Galdea et al., 2023). This situation creates a pressing need to implement inclusive educational strategies that directly address students' linguistic and cognitive needs.

The use of mobile applications in education has gained recognition for its ability to enhance student engagement, personalize content, and provide immediate feedback, which are essential for learners with dyslexia (Crompton & Burke, 2018). These tools

allow for a multisensory and interactive learning experience that accommodates diverse learning styles.

Among these tools, the *I Read* mobile application offers literacy activities adapted to children's developmental levels and specific challenges related to dyslexia. Its design aligns with best practices in dyslexia intervention by incorporating gradual levels of difficulty, visual support, and engaging tasks (Sierra Chica Software SL, 2022).

In addition, it is important to highlight that this research seeks to contribute meaningfully to the advancement of inclusive education and the responsible integration of digital tools in the classroom. By analyzing the perceptions of educators, the study provides relevant insights into the pedagogical use of mobile applications to support literacy development in children with learning difficulties. Furthermore, it emphasizes the importance of adapting teaching strategies to the needs of students who often remain underserved by traditional methodologies.

As a result, the main beneficiaries of this work are children diagnosed with dyslexia, who may experience improvements in their reading and writing performance through accessible and stimulating methods. At the same time, teachers stand to benefit by gaining access to alternative strategies that can be implemented in the classroom to support individualized learning. Likewise, educational institutions can use the findings to guide the adoption of inclusive practices supported by low-cost and easy-to-use technological resources.

Finally, the viability of the study is supported by the availability of mobile devices in the educational context and the willingness of teachers to explore new didactic strategies. Therefore, this project is both feasible and relevant, as it aligns with current educational needs and promotes equity in learning opportunities.

6. SCIENTIFIC AND TECHNICAL FOUNDATION

6.1 Background

I Read is still limited in academic literature; related research on similar applications—such as the Individualized Reading Enhancing Application for Dyslexia (IREAD)—has demonstrated high usability and effectiveness in classroom contexts. For instance, Burac and Dela Cruz (2020) found that teachers valued features like text-to-speech, phonics-based activities, and user-friendly interfaces when supporting dyslexic learners. These findings suggest that applications like I Read, when well-integrated by teachers, can serve as effective complementary tools in literacy intervention programs. In this context, the role of the teacher is central not only in facilitating the use of such tools but also in evaluating their appropriateness and adaptability to students' specific needs.

In recent years, various studies have explored the role of mobile-assisted learning in supporting students with specific learning disorders, particularly dyslexia. For instance, research carried out by Al-Azawei et al. (2017) analyzed the effectiveness of mobile tools in enhancing reading comprehension among students with learning difficulties in EFL contexts. One of the most relevant contributions of this study lies in its demonstration that personalized, multisensory features—such as audio-visual prompts and adaptive tasks—can lower cognitive overload and improve engagement. This perspective aligns with the Universal Design for Learning (UDL), which advocates for flexible learning environments that accommodate individual learning differences. From a critical standpoint, the study emphasizes the importance of integrating technology not as a mere supplement, but as a core strategy for inclusive and differentiated instruction.

Another relevant investigation is that of Pino and Mortari (2014), who explored how digital learning environments could assist children with dyslexia in Italian primary schools. Their findings indicated that tools offering immediate feedback and learner autonomy can significantly increase motivation and active participation. This approach is grounded in constructivist theory, which views learning as an active and self-directed process. However, it is worth noting that while the study offers promising results, it also underscores the necessity for teacher guidance in managing digital content effectively to prevent superficial engagement. Therefore, the success of digital interventions depends

not only on the tools themselves but also on how they are embedded into pedagogical practices.

Zambrano Marcillo et al. (2024) proposed a smartphone-based methodology to support English reading comprehension among first-year secondary students in Ecuador. Their mixed-methods study reported that 75 % of participants improved their reading scores following the intervention, confirming the effectiveness of differentiated learning strategies through mobile devices. This study offers significant local relevance to the Ecuadorian context and supports multisensory and differentiated instruction involving accessible technology

These studies provide a solid theoretical and empirical foundation for the present research, which seeks to understand teachers' perspectives on the use of the "I Read" mobile application to support English literacy in children with dyslexia.

6.2 Theoretical Framework

6.2.1 The importance of the English language

English is a language spoken throughout the world as a means of communication used in different areas, such as education. According to Walia (2023), mention that the English language has become the global lingua franca throughout the world, which is the most used in the areas of education, communication, and technology. It is also recognized as a global phenomenon that has become a common language, being the most used in international communication, and it is spoken by more than 1.5 billion people in all parts of the world, the expansion of the language is due to linguistic, social, historical factors that focus on both native speakers or as a foreign language. As claimed by Ilyosovna (2020), around the world, there are 67 countries where English is their official language, and 27 countries that have English as their secondary official language. In addition, it is necessary to mention that some countries use it as a foreign language

Considering the relevance of learning English is important to mention six essential reasons why students need to study it:

- It is an international common tongue

- It is considered an academic language
- It gives learners access to numerous websites and the ability to write printed information
- It is handy when people are travelling
- It is useful in international business or commerce
- It opens new doors to get a good job.

Additionally, people who study the English language have more opportunities to succeed in their careers. Ilyosovna (2020) explained that if learners master this language, they can become translators, English teachers, or English marketing professionals for a global company, and improve their academic knowledge.

According to researchers, the English language has become one of the main exponents in the world, facilitating access to education, trade, and helping in the cultural field, which contributes to the development of people both academically and professionally.

6.2.2 Learning Difficulties

In the educational field, different types of learning difficulties can affect a student's performance in comparison with their peers, preventing them from keeping pace with others. As claimed by Muktamath (2021), learning difficulties are disorders children suffer by preventing them developing language. These children could have disorders in speaking, listening, reading, comprehension, spelling, arithmetic calculations, writing, and concepts. Furthermore, it is known as a hidden disability because learning difficulties are not obvious to them. Hence, teachers come to think that they are lazy, clumsy, or not listening; it can result in low self-esteem, confidence, and motivation. So, educators need to stay attentive to help students in their learning, using different strategies, techniques, or approaches that aid pupils in the classroom.

In addition, Zidan (2023) mentions some characteristics that students with learning difficulties have that including common errors in spelling, letter recognition, auditory discrimination, difficulties with letters, disorders of auditory and visual memory, difficulties in perception, where the child cannot recognize geometric shapes, and writing numbers and letters in an inversal way, confusing between letter sounds resulting from

impaired auditory memory, knowing words and their semantics, recall what they are seeing, inability to solve problems, etc. Its disabilities can gravely affect the learning language process, causing students a deficit in some relevant parts of language. For this reason, teachers must look for these characteristics in their students and not confuse the laziness of a student with some learning disabilities.

To recognize these types of learning difficulties, Misciagna (2022) exposes four principal symptoms:

- During the school years, problems with reading, writing, arithmetic, or mathematical reasoning can be identified by symptoms such as poor, slow, inaccurate, and labored reading, limited use of expressions, difficulties in remembering numerical data, or incorrect mathematical reasoning.
- Academic skills, such as reading and writing, should currently have low scores on the corresponding tests. If the student suffers from dyslexia, they must read with considerable effort.
- Learning problems have their origin in the early years of school.
- These kinds of difficulties tend to affect academic success, occupational performance, or daily activities. However, they must not be explained by developmental, neurological, sensory (vision or hearing), or motor disorders.

Besides, it is necessary to say that teachers and parents play a fundamental role in diagnosing these problems in time, considering the symptoms mentioned before, to give them an early treatment, preventing students from falling into total illiteracy.

6.2.2.1 Types of learning difficulties

Learning difficulties are a barrier that affects many students in the learning process and, in some cases, require individualized attention; therefore, it is important to know the types of difficulties.

According to Muktamath et. al (2021), here are seven types of learning difficulties:

- **Dyslexia:** Students are incapable of reading fluently. Learners have difficulties decoding and comprehending the content of lectures; they often reveal letters, words, or numbers as “the letters are dancing on the page”. Also, students, while they are reading, omit and add words. They have a poor vocabulary, and sometimes their speech is limited.
- **Dysgraphia:** This affects the handwriting ability and fine motor skills. The children present poor spelling, grammar, punctuation, and handwriting. They cannot structure complex writing. They are incapable of dealing with abstract ideas and have limited vocabulary knowledge.
- **Dyscalculia:** In the primary classes in elementary school, students may be incapable of comprehending mathematical symbols, problems, memorizing and organizing numbers, or counting them. Also, they reverse numbers and confuse before and after. Relating spatial orientation or making space, size, time, shape, and weight estimates tends to be poor. Additionally, they are slow to acquire abstract reasoning skills, which are necessary for problem-solving in the higher classes.
- **Auditory processing disorder:** Students cannot hear as well as usual they do, because the sound does not pass freely through the ear and is not processed or interpreted by the brain. It is difficult for them to follow rapid speech, and sometimes a rephrasing of information is necessary. It is difficult to follow instructions, the sequence of stories and conversations, because they cannot recognize words with different meanings or use them in other contexts, and cannot understand figurative language, sarcasm, humor, and play on words.
- **Language processing disorder:** Pupils have trouble with related meaning and sounds. It can be caused by limited vocabulary, difficulties in remembering words, structure, or pronunciation. Also, they present grammatical problems. They have trouble comprehending complex sentences and answering questions.
- **Nonverbal learning disabilities:** They cannot decode nonverbal behaviors. Students are incapable of understanding abstract concepts, reading facial expressions or body language; completing activities as jigsaw puzzles and constructing with blocks, exhibit problems in comprehending, and think of things in literal terms.

- **Visual perceptual/visual motor deficit:** They have poor eye-hand coordination. When they read, they easily confuse similar letters, have difficulties in copying or drawing, reverse letters such as p-q or m-w, are unable to resolve activities about word construction, and organize their writing; also, children have limited reading comprehension skills, which affects their reading and writing.

Each case of these learning difficulties has different characteristics, but the affected areas are the same: reading, writing, and spelling. These three areas are considered the most important in the learning process because they help students to acquire knowledge and interact with others, considering it as an essential part of language.

6.2.3 Dyslexia

Dyslexia is a learning disorder where children have difficulty recognizing certain words, sounds, or letters, delaying their learning. In line with the definitions of the Utah Code Annotated (UCA) cited in Dickson & Voorhies (2025), It is a certain learning disorder, neurological in origin, characterized by problems in recognizing words, poor spelling words, poor spelling, and decoding abilities, resulting in a deficit in phonological elements of language. Although it is considered a serious problem in language learning and sometimes difficult to address, teachers have been trained to face these challenges in the classroom.

Therefore, it is essential to recognize children with dyslexia early to help them in their learning. According to the Illinois State Board of Education (2024), dyslexia is characterized by symptoms that cause difficulties, especially with phonology and spelling during reading. Children with dyslexia also have other language problems, such as writing, spelling, and pronunciation. This disorder sometimes affects children throughout their lives. Additionally, it limits the student's academic performance in the educational setting, and in many cases, students may need curricular adaptations or services focused on these needs.

6.2.3.1 Types of dyslexia

The dyslexia disorder can affect different parts of the language; however, two principal parts are affected by this problem: the mechanisms of auditory perception and visual perception. Students who have problems in the first cannot acquire the correct sound of the appearances of the letters. According to Ali et. al (2021), the auditory perception deficit in dyslexia is closely related to the neurocognitive attentional deficit in processing sensory stimulation. In the reading process, people's perception not only takes care of visual input in decoding the alphabets' structure, orthographic structure, but also on the phonological insight of each letter, permitting the decoding action of grapheme-phoneme conversion throughout the reading process. Due to this anomaly, children with dyslexia have a problem relating letters to sounds, trouble recognizing or remembering words, and difficulty with their learning.

Furthermore, they mention that for normal readers, the process of reading is smooth without problems, but for children with dyslexia, it is hard to associate the word structure with the phonemic sound. For it, learners have difficulties in grapheme-phoneme conversion during reading.

Secondly, students cannot mentally visualize letters and sounds. Ali et. al (2021) explains that there are two principal pathways in the human visual system. These are known as the magnocellular and parvocellular pathways, which are responsible for the axons that leave the retina and perceive visual input. The magnocellular visual system functions to process the visual target input while the learner is reading. Without this functioning normally, the visual system makes it impossible to perceive reading input rapidly. In consequence, dyslexics are not able to distinguish and discriminate between different temporal stimulations and tend to create a single image out of two different presentations. It means that students with this kind of disorder have problems recognizing letters, or confuse them with others that have the same structure, for example, b-d, p-q. Learners reverse letters or have problems coping with information.

6.2.3.2 Causes and Consequences of Dyslexia

6.2.3.2.1 Causes

According to Lyon et. al (2003), cited in Misciagna (2022), the principal cause of dyslexia is attributed to a neurobiological problem, characterized by issues with inaccurate word recognition and poor spelling. These problems are due to a deficit in the phonological component of language. In short, reading problems are due to phonological processing, that is, the processing of speech sounds, resulting in problems not only in reading but also in writing.

Nevertheless, Werth (2023) expounds some theories about the causes of dyslexia, such as the magnocellular theory of dyslexia, the unusual foveal and parafoveal processing of letters, including an unusual crowding effect, the temporal summation theory, and the phonological awareness theory. The last-mentioned is the most approached by researchers. It includes some abilities: identifying phonemes, rhyming, naming letters, objects, and colors, and splitting words into syllables. Also, it mentions that the impairment in these skills causes developmental dyslexia, which in turn is a disorder where children cannot relate letter sequences to sound sequences. So, it is difficult for students to understand and comprehend the sound of every word, causing them to make mistakes at the moment of reading or writing.

Additionally, the Texas Educational Agency (2024) mentions in their handbook that Learners who have dyslexia typically present difficulties in phonological and phonemic awareness; handwriting, single-word reading, reading fluency, and spelling. These difficulties are sudden for their age and educational level. Sometimes, there are family stories behind these problems that could affect the children. It is necessary to mention that learners with this type of difficulty are important that receive treatment as soon as possible to prevent future difficulties related to dyslexia from affecting the development of language.

6.2.3.2.2 Consequences

In line with Misciagna (2022), here is a list of some consequences of dyslexia in reading and writing:

Problems in composing texts

- Lack knowledge of grammar, punctuation, word usage, sentence structure, and paragraph structure.
- Omitting words in sentences or unfinished sentences.
- Poorly organized written work
- Illegible handwriting.
- Incorrect use of upper- and lower-case letters.
- Inverted characters; mixing of printing and cursive writing.
- Letters or sounds that are too similar are confused. For example: jumpt for jumped.
- Use of non-permissible letter strings consistently. E.g., egszakt for exact; discuss/diskus.
- Uneven spacing between words and letters.

After analyzing the different studies, it is decided that dyslexia has a negative influence on phonological awareness, spelling, and writing, which should be understood by all teachers in order to improve the educational system and apply inclusive strategies.

6.2.4 Literacy

There are different meanings of literacy according to the areas in which it is studied, but if it is applied in the educational field, it refers to the ability to read and write. UNESCO (2025) defines literacy as:

A means of identification, understanding, interpretation, creation, and communication in an increasingly digital, text-mediated, information-rich, and fast-changing world. Literacy is a continuum of learning and proficiency in reading, writing, and using numbers throughout life and is part of a larger set of skills.

Furthermore, Rintaningrum (2009) explains that literacy refers to the ability to read and write prose and other print documents; it is a complex process of the language that integrates thinking and skills, incorporating a variety of habits, attitudes, interests, and knowledge, serving for different purposes and contexts.

Considering both meanings of literacy, it is understood as the ability to read and write. However, looking from a different side and adding dyslexia. Literacy is considered a door to integrating a child into the learning process. In reading, it is difficult for them, but by applying different strategies, both virtual and printed activities, students can improve their abilities that permit them to understand in a better way all the information, instructions, and words. In writing, the teacher can use kinesthetic activities, movements, and images that help them remember all the letters and words.

6.2.4.1 The literacy processes

According to Washington, (2020), in the literacy process, there are three steps to help students understand and comprehend the text better:

- **Pre-reading**: The teacher must explain the topic of reading; it needs to be a fragment of a lecture, not extensive. The teacher will interact with students and the text by trying to relate its context to the life or experience of the students. It is necessary to improve the comprehension of the text and generate curiosity in the children.
- **Reading:** Educators must plan some activities that support students during their reading. Also, this step is known as a pre-while-post model for reading. They can apply activities as complete reading drills or break down into syllables. This kind of work helps them to understand and review the sound of each word.
- **Post-reading:** In this step, students can talk with their classmates about the reading to exchange information. It is important to mention that this activity needs to be an integrative activity where all the students participate without exception. At the moment, interacting with other classmates can help them comprehend better.

If students have not developed reading ability yet, it is necessary to start with the Beginning Reading skill. Hadhrame et al. (2022) mention that the first step is to begin reading. Students begin to learn the alphabet's forms and pronunciations from A to Z. Then, form and read syllables, phrases, and sentences. At this moment, the teacher must start with dictation activities to help students relate spoken letters to written. After that, children are introduced to short sentences. After the child has mastered short phrases and studied and understands the structure of a whole sentence. Following that, even children must be taught how to read complex sentences.

For researchers, the literacy process is a process where teachers should use different and inclusive, and flexible methods that help all students in learning with the objective of good communication.

6.2.4.2 Learning problems in literacy

Some problems that teachers can face at the moment in developing learning literacy in children are:

- Reading:
- Many students do not have prior exposure to reading concepts
- Students do not have a language-based learning
- Sometimes, teachers do not give clear instructions that permit students to understand the activities or the topics.
- Unknown total of words' sounds
- Writing:
- Students have not developed fine and coherent skills, which is why they struggle with spelling.
- They have trouble recognizing words and omit or interchange words.
- They have limited knowledge of expressions or words that prevent them from writing a good story (Smith, J., & johnson, A. (2020).

One of the problems that can also arise is the irresponsibility and lack of concern of the tutors or student representatives themselves, who, instead of helping teachers and their children overcome this type of difficulty, do not motivate them or help them at home.

Also, some teachers do not have the correct training to deal with this type of strategy. It can be one of the problems of learning literacy (UNESCO, 2025).

Researchers mention that it is important to know the problems that students with dyslexia address since they can affect the development of learning, in the same way teachers must adapt methodologies and offer constant support to each student, addressing these problems emphasically help in the educational system in the educational system.

6.2.4.3 Components Areas to Improve Literacy

In line with The National Reading Panel (2002) cited in Dickson & Voorhies (2025), here are five component areas of reading that need to be taught:

- **Phonemic awareness:** the skill to manage phonemes into words by isolating sounds and blending them.
- **Phonics:** it is related to phonemes and printed letters, and the use of this knowledge to read and spell.
- **Fluency:** the characteristic of reading with an adequate rate, accuracy, and expression to generate comprehension.
- **Vocabulary:** insight into words and their meanings
- **Comprehension:** the skill to understand and construct meaning from text.

Additionally, it is relevant to mention the components of writing and speaking:

- **Writing:** the skill used to communicate ideas in written form. It includes spelling and handwriting.
- **Oral language:** Used to express insight, feelings. Also, it is an important part.

It is important to mention that this type of part is important to teaching or improving in the community, which means in the classroom with all the kids, and avoiding isolation, because it can affect the learning process.

6.2.4.4 How Dyslexia Affects the Literacy Process

Dyslexia, writing problems coexist for two reasons. First, writing and reading depend on underlying processes that are also related. Graham and Hebert (2010, 2011, as cited in Hebert et al., 2018) explain that dyslexia involves difficulties related to phonological development important for interpreting written language. While writing requires encoding phonological information when writing words. When the child has this type of language disorder, writing and reading are the most affected because students cannot recognize letters or words by sound. Making the language learning process difficult.

On the other hand, because this problem impacts the important processes of reading and writing equally, reading is necessary through all facets of writing all people who write need to review the original material before writing, and also read their writing to analyze possible spelling and grammatical errors. Since the student cannot recognize their problems, they need a special tutor to aid them step by step to improve their weaknesses in writing and reading.

6.2.5 Reading strategies

Hadhrami et al. (2022) expose some strategies and techniques that can help students improve their reading process: Imitating the form of the teacher's pronunciation, the sounds, and words. Practice reading regularly, complete reading drills, use techniques for spelling words that are broken down into syllables, and write stories based on students' own experiences. Additionally, learners with this type of disorder employ the phonemic approach, peeling syllable methods, and language experience methods; drilling activities are used as a part of their reading activities.

Moreover, syllable peel is another strategy to employ. This consisted of training students to spell a syllable-split word. This strategy was discovered when an instructor used it during an English session using the word “hundred”. The educator showed reading, describing it as "hundred," and then the learners practiced this method with the next word. This is described as Reni's stated theory, which consists of the syllable peeling technique that explains how to parse and combine words.

Another known technique is the language experience method. The first step is to offer clear instructions by interrogating students about their language learning experience. This strategy is entwined with the listening, speaking, and writing skills.

If students have not developed reading ability yet, it is necessary to start with the Beginning Reading skill. The first step is to begin reading. Students begin to learn the alphabet's forms and pronunciations from A to Z. Then, form and read syllables, phrases, and sentences. At this moment, the teacher must start with dictation activities to help students relate spoken letters to written. After that, children are introduced to short sentences. After the child has mastered short phrases and studied and understands the structure of a whole sentence. Following that, even children must be taught how to read complex sentences.

6.2.6 Writing Strategies

According to Menbet (2018), strategies become essential for teachers, but they need to create a more effective environment to ensure that dyslexic learners can understand and fulfill the learning outcomes of each learning activity applied in class. To help students memorize and practice the same type of difficult letter, it is necessary to apply several multisensory techniques. This method covers the auditory, visual, kinesthetic, and tactile approaches to learning elements. First of all, the visual technique is necessary for teachers to use when reading texts that have visual art. It can include posters, images, videos, and paintings to create a connection with the lecture. For example, if a teacher presents a brainstorming session about the government, they can use visual maps to link ideas of monarchy and democracy.

In addition, teachers can also use physical activities to help students remember spelling and writing during different learning sessions. For example, singing songs, clapping, or making movements. Hammond and Hercules (2016), cited in Menbet (2018), expose the techniques that dyslexics employ to face their challenges in learning, such as cramming and chunking to understand details during reading. The learners use cramming to study for academic matters such as tests. With chunking, students divide it into fragments, intending to break down the problems underlying into smaller sections that need to be

comprehended and solved. The mind mapping technique is another technique that improves learners' knowledge and understanding.

6.2.7 Technology

Technology is an important tool nowadays because it helps to make some things in an easy way. According to Smith (2025) said that technology involves a set of different tools such as computers, networks, and software programs that help to manage and transmit information clearly and easily. So, the technology is useful in different areas, like a business that can help people to do their work much better and effectively, in a personal area, this technology helps to find and transmit information efficiently by using different technological applications.

Garcia et al (2021) mentioned that in recent years, the emergence of new technologies has been increasing, which has produced many opportunities for those people who can manage and adapt such technologies for personal use or in the workplace. In addition, academic production is one of the main causes of the production of new technology. Therefore, several methods have been implemented to analyze and identify new areas for the application of such technologies. Also, the methodology of this work is related to the concept of blockchain, which allows for the identification of emerging technologies that can have a great capacity for breakthrough.

According to the researchers said that the technology is not just an application because it compounds with many tools like computers, software, and different programs that help people find and manage information efficiently. In addition, with the emergence of new technology, some people could manage and adapt it for their needs, and with that, people make their work easier than before the creation and implementation of the technology in different environments. For that reason, technology has had several impacts on people's daily lives.

6.2.7.1 Technology in the education field

Technology in education has become a tool that helps both teachers and students improve teaching and learning by promoting collaboration and participation. According to Tai et

al. (2019, Cited in Lai, 2023), in modern education, the use of technology is essential as it presents new opportunities to facilitate education and transform the way of teaching, focusing on effective student participation, where students can be protagonists of their learning.

Furthermore, according to Deshpande and Shesh (2021, as cited in Lai, 2023), some ways in which technology can help not only students and teachers, but the entire educational system in general, are discussed by optimizing educational effectiveness and thus reducing teaching-related expenses. Moreover, the incorporation of technology in education is presented as a strategy to improve or transform pedagogical practices, promoting more flexible and engaging spaces in education.

According to Johnson et al. (2016, as cited in Lai, 2023), technology in education encompasses both programs and applications designed for teaching, as well as tools adapted to different contexts, as long as they are accompanied by educational strategies for their effectiveness.

According to the research, it can be concluded that the integration of technology in the educational environment offers different opportunities inside and outside the classroom. The implementation of programs helps active learning, where students are the protagonists of their learning, so it is important that the teacher applies tools for educational needs.

6.2.8 A mobile application

The creation of mobile applications has transformed people's lives, as they provide access to education, healthcare, and communication tools. According to Svitlana (2006; cited in Amelia et al, 2022), mobile applications are considered a learning tool in different ways, whether face-to-face, remote, or online.

Similarly, mobile apps are programs designed for smartphones and tablets, where countless mobile applications can be downloaded, such as Google Play or the Apple App Store. They offer users various functions, such as streaming music, playing games, ordering food, reading news, and more. Their popularity is increasing as more people use

their mobile devices for various purposes. (Venkataraman, Manivannan, Rajkumar, 2022).

Therefore, mobile app development has become a highly competitive industry, where developers compete to create the most innovative and useful apps. When creating a mobile app, developers must first consider the device they are creating it will run.

On the other hand, nowadays, smart mobile applications play an important role in the detection and intervention in children with dyslexia. According to Politi-Georgousi & Drigas (2020) these mobile applications adapt to the needs of children with dyslexia and the pace of learning in today's society.

These applications have become an approach to good learning; during the last decades, they have been implemented, focusing on different symptoms of dyslexia (reading, writing, mathematical difficulties, memory, etc.).

According to the studies reviewed, the implementation of mobile applications adapts to any area of education and to the individual needs of students and can significantly improve educational outcomes and become an important complement to learning.

6.2.8.1 Mobile application benefits

Mobile applications offer multiple advantages in education. They facilitate independent learning and allow students to access educational content. According to Venkataraman (2022), some of the strengths of mobile applications in the educational field are wide and varied. They provide access to educational resources. With these mobile applications, children can check assignments and access courses, all from a single device, which helps them improve their strengths and weaknesses. They also allow students to interact with their teachers. In addition, these mobile applications offer interactive activities and quizzes where students actively participate. On the other hand, mobile applications have many benefits in the educational field, as mentioned by Zhang (2011; cited in Amelia et al; 2022) mentions that the advantages of mobile applications allow learning inside and outside the classroom at any time; Their use is much better than that of traditional tools,

so this allows students to have a tool that they can learn with, whether with the help of a teacher or at home.

Furthermore, Venkataraman (2022) states that mobile applications provide personalized learning experiences through which students can receive individualized instruction, helping them progress. This ensures that students can make the most of their education experience. Mobile applications are commonly used as educational games, which can help improve skills in a fun way, as they have become an indispensable tool for teaching and learning.

Furthermore, the benefits of using mobile applications include broad access to information, which promotes effective independent learning. According to researchers, mobile apps play a crucial role in teaching and learning. Their accessibility allows children to access them at any time of day, ensuring learning and adapting to every need.

6.2.8.2 Importance of using a mobile application to learn reading and writing skills

With the increase in the use of technology, teachers have had to adapt and start to implement this in their classrooms. Polshavoc (2024) explains that the use of mobile devices in the teaching-learning process has made a great contribution in increasing the level of insight and improving students' skills, such as research skills, acquiring a new language, enhancing thinking skills, and increasing motivation in the classroom, creating a significant environment that benefits the learning process. For this reason, teachers have decided the use this type of device with the intention that students not only study the content of texts that are important, but also open new paths of knowledge, which students can expand their insight.

Furthermore, different researchers, creators of apps, and companies have created apps adapted to the needs of each student. Dyslexia students have to face different challenges every day in the classroom; also, it represents a responsibility for the teacher to train themselves to interact with those students and the whole class. The use of mobile applications can complement the learning process, reinforce what students learned in a dynamic way, in which all participate. Additionally, students can use it themselves to improve their writing and reading skills. Martin (2024) explains that learning using apps

can be more engaging than reading books, since many of them have games, quizzes, videos, and animations to facilitate understanding. Considering those aspects, mobile applications are interesting tools that help teachers to reinforce the knowledge in students, and students can use them to improve their abilities. Also, it is more useful if kids have any disorder because it can help to understand and comprehend in a better way the learning process, especially in reading, writing, and spelling.

In addition, mobile applications have become important tools for the development of reading and writing in a fun and accessible way for students to reinforce what they have learned in the classroom in an autonomous way.

6.2.8.3 Classification of a mobile application

In this technological era, there are many apps that have been created by different businesses to help children with dyslexia improve their literacy, develop their reading and writing skills using useful tools, activities, and games to enhance multisensory learning. In line with Aldousari (2021), mobile applications are meant to develop the fundamental skills of students with dyslexia, such as their problem-solving skills, short-term memory, spelling, and orthographic coding.

In compliance with Burton-Hugues (2023) & Aldousari (2021), some apps can help students to enhance their literacy and learning process:

- Crazy Cursive Letters: designed to improve students' writing of cursive letters and words. Instead of writing the same words over and over on lined paper, learners get to trace many letters onto various backgrounds, like in the sky or on a cake. It makes the process more fun and dynamic the process. The principal benefits are: physically tracing over letters, sound effects, the background and colors are bright and varied, arrows guide the player, visual feedback, it has 100 frequently used words, and students can add their own. It is recommended for 6-8-year-olds.
- Montessori Words & Phonics: This app focuses on self-directed activities and hands-on, sensory learning. It focuses on learning the phonetics of letters and words through a multisensory experience. It uses a movable alphabet designed to

help kids develop their reading, writing, and spelling skills. This app helps learners to memories the phonics associated with letters. It is recommended for those 5 and under.

- Writing Wizard: designed to improve the player's ability to form letters and words. Students will be able to trace, learn letter sounds. Through the visual instructions, students can understand how to complete the activities. Also, there are options for customizing the learning experience, such as changing the font and letter size. This app improves fine motor skills in players, improving their ability to form letters. It is recommended for those 5 and under.
- Epic-Kids' Books & Reading: It is a read app. It has 40,000 books, audiobooks, learning videos, and more. The principal benefits are: Stories can be read aloud by a professional narrator, books can be downloaded, and it has learning tools like Spotlight Words and audio-enabled Dictionary Lookup that teach vocabulary and pronunciation. It has significant improvements in kids who use it.
- Simplex Spelling Phonics: It helps students improve their spelling and reading skills. But it focuses on improving the learner's understanding of phonemes. The principal characteristic of this app is that it puts words into context, helping them to understand how to form and use words. Also, it has a useful feature called "reverse phonics.", which divides the words into phonemes to enhance the understanding of letters' sounds and structure. It has a validated by an academic study, which revealed that students who use it classroom for 18 weeks show an average spelling improvement.
- Me Books: It is an interesting app to read. It has hundreds of popular books and comics. For dyslexic kids, there are recommendations as Oxford Reading Tree and Laybird Classics. This app has a professional narrator to read the stories, and students can select different books, and narration and sounds can be recorded. The lecture and picture can be given a color overlay.
- "I Read" This interesting app provides readings adapted to each student's age, according to Sierra Chica Software SL (2022). "I read " uses attractive texts. It can be used offline. It has eye-catching images to help children read in a fun way. Each time the child progresses through the five easy-to-use levels, it will also help them improve their writing.

- Dyslexia Baca: This is a useful app that provides visual graphics of confusing letters, and helps those who struggle learner's learning. It can help them to distinguish letter p, q, b, d, m, and w. Mohamad et. al (2024) mention that it was created in the Malay language. Furthermore, it incorporates a multisensory approach, adapting the environment for dyslexic children. It was lauded by multimedia experts, who use it in a heuristic. Recognizing that dyslexic children often have difficulties with reading and understanding due to a deficit in orthographic decoding and limited working memory capacity.

These mobile applications are meant to improve the fundamental skills of those with dyslexia, such as improving their problem-solving skills, short term memory, and orthographic coding These mobile applications are meant to improve the fundamental skills of those with dyslexia such as improving their problem-solving skills, short-term memory, and orthographic coding.

6.2.8.4 The I Read mobile application

The I Read mobile application, developed by Sierra Chica Software SL (2022), is an educational tool designed to improve reading comprehension in children aged 4 to 8. It features a series of structured texts and interactive comprehension questions across five progressive levels, including themes such as "Basic Primer" and "Animals." The application provides immediate feedback through visual and auditory stimuli, such as chimes and stars, to motivate learners (AppAdvice, 2024). Due to its offline functionality and intuitive interface, I Read becomes particularly valuable in educational contexts with limited technological resources or inconsistent internet access, such as many Ecuadorian public schools. These features make the tool adaptable to environments where traditional support for students with learning difficulties is often unavailable, which enhances its potential in inclusive teaching practices.

The structure and functionality of I Read align with principles of assistive technology for learners with dyslexia. According to Politi-Georgousi and Drigas (2020), effective digital tools for dyslexia should integrate visual reinforcement, gradual difficulty, and multisensory components to address the specific cognitive processing challenges of

dyslexic students. I Read incorporates these elements through simplified text design, auditory guidance, and gamified progression, offering a learning experience that reduces frustration and promotes autonomy. In this regard, I Read exemplifies the type of tool that supports differentiated instruction, especially in language acquisition for students with literacy difficulties. Its structure responds to the pedagogical need for alternatives that personalize learning pathways while maintaining educational standards.

In summary, I Read is not only a technological resource but also a pedagogical strategy that can contribute to literacy development in students with dyslexia. Its design characteristics—offline access, multisensory feedback, and progressive content—make it suitable for inclusive educational environments, particularly when guided by teachers who understand both the limitations and the potential of digital tools. The analysis of teachers' perceptions regarding their use provides valuable insights into how such applications can be effectively adapted and integrated into real-world educational contexts.

7. METHODOLOGY

7.1 Research approach

This study follows a qualitative research approach. It seeks to understand human behavior and experiences through non-numerical data such as interviews, observations, and narratives. Rather than aiming to quantify variables, qualitative research aims to explore complex processes, meanings, and contextual factors. According to Tenny, Brannan, and Brannan (2022), qualitative designs are particularly valuable in educational research where understanding perceptions, motivations, and contextual dynamics is crucial. In the context of the present study, this approach is essential for analyzing teachers' perceptions of the "I Read" mobile application and its role in supporting literacy development among children with dyslexia.

7.2 Research design

More specifically, this investigation adopts a descriptive qualitative design, which aims to portray phenomena as they naturally occur, without deep theoretical interpretation or

abstraction. As Doyle (2019) highlights, descriptive qualitative studies are especially appropriate when the goal is to provide a comprehensive summary of participants' experiences in everyday terms. In this regard, the purpose of the current research is not to generate a new theory, but rather to describe how educators perceive, implement, and evaluate the use of the “I Read” application within real classroom settings.

Furthermore, this methodological choice aligns with Busetto, Wick, and Gumbinger’s (2020) assertion that descriptive qualitative studies are particularly useful when researchers seek to address what, how, and why questions about emerging or underexplored practices. It also allows the researcher to remain close to participants’ actual words and experiences, which enhances the credibility and relevance of the findings—especially in localized educational contexts such as Ecuador.

7.3 Population Sample

The participants were three English teachers working with six fourth-grade students previously diagnosed with dyslexia. The teachers were selected through purposive sampling, considering their direct experience with inclusive education and their familiarity with the needs of students who require additional support in literacy development.

7.4 Data collection and procedures

The main instrument used was a semi-structured interview guide. It was adapted from a doctoral thesis focused on the use of educational technologies for students with learning difficulties. From that instrument, only the questions that were relevant to the research objectives of this study were selected. The questions explored the teachers’ perceptions regarding the feasibility, potential benefits, and challenges of using the I Read mobile application with students who have dyslexia. This interview guide was based on the work by Allafi (2022), who developed a game-based mobile application aimed at improving reading skills in dyslexic learners, and whose study also used qualitative methods to explore educators' insights into the integration of such technologies in primary education settings.

The interviews were conducted individually and in a private setting; each session lasted approximately 30 to 40 minutes and was audio-recorded with prior informed consent. The recordings were then transcribed for analysis.

7.5 Data Analysis

The interview transcripts were analyzed using thematic analysis, following the six-phase process proposed by Kiger and Varpio (2020): familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This method allowed for a systematic identification and interpretation of patterns within the participants' responses. It enabled the categorization of teachers' perceptions and insights regarding the integration of the I Read mobile application in classrooms with students who have dyslexia.

8. ANALYSIS AND DISCUSSION OF RESULTS

Table 2: Teachers' interviews' categories

THEMES (CATEGORIES)	**SUBCATEGORIES**
Benefits of "I Read"	Interactivity
	Visual aids
	Reading text
	Motivation
Negative aspects of "I Read"	Distraction
Validation of "I read"	Usefulness of I read

Source: Own elaboration by Molina, A, & Imbaquingo, E

8.1 Category: Benefits of "I Read" for Dyslexia

8.1.1 Subcategory: Interactivity

1.- Es interactiva y los estudiantes van a responder, lo cual sería bueno para las clases [The teachers agreed that *I Read* is interactive and prompts active participation] (ETM)

2.-*"Es muy interesante, muy divertido y sobre todo muy útil porque contiene texto, imágenes y preguntas para retroalimentación."*[I find it very interesting, very fun, and above all, very useful because it contains text, images, and questions for feedback.] (ETL)

3.-"Parece muy interactiva para los niños y puede mejorar la lectura." [It seems very interactive for children and can improve reading.] (ETR)

The interactivity of the I Read app was highlighted by the interviewed teachers as one of its main benefits for supporting children with dyslexia. Teachers noted that the platform promotes active participation to maintaining student attention. Teachers consider that the combination of images, short texts, and feedback questions makes the experience interesting, fun, and useful for learning because the app seems very interactive for children and could directly contribute to improving their reading. These perceptions coincide with those reported by Buele et al. (2020), who say that images, sounds, and immediate feedback are elements to catch students' attention that contribute to improving the language skills of children with dyslexia between the ages of 8 and 12. The authors argue that by activating multiple senses, information processing is facilitated, cognitive overload is reduced, and motivation is increased. Similarly, Dela Cruz et al. (2020) concluded in their study of the IREAD app that mobile tools with features such as text, image, progress tracking, and immediate feedback significantly improve reading comprehension in students with dyslexia. These coincidences reinforce the validity of using interactive resources such as I Read, which stimulate multisensory participation and are pedagogically effective for students with specific learning difficulties.

8.1.2 Subcategory: Visual aids

1.-"*10, porque los niños aprenden a través de imágenes.*"
[10, since children do learn through images] (ETM)
2.-"*El hecho de usar imágenes, textos cortos, dependiendo del nivel, y las actividades al final."*
[The fact of using images, short texts, depending on the level, and the activities at the end.] (ETL)
3.- "*El uso de imágenes para relacionar las lecturas, además de que es una aplicación, y a los niños les gusta usar su celular*."

[The use of images to relate the readings, in addition to the fact that it is an application, and children like to use their cell phones.] (ETR)

The teachers interviewed value the use of visual resources in the iRead app. For example, one of them gives a 10 for the effectiveness of images for learning, highlighting those children learn best with visual and colorful resources. Another teacher points to the combination of images with short texts and level-appropriate activities as key to improving reading comprehension and facilitating learning, while a third emphasizes that images help connect readings and that the app is engaging because children enjoy using their phones to learn. These perceptions coincide with the study by Allafi and Newbury (2021), who emphasize that technological tools such as mobile apps, especially those that help students with dyslexia, must integrate visual resources to be effective. According to these authors, the use of images and other visual resources not only improves comprehension and retention of information but also helps reduce the anxiety these students often experience during the reading process. Furthermore, they highlight that motivation increases when visual resources are combined with intuitive and accessible interfaces, as observed by teachers in relation to I Read. The study also highlights the importance of adapting visual resources to each student's level, a factor that coincides with the observation that images and short texts should be adapted to each child's ability.

In conclusion, both the empirical evidence gathered in their research and the findings of the study by Allafi and Newbury (2021) reinforce the idea that visual resources are a fundamental component in the design of educational applications for students with dyslexia, as they facilitate comprehension, maintain interest, and enrich the learning experience. Similarly, a study conducted by Asri et al. (2025) at the International Islamic University of Malaysia, entitled "Development of a Mobile Application for Dyslexic-Friendly Learning Materials," highlights that the use of visual aids, such as images and graphics, in mobile applications significantly improves reading comprehension in children with dyslexia. The authors note that these visual tools facilitate the association of concepts and words, promoting more effective and engaging learning for students.

8.1.3 Subcategory Reading text

1.-*"Sí, porque pueden aprender mientras juegan en el celular."*

[Yes, because they can learn while playing on the phone.] (ETM)

2.-"*Sí, porque los niños están más motivados para aprender inglés."*

[Yes, because the children are more motivated to learn English.] (ETL)

3.-"*Sí, porque los estudiantes pueden disfrutar aprendiendo mediante juegos y no tienen que saber que están aprendiendo."*

[Yes, because the students can enjoy learning through games, and they do not have to know that they are learning.] (ETR)

The teachers interviewed acknowledged that the IREAD app contains various levels and adapted readings, which facilitate progressive work with students with dyslexia. For example, one of the teachers noted that "it has levels and different readings," while ETL emphasized that the app uses images, short texts appropriate to the level, and activities at the end of each reading. The second teacher, in turn, valued the use of images to relate the content to the text and stated that "children want to use it more because it's on their phones." These perceptions are consistent with the findings of the study by Burac and Dela Cruz (2020), who stated that IREAD includes reading material structured by level, short and understandable texts, accompanied by images and final exercises that reinforce reading comprehension. Furthermore, as a mobile app, it offers an accessible and motivating experience for students, reinforcing English teachers' ideas about children's preference for technological devices. Therefore, it can be concluded that the teachers' comments are validated against the characteristics described in the literature, and that the reading component within I READ constitutes a key element in supporting reading comprehension in children with dyslexia.

8.1.4 Subcategory: Motivation

1.-*"Sí, porque pueden aprender mientras juegan en el celular."*

[Yes, because they can learn while playing on the phone.] (ETM)

2.-"*Sí, porque los niños están más motivados para aprender inglés."*

[Yes, because the children are more motivated to learn English.] (ETL)

3.-"*Sí, porque los estudiantes pueden disfrutar aprendiendo mediante juegos y no tienen que saber que están aprendiendo."*

[Yes, because the students can enjoy learning through games, and they do not have to know that they are learning.] (ETR)

According to the teachers, the application increases students' motivation by presenting content in an interactive and visually appealing way, which captures their interest and encourages consistent practice. This aligns with Li (2024), who found that digital educational games positively impact student motivation and engagement. Furthermore, the application supports attention by offering structured tasks that facilitate sustained focus. Engagement is promoted through fun elements and immediate feedback, which help maintain student involvement and reinforce learning in a dynamic format.

8.2 Category: Negative aspects

8.2.1 *Subcategory: Distraction*

1.- "*Puede ser una distracción y se meten en juegos."*
[It can be a distraction, and they get into games.] (ETL)
2.-"Debería usarla para ver si hay resultados negativos."
[I should use it to see if there are negative results.] (ETM)
3.-Ninguna [None] (ETR)

The three teachers expressed varying opinions regarding the potential distraction that using the I Read app in the classroom could generate. Teachers expressed direct concern, noting that the app could be a source of distraction because students might be diverted to integrated games, which could interfere with the effective learning process, so teachers have to take cautious stance, indicating the need to test the app to assess whether it actually presents negative effects related to attention.

These perceptions reflect a common debate in the literature on educational technology for students with special needs. For example, Burac and Dela Cruz (2020) acknowledge that

although mobile apps IREAD for dyslexic students incorporate gamified elements to increase motivation and engagement, there is a risk that these components could divert attention if not properly managed by educators. This highlights the need to balance interactivity with a pedagogical approach to maximize educational benefit. Additionally, Alghamdi and Reffat (2024) emphasize that the effective implementation of assistive applications requires constant teacher supervision and teaching strategies that minimize potential distractions, especially considering that students with attention difficulties may be more susceptible to losing focus. Both authors agree that the success of these technologies depends largely on teacher training and their planned integration into the curriculum. In conclusion, the contrast between teacher experiences and the academic literature indicates that, while IRead has high potential to improve literacy in children with dyslexia, its use must be carefully monitored to prevent motivation derived from interactive elements from becoming distracting. This emphasizes the importance of teacher training and an instructional design that optimizes attention and learning

8.3 Category: Validation

8.3.1 Subcategory: Usefulness of "I read"

1.-*"Un 8, porque me gustaría probar la aplicación yo misma para ver cómo funciona."*

[An 8, since I would like to try the application myself to see how it works.] (ETM)

2.-*"Diez."*
[Ten.] (ETL)

3.-*"Diez."*
[Ten.] (ETR)

1.-"*También 8 porque me gustaría aplicar la aplicación para tener un resultado."*
[Same as 8 because I would like to apply the application to get a result.] (ETM)
2.-"*Igual 8, porque me gustaría usar la app para obtener un resultado. Porque puede ser una distracción."*
[Same as 8, because I would like to use the app to obtain a result. Because it can be a distraction.] (ETL)

3.-*"Diez."*

[Ten.] (ETR)

1.-*"10, porque los niños aprenden a través de imágenes."*

[10, since children do learn through images.] (ETM)

2.-*"Diez."*

[Ten.] (ETL)

3.-*"Diez."*

[Ten.] (ETR)

The responses from the interviewed teachers show a generally positive perception regarding the usefulness of the “I Read” mobile application. One teacher rated it with an 8 out of 10, stating that they would like to test the application themselves to assess its effectiveness. Another mentioned, “I would like to use the app to obtain a result, because it can be a distraction.” However, most teachers gave the application the highest rating of 10, highlighting its potential benefits for children, especially in supporting learning through images. These results align with Burac et al. (2020), who emphasize that mobile applications designed for learners with dyslexia must combine instructional content with motivational elements, which include visuals, rewards, and interactive components. The motivation to test the app before fully validating its effectiveness suggests that while teachers recognize its theoretical usefulness, they seek empirical confirmation in their specific classroom contexts.

Furthermore, the study by Alghamdi & Reffat (2024) supports this finding by stating that mobile applications for dyslexic students can improve reading and writing skills significantly when combined with personalized and engaging content. The high ratings given by the teachers indicate they perceive the app as potentially effective due to its multimodal features and compatibility with children's digital interests. In addition, according to the study by Nur et al. (2020), the “I Read” app offers an individualized reading enhancement system that adapts to the users' reading difficulties, making it more likely to be viewed as useful by educators seeking inclusive learning strategies. The fact that children enjoy using mobile phones, as noted by the teachers, strengthens the belief that such tools can foster more motivation and interaction during learning.

In conclusion, teachers' perceptions and existing research confirms that "I Read" is perceived as a useful tool to improve literacy in children with dyslexia. However, some teachers' reservations about distractions indicate the importance of guided implementation and teacher training

9. RESEARCH IMPACTS

9.1 Technical Impact

The implementation of the I Read mobile application demonstrates how technology can be effectively integrated into literacy instruction for students with dyslexia. Its offline accessibility, visual support, and structured levels of difficulty make it a user-friendly and adaptable tool in classrooms with limited technological infrastructure. This technical flexibility ensures that the app can be used even in schools without stable internet connections or advanced digital resources.

9.2 Social Impact

The use of *I Read* promotes inclusive education by addressing the specific learning needs of children with dyslexia. The app fosters student confidence and active participation by providing a non-threatening environment where learners can progress at their own pace. This creates a more equitable learning experience and helps reduce the social stigma often associated with learning difficulties.

9.3 Environmental Impact

As a fully digital resource, I Read reduces the reliance on printed textbooks and worksheets, supporting more sustainable classroom practices. By minimizing paper use and promoting digital interaction, the app contributes to environmentally conscious education without compromising instructional quality.

9.4 Educational Impact

The study confirms that I Read enhances reading comprehension and motivation in students with dyslexia through its interactive features, such as immediate feedback, visuals, and gamified tasks. The application allows for differentiated instruction, enabling

teachers to tailor reading activities based on students' individual progress. As a result, it supports deeper engagement and reinforces fundamental literacy skills in English.

9.5 Economic Impact

Given that I Read is a low-cost or freely accessible tool, it represents a practical alternative for public schools with limited educational budgets. The app reduces the need for expensive intervention programs or materials, making it a cost-effective strategy to support literacy development in diverse educational settings, particularly in under-resourced communities.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

After reviewing the theoretical foundations related to mobile learning and inclusive education, it becomes evident that mobile applications—when designed with multisensory and accessible features—can serve as effective support tools for students with learning difficulties. These tools provide an alternative way of learning that accommodates different cognitive profiles, particularly in language acquisition. This theoretical understanding supports the integration of digital tools like I Read into inclusive classrooms.

The perceptions gathered from English teachers reveal that the I Read application is viewed positively as a technological tool to assist students with dyslexia. Teachers emphasize the application of interactive elements, such as visual aids, progressive levels, and immediate feedback, as features that motivate learners and support comprehension. However, they also noted that one of the negative aspects observed was that the application could sometimes cause distraction among students. These perceptions suggest that when mobile tools are well-integrated into pedagogical practices, they can enhance students’ reading and writing experiences in a meaningful way.

Based on the results, it can be concluded that mobile applications like I Read contribute not only to the improvement of literacy skills but also to fostering greater student

autonomy and motivation. However, the successful implementation of such tools largely depends on the teacher's ability to adapt content and manage the application as part of a broader instructional strategy. Therefore, sustained support and training for educators are essential for maximizing the impact of digital interventions.

10.2 Recommendations

It is recommended that schools and educational institutions promote the inclusion of mobile learning tools like I Read as part of their support strategies for students with dyslexia. These tools should be aligned with inclusive education models that prioritize flexibility, accessibility, and differentiation to meet students' individual needs.

Teachers should receive continuous training in the pedagogical use of mobile applications to ensure that these resources are not only used for engagement but also for meaningful literacy development. Training should include practical strategies for integrating apps into lesson planning and for monitoring student progress effectively.

Future research and classroom implementation should consider the contextual needs of each educational setting. While the application has shown positive results, it is advisable to combine it with complementary methods—such as personalized instruction and small-group interventions—to provide a more comprehensive approach to literacy support for students with dyslexia.

13. REFERENCES

Al Hadhrami, A. S., Al–Amrat, M.A.S., & Darawsheh, S.R. (2022). Approach to improve the reading skills of students with dyslexia. Information Sciences Letters. https://www.researchgate.net/publication/363087810_Approach_to_Improve_Reading_Skill_of_Students_with_Dyslexia

Al Otaiba, S., & Petscher, Y. (2020). Identifying and serving students with learning disabilities, including dyslexia, in the context of multitiered supports and response to intervention. *Journal of Learning Disabilities*, https://www.researchgate.net/publication/343598302_Identifying_and_Serving_

Students_With_Learning_Disabilities_Including_Dyslexia_in_the_Context_of_Multitiered_Supports_and_Response_to_Intervention

Aldousari, A. (2021). *Mobile applications for students with dyslexia: A systematic literature review. American Research Journal of Humanities and Social Sciences* https://www.researchgate.net/publication/349465421_Mobile_Applications_for_Students_with_Dyslexia_A_Systematic_Literature_Review

Allafi, R. S. S. (2022). *Developing a game-based mobile application to enhance reading skills for dyslexic students at primary schools in Saudi Arabia* [Master's thesis, University of Sussex]. University of Sussex Research Portal. https://hdl.handle.net/10779/uos.23491733.v1

Allafi, R. S., & Newbury, P. (2021). *Importance of assistive mobile applications for dyslexic students in Saudi Arabia* [Manuscript]. University of Sussex. https://sussex.figshare.com/articles/journal_contribution/IMPORTANCE_OF_ASSISTIVE_MOBILE_APPLICATIONS_FOR_DYSLEXIC_STUDENTS_IN_SAUDI_ARABIA/28684205/1?file=53282954

Amelina, S. M., Tarasenko, R. O., Semerikov, S. O., & Shen, L. (2022). *Using mobile applications with augmented reality elements in the self-study process of prospective translators.* Educational Technology https://www.researchgate.net/publication/363649746_Using_mobile_applications_with_augmented_reality_elements_in_the_self-study_process_of_prospective_translators

Amelia, S.M., Tarasenko,R,O., Semerikov, S.O., & Shen,L. (2022) Using mobile applications with augmented realityelements in the self-study process of prospectivetranslators. Educational Technology. https://acnsci.org/journal/index.php/etq/article/view/51/435

Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2017). *Universal Design for Learning (UDL): A content analysis of peer-reviewed journal papers from 2012 to 2015*. Journal of the Scholarship of Teaching and Learning, 17(3), 67–84. https://doi.org/10.14434/josotl.v17i3.22102

Alghamdi, R., & Reffat, R. (2024). Importance of assistive mobile applications for dyslexic students in Saudi Arabia. *PUPIL: International Journal of Teaching, Education and Learning.*

https://sussex.figshare.com/articles/journal_contribution/IMPORTANCE_OF_ASSISTIVE_MOBILE_APPLICATIONS_FOR_DYSLEXIC_STUDENTS_IN_SAUDI_ARABIA/28684205

Asri, D. N. A., Ramli, H. A. M., & Saidin, N. (2025). *Development of a mobile application for dyslexic-friendly learning materials*. IIUM Engineering Journal, 26(2), 142–154. https://www.researchgate.net/publication/391771150_Development_of_a_Mobile_Application_for_Dyslexic-Friendly_Learning_Materials

Burac, M. A. P. & Dela Cruz, J. D. (2020). *Development and usability evaluation on Individualized Reading Enhancing Application for Dyslexia (IREAD): A mobile assistive application. IOP Conference Series: Materials Science and Engineering, 803(1), Article 012015.* https://doi.org/10.1088/1757-899X/803/1/012015

Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. Neurological Research and Practice, 2(14). https://doi.org/10.1186/s42466-020-00059-z

Buele, J., López, V. M., Salazar, L. F., Edisson, J. H., Reinoso, C., Carrillo, S., Soria, Á., Andrango, R., & Urrutia-Urrutia, P. (2020). *Interactive system to improve the skills of children with dyslexia: A preliminary study*. En Á. Rocha & R. P. Pereira (Eds.), *Developments and advances in defense and security* (pp. 439–449). Springer Nature Singapore. https://www.researchgate.net/publication/333784646_Interactive_System_to_Improve_the_Skills_of_Children_with_Dyslexia_A_Preliminary_Study

Creswell, J. W., & Creswell, J. D. (2023). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* SAGE https://repositorio.ciem.ucr.ac.cr/jspui/handle/123456789/514

Dougherty, S. M., & Horne, M. R. (2021). *Best practices in early childhood literacy*. Center for Education Policy Analysis, Research, and Evaluation (CEPARE), University of Connecticut. https://cepare.uconn.edu/wp-content/uploads/sites/3130/2021/10/CEPARE-Early-Childhood-LIteracy-Oct-2021.pdf

Doyle, L. (2019). An overview of the qualitative descriptive design within nursing and healthcare research. ResearchGate. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7932381/

Elbes, E. & Oktaviani, L. (2022). *Character Building in English for Daily Conversation Class Materials for English Education Freshman Students.* Journal of English Language Teaching and Learning (JELTL) https://www.researchgate.net/profile/Lulud-Oktaviani/publication/369176604_CHARACTER_BUILDING_IN_ENGLISH_FOR_DAILY_CONVERSATION_CLASS_MATERIALS_FOR_ENGLISH_EDUCATION_FRESHMEN_STUDENTS/links/6464bd209533894cac770bc5/CHARACTER-BUILDING-IN-ENGLISH-FOR-DAILY-CONVERSATION-CLASS-MATERIALS-FOR-ENGLISH-EDUCATION-FRESHMEN-STUDENTS.pdf

García-Pastor, I. ., Sánchez-Fuente, F. ., & Otegi-Olaso, J.-R. . (2021). Methodology for defining application trends in emerging technologies: Blockchain as a case study. *Spanish Journal of Scientific Documentation* , *44* (4), e310. https://doi.org/10.3989/redc.2021.4.1771

Ilyosovna, N. (2020). *The Importance of English Language*. International Journal on Orange Technologies (IJOT). https://media.neliti.com/media/publications/333378-the-importance-of-english-language-2c7b6d03.pdf

Kiger, M. E., & Varpio, L. (2020). *Thematic analysis of qualitative data: AMEE Guide* No. 131. Medical Teacher, 42(8), 846–854. https://doi.org/10.1080/0142159X.2020.1755030

Lai, J. W. M., De Nobile, J., Bower, M., & Breyer, Y**.** (2022). *Comprehensive evaluation of the use of technology in education – validation with a cohort of global open online learners*. *Education and Information Technologies,* https://figshare.mq.edu.au/articles/thesis/The_comprehensive_evaluation_of_the_use_of_technology_in_education/25669551?file=48034159

Martin, E. (2024, October 1). *From classrooms to smartphones: The rise of mobile apps in education*. eLearning Industry. https://elearningindustry.com/from-classrooms-to-smartphones-the-rise-of-mobile-apps-in-education

Menbet, A. A. (2018). *The Use of Effective Strategies to Improve Saudi EFL Dyslexic Learners' Writing Skills. Theory and Practice in Language Studies*, 8(12), 1611–1619. https://doi.org/10.17507/tpls.0812.06

Misiagna, S. (2022). *Learning Disabilities: Neurobiology Assessment, Clinical Features and Treatment.* https://books.google.es/books?hl=es&lr=&id=LNJuEAAAQBAJ&oi=fnd&pg=PA3&dq=Types+of++learning+difficulties+&ots=vXXmehh_UC&sig=Pj-z4U5Rj_jz_MjgsvAt2IVnQFY#v=onepage&q&f=false

Mohamad, M., Abdullah, N., Rahim, N.,Sanmugam,M., & Takajo, H. (2024).Mobile Assistive Technology for Dyslexic Children: A Significant Review.Journal of Advanced Research in Applied Sciences and Engineering Technology https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/article/view/5689/5843

Muktamath, V., Hegde, P. & Chand, S. (2021). *Types of Learning Disability*. Research Gate. https://www.researchgate.net/publication/357239652_Types_of_Specific_Learning_Disability

National Institute of Child Health and Human Development. (2017). *Learning disabilities*. Retrieved from https://www.nichd.nih.gov/health/topics/learning/conditioninfo/types

Nishanthi, R. (2018). *Importance of Learning English in Today World.* International Journal of Trend in Scientific Research and Development (IJTSRD). https://www.researchgate.net/publication/329505353_Important_of_learning_English_in_today_world

Nordquist, R. (2020). *English as a Foreign Language (EFL).* ThoughtCo. https://www.thoughtco.com/english-as-a-foreign-language-efl-1690597

Palshkov, K., Shetelya, N., Khlus, N., Vakulyk, I., & Khyzhniak, I. (2024). Impact of mobile apps in higher education: Evidence on learning. Amazonia Investiga https://www.researchgate.net/publication/380381818_Impact_of_mobile_apps_in_higher_education_Evidence_on_learning

Pezo Galdea, J.I., Leiton Leiton, D.R., Sanchez Suarez, J. G & Alejandro Cruz, M. A. (2023). Persepcion docente sobre la dyslexia en instituciones educativas del canton

Pino, M., & Mortari, L. (2014). The inclusion of students with dyslexia in digital learning environments: A case study in an Italian primary school. Computers & Education, 81, 49–58. https://doi.org/10.1016/j.compedu.2014.09.005

Politi-Georgousi, S., & Drigas, A. S. (2020). *Mobile applications, an emerging powerful tool for dyslexia screening and intervention: A systematic literature review. International Journal of Interactive Mobile Technologies* (iJIM), 14(18), 4–17. https://doi.org/10.3991/ijim.v14i18.15315

Quimosing-Ocay, A. (2022). *Learning English as a Foreign Language (EFL):* A Narratology. Southeast Asia Language Teaching and Learning (SALTeL) Journal 5(2):13-21. https://www.researchgate.net/publication/363043612_Learning_English_as_A_Foreign_Language_EFL_A_Narratology

Rintaningrum, R. (2009). *Literacy: Its Importance and Change in the Concept and Definition.* TEFLIN Journal 20(1). https://www.researchgate.net/publication/47523879_Literacy_Its_Importance_and_Changes_in_the_Concept_and_Definition

Saminathan, V., Manivannan, S., & Rajkumar, J. (2022). *Mobile applications for education – An overview. International Journal of Scientific Development and Research,* https://www.researchgate.net/publication/368755973_Mobile_Applications_for_Education_-_An_Overview

Saminathan, V.,Manivannan,S., & Rajkumar, (2022). Mobile applications for Education –and overview. https://www.researchgate.net/publication/368755973_Mobile_Applications_for_Education_-_An_Overview

Santa Elena. Ciencia latina revista cientifica Multidiciplinar https://www.researchgate.net/publication/371386347_Percepcion_docente_sobre_la_dislexia_en_instituciones_educativas_del_canton_Santa_Elena

Sierra Chica Software SL. (2022). *I Read: Reading Comprehension* (Versión 1.0) [Aplicación móvil]. App Store. https://apps.apple.com/us/app/i-read-reading-comprehension/id1629883809?utm_source=chatgpt.com

Smith, G. (2025). What is Information Technology and its Benefits? *Theknowledgeacademy*. https://www.theknowledgeacademy.com/blog/what-is-information-technology/

Snowling, M. J., & Hulme, C. (2012). Interventions for children's language and literacy difficulties. *International Journal of Language & Communication Disorders, 47*(1), 27–34. https://www.researchgate.net/publication/221769779_Interventions_for_children's_language_and_literacy_difficulties

Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). *The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. Computers & Education* https://www.sciencedirect.com/science/article/pii/S0360131515300804?via%3Dihub

Tenny, S., Brannan, J. M., & Brannan, G. D. (2022). *Qualitative study. In StatPearls. StatPearls Publishing.* https://www.ncbi.nlm.nih.gov/books/NBK470395/

The Texas Education Agency. (2024). *The Dyslexia Handbook: Procedures Concerning Dyslexia and Related Disorders*. https://tea.texas.gov/academics/special-student-populations/special-education/texas-dyslexia-handbook.pdf

UNESCO (2025). *Literacy: What you need to know about literacy*. https://www.unesco.org/en/literacy/need-know

Walia, (2023). English Language overview: A review article. International Journal of Innovative research in technology. https://www.researchgate.net/publication/371852631_English_Language_Overview_A_review_Article

Washington University in St. Louis. (2020). *Reading strategies: Active learning techniques for college reading*. The Learning Center. https://ctl.wustl.edu/learningcenter/wp-content/uploads/sites/2/2021/07/Reading-Strategies_TLC_2020.pdf

Werth, R. (2023). *Dyslexia: Causes and Concomitant Impairments.* Brain Sciences. (MDPI). https://www.researchgate.net/publication/369165187_Dyslexia_Causes_and_Concomitant_Impairments

Woodfine, B. P., Nunes, M. B., & Wright, D. J. (2008). Text-based synchronous e-learning and dyslexia: Not necessarily the perfect match. *Computers & Education,* https://www.researchgate.net/publication/223074236_Text-based_synchronous_e-learning_and_dyslexia_Not_necessarily_the_perfect_match

Zambrano Marcillo, D., Vega Revelo, D., & Paredes Paucar, G. (2024). *Estrategia para el uso de teléfonos inteligentes en las clases de comprensión lectora: Una propuesta para los estudiantes de primer año de secundaria en Ecuador*. Universidad Técnica de Ambato. https://doi.org/10.37811/cl_rcm.v8i1.9717

Zidan, M. (2023). *Learning Difficulties Theories and Solutions*. Neoma Journal of Humanities and Literature (NJHL). https://www.researchgate.net/publication/371226534_Learning_Difficulties_Theories_And_Solutions

14. ANNEX

Annex 1. Request for authorization from the educational institution