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FACULTY OF EDUCATION

School of English Language Teaching

Thesis Submitted to Obtain the Licentiate Degree in
English Language Teaching

The Impact of Implementing Technological Devices (Smartphones and Laptops) and the Increase of Phonological Awareness in Students from First Cycle at La Iberia and Grano De Oro Elementary Schools in Siquirres, Circuit 06, at the Limón Regional Bureau for Education, during the Second Semester of 2025.

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Content

Sworn Declaration

Yo David Humberto Molina Solís, mayor de edad, portador de la cédula de identidad número uno diez setenta y tres cero ocho trece (1-1073-0813) egresado de la carrera de Enseñanza de inglés de la Universidad Internacional de las Americas, hago constar por medio de este acto y debidamente apercibido y entendido de las penas y consecuencias con las que se castiga con el Código Penal de mi trabajo de tesis para optar por el titulo de Licenciatura en Enseñanza del Inglés I y II ciclo, juro solemnemente que mi trabajo de investigación titulado: "The impact of implementing technological devices (smartphones and laptops) and the increase of phonological awareness in students from first cycle at la Iberia and Grano de Oro elementary school in Siquirres, circuit 06, at the Limon Regional Bureau for Education, during the second semester of 2025 ", es una obra original que ha respetado todo lo preceptuado por las Leyes Penales, así como la Ley de Derecho de Autor y Derecho Conexos número 226 del 25 de noviembre de 1982; incluyendo el numeral 70 de dicha ley que advierte; articulo 70. Es permitido citar a un autor, transcribiendo los pasajes pertinentes siempre que estos no sean tantos y seguidos, que puedan considerarse como una producción simulada y sustancial, que redunde en perjuicio, del autor de la obra original. Asimismo, quedo advertido que la Universidad se reserva el derecho de protocolizar este documento ante Notario Público.

En fe de lo anterior, firmo en la ciudad de San José a los 17 días del mes de noviembre del año dos mil veinticinco.

Firma del estudiante

Cédula: 1-1073-0813

Tutor's Letter

CARTA DEL TUTOR

San José, 15 de noviembre de 2025

Universidad Hispanoamericana

Licenciatura en la Enseñanza del Inglés

Estimados señores:

El estudiante David Humberto Molina Solís , cedula de identidad número 110730813, me ha presentado para efectos de revisión y aprobación, el trabajo de investigación denominado **The impact of implementing technological devices (smartphones and laptops) and the increase of phonological awareness in students from first cycle at la Iberia and Grano de Oro elementary school in Siquirres, circuit 06, at the Limon Regional Bureau for Education, during the second semester of 2025**, el cual ha elaborado para optar por el grado académico Licenciatura en la Enseñanza del Inglés para I y II ciclo. En mi calidad de tutora, he verificado que se han hecho las correcciones indicadas durante el proceso de tutoría y he evaluado los aspectos relativos a la elaboración del problema, objetivos, justificación, antecedentes, marco teórico, marco metodológico, tabulación, análisis de datos, conclusiones y recomendaciones.

De los resultados obtenidos por el postulante se obtienen la siguiente calificación:

	Descripción	***%***	***% Obt***
a	Originalidad del tema	10%	10%
b	Cumplimiento de entrega de avances	20%	20%
c	Coherencia entre los objetivos, instrumentos aplicados y los resultados de la investigación	30%	30%
d	Relevancia de las conclusiones y recomendaciones	20%	20%
e	Calidad detalle del marco teórico	20%	20%
	Total	100%	100%

En virtud de la calificación obtenida, se avala el traslado al proceso de lectura

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Reader`s Letter

CARTA DE LECTOR

San José, 12 de enero de 2026
Universidad Hispanoamericana
Sede Llorente
Carrera

Estimado señor

El estudiante David Humberto Molina Solís, cédula de identidad 1-1073-0813, me ha presentado para efectos de revisión y aprobación, el trabajo de investigación denominado "The Impact of Implementing Technological Devices (Smartphones and Laptops) and the Increase of Phonological Awareness in Students from First Cycle at La Iberia and Grano De Oro Elementary Schools in Siquirres, Circuit 06, at the Limón Regional Bureau for Education, during the Second Semester of 2025.", el cual ha elaborado para obtener su grado de Licenciatura en Enseñanza del Inglés.

He revisado y he hecho las observaciones relativas al contenido analizado, particularmente lo relativo a la coherencia entre el marco teórico y análisis de datos, la consistencia de los datos recopilados y la coherencia entre éstos y las conclusiones; asimismo, la aplicabilidad y originalidad de las recomendaciones, en términos de aporte de la investigación. He verificado que se han hecho las modificaciones correspondientes a las observaciones indicadas.

Por consiguiente, este trabajo cuenta con mi aval para ser presentado en la defensa pública.

Atte.

Silvia Rodríguez Arce
Cédula No. 1-1217-0331

Dedicatory

I dedicate this work, first and above all, to **Almighty God**, whose mercy, strength, and wisdom have sustained me through every step of this journey. May He accept this effort and grant me forgiveness, guidance, and peace in all that lies ahead.

With deep reverence, I also thank the **Most Holy Theotokos** for her loving intercession and protection. Her maternal compassion has accompanied me in moments of weakness and granted me the courage to persevere.

Finally, I dedicate this work to the memory of my beloved brother, best friend, and "little monk," **Joe Black**. His loyalty, humility, and gentle presence brought light to my life. His love continues to inspire me, and I carry him in my heart with gratitude and tenderness until the end and far beyond.

Acknowledgment

I extend my sincere gratitude to my thesis tutor for her kindness, patience, and unwavering support. Her clarity, motivation, and professionalism guided me throughout this process, and I am deeply appreciative of her dedication.

I also thank Mr. Julio Castro for his valuable guidance during the initial stages of this project, as well as the principals of both institutions for allowing this research to be conducted in their schools.

Above all, I give thanks to God for the people who accompanied and supported me during this journey. Blessed be the Lord now and ever.

Abstract

This study aims to analyze the impact of using technological devices, specifically smartphones and laptops, on the development of phonological awareness in first-cycle students at La Iberia and Grano de Oro elementary schools in Siquirres, Limón, during the second semester of 2025. In this study, phonological awareness will be assessed through three main aspects that are suitable for the first cycle: hearing, identifying, and manipulating sounds in spoken English. This focused approach follows the idea of moving from the general concept of phonological awareness to the specific and measurable domain of phonemic awareness (as the measurable subset of phonological awareness). It also aligns with the expectations of the MEP English Program, which promotes the development of listening and speaking skills as a foundation before formal reading or writing begins.

The research emerges from the need to strengthen English pronunciation and listening skills in rural public schools, where access to technology and authentic English input remains limited. To address this challenge, the study introduces interactive and digital learning experiences that encourage students to recognize, distinguish, and reproduce English sounds through engaging technological tasks.

The research follows a mixed-method design combining classroom observations, pre- and post-assessments, teacher questionnaires, and semi structured interviews. During the first stage, diagnostic tools will identify students' initial phonological awareness level and teachers' readiness to integrate technology. In the second stage, several English lessons will incorporate smartphones and laptops to support sound discrimination and pronunciation practice through

digital games and listening applications. After the intervention, a post-test and classroom reflection will measure changes in students' performance and motivation.

Integrating technological devices into English lessons is expected to enhance students' phonological awareness, increase engagement, and promote a more inclusive learning environment suited to the realities of rural Costa Rican classrooms.

Keywords: technological devices, phonological awareness, digital learning, rural education, English as a foreign language.

Resumen

El presente estudio tiene como objetivo analizar el impacto del uso de dispositivos tecnológicos, específicamente teléfonos inteligentes y computadoras portátiles, en el desarrollo de la conciencia fonológica de los estudiantes de primer ciclo de las escuelas La Iberia y Grano de Oro, en Siquirres, Limón, durante el segundo semestre del año 2025. En este estudio, la conciencia fonológica se evaluará mediante tres aspectos fundamentales, apropiados para el primer ciclo educativo: escuchar, identificar y manipular los sonidos en inglés oral. Este enfoque específico se basa en la idea de avanzar desde el concepto general de conciencia fonológica hacia el dominio medible y concreto de la conciencia fonémica (subconjunto evaluable de la conciencia fonológica). Además, este abordaje se alinea con las directrices del Programa de Inglés del MEP, el cual promueve el desarrollo de las habilidades de escucha y habla como base fundamental antes de iniciar formalmente los procesos de lectura o escritura. La investigación surge ante la necesidad de fortalecer la pronunciación y la comprensión auditiva del inglés en centros educativos rurales, donde el acceso a la tecnología y a insumos auténticos del idioma continúa siendo limitado. Para responder a esta necesidad, se implementarán experiencias de aprendizaje interactivas y digitales que motiven a los estudiantes a reconocer, diferenciar y reproducir sonidos del inglés por medio de tareas tecnológicas dinámicas y atractivas.

El estudio adopta un enfoque mixto que combina observaciones en el aula, evaluaciones diagnósticas y finales, cuestionarios para docentes y entrevistas semiestructuradas. En la primera etapa, se aplicarán instrumentos para identificar el nivel inicial de conciencia fonológica de los estudiantes y el grado de preparación de los docentes para integrar la tecnología en sus clases. En la segunda etapa, se desarrollarán varias lecciones de inglés que incorporen teléfonos inteligentes y computadoras portátiles, con actividades digitales enfocadas en la discriminación de sonidos y

en la práctica de la pronunciación. Posteriormente, se aplicará una evaluación final y se realizará una reflexión en el aula para medir los avances en el desempeño y la motivación de los estudiantes.

Se espera que la integración de dispositivos tecnológicos en las lecciones de inglés potencie la conciencia fonológica de los estudiantes, aumente su participación y fomente un entorno de aprendizaje más inclusivo y acorde con la realidad educativa de las aulas rurales costarricenses.

Palabras clave: dispositivos tecnológicos, conciencia fonológica, aprendizaje digital, educación rural, inglés como lengua extranjera.

Chapter I

Problem Statement

1.1. Introduction

In recent years, technology has become one of the strongest drivers of change in education. However, in rural areas like Siquirres, Limón, integrating technology into the language classroom is challenging. Many schools still face limited device access, digital training, and stable internet connections. As an English teacher in this setting, I have witnessed how these limitations affect students' opportunities to learn English meaningfully. Most students come from families with minimal exposure to technology and English, making classroom innovation beneficial and essential. In this context, smartphones and laptops can help bridge educational gaps, promote inclusion, and strengthen key linguistic skills like phonological awareness.

Phonological awareness refers to the ability to recognize and manipulate the sound structures of language, such as syllables, rhymes, and phonemes. Gillon (2004) emphasizes that this skill forms the foundation for reading and pronunciation development in any language. For young English as a Foreign Language (EFL) learners in Costa Rica's first educational cycle, developing phonological awareness is essential to achieve clear pronunciation, accurate listening comprehension, and fluent reading. Unfortunately, in many rural schools, teaching methods still depend on memorization and grammatical exercises, leaving little space for meaningful oral practice (Warschauer, 1996). This reality highlights the need for more engaging and interactive strategies to help students truly connect with English, something technology can offer in unique ways.

Today's children grow up with digital media, and their attention and curiosity are focused on technology. Therefore, interactivity and visuals are focused on technology. When used wisely, technology can complement this natural inclination. As Ybarra and Green (2003) point out, digital tools can significantly enhance students' phonological awareness by providing

immediate auditory feedback and encouraging self-paced learning. Interactive games, pronunciation apps, and listening activities allow children to experiment with sounds in ways traditional paper-based exercises rarely achieve.

In Costa Rica, the Ministry of Public Education (MEP, 2014) considers educational technology an essential resource to improve inclusion and the quality of learning. Schools like La Iberia and Grano de Oro, located in agricultural communities, face significant challenges such as high poverty, low parental literacy, and limited access to digital devices. Despite these barriers, both schools and their teachers demonstrate a strong commitment to advancing English education. Integrating technology in these classrooms can foster academic progress, social participation, and digital literacy, preparing students for an increasingly connected world.

The teacher's role is central in this transformation. Ospina (2004) explains that technology only becomes effective when teachers understand how to set goals, design meaningful activities, and select appropriate tools. Rural teachers must therefore strengthen their digital and pedagogical skills to move from teacher-centered approaches to more participatory and student-centered learning. This shift aligns with the principles of the MEP English curriculum (2000), which promotes communicative competence, inclusiveness, and contextualized learning.

This study analyzes the impact of using technological devices, particularly smartphones and laptops, on developing phonological awareness in first cycle students from La Iberia and Grano de Oro schools in Siquirres, Circuit 06. By exploring how technology affects teaching and learning, the research seeks to contribute practical insights that can help improve English instruction in rural Costa Rican schools. Ultimately, this work hopes to support innovative,

inclusive, and equitable language learning for all students, ensuring they acquire one of the world's most vital communication tools: English.

1.1.1. Background of the Problem

Over the past decades, Costa Rica has made significant progress in improving English language education through curriculum reforms and teacher training programs. The Ministry of Public Education (MEP) has emphasized communicative approaches that prioritize speaking and listening skills, aligning its national standards with the Common European Framework of Reference for Languages (CEFR). However, many rural schools still struggle to implement these goals. Lessons in these settings often rely on translation and repetition exercises, which limit students' development of pronunciation and oral fluency (MEP, 2000; González, 2016).

Phonological awareness is the ability to hear, identify, and manipulate sounds, which is one of the main pillars of reading and language learning. Yopp and Yopp (2000) explain that children who develop this awareness early are better able to decode words and pronounce them accurately. In first cycle EFL classrooms, limited exposure to authentic English and overly traditional teaching methods often prevents students from developing these skills. As a result, learners advance through the school system with difficulties distinguishing sounds and little confidence in their pronunciation. This situation is particularly noticeable in rural schools, where access to qualified teachers, new materials, and exposure to authentic English contexts is scarce.

In the case of La Iberia and Grano de Oro schools, located in the district of La Alegría in Siquirres, Limón, the teaching of English faces multiple socio educational challenges. Most families depend on agricultural labor in pineapple and banana plantations, and many parents have limited formal education. Because of this, students receive little or no reinforcement of

English at home. In addition, internet access is unstable, and digital resources are often outdated or unavailable. Technology could change this reality by providing new ways for students to listen, repeat, and practice English sounds in interactive and meaningful ways.

Several studies support this approach. Warschauer (1996) and Burston (2014) emphasized that computer assisted language learning increases student engagement and autonomy by providing interactive exposure to authentic English input. Likewise, Burston (2014) highlighted the importance of integrating technology strategically to enhance learner-centered environments and feedback. More recent research on mobile learning also confirms that interactive applications and pronunciation tools strengthen students' motivation and autonomy by enabling constant access to authentic pronunciation models (Burston, 2014). Similarly, Celce-Murcia, Brinton, and Goodwin (2010) argue that digital tools' visual and auditory feedback help learners monitor their pronunciation and make corrections independently. These tools transform students into active participants rather than passive recipients of information.

Integrating technology effectively in English lessons requires clear pedagogical planning. In rural classrooms, technological devices can be powerful tools, but their impact depends on how they are used to guide meaningful interaction. When digital tools are applied without a communicative or learning purpose, their educational potential decreases. Ospina (2004) explains that technology in language teaching should reinforce the teacher's mediation role by creating opportunities for students to interact with language in purposeful and engaging ways. This idea is central to the present study, as the use of smartphones and laptops seeks to support phonological awareness through guided, interactive practice rather than isolated digital exposure.

Another point to consider is the connection between technology use and the phonological goals established by the CEFR A1 level in the MEP curriculum. These standards emphasize listening comprehension, pronunciation accuracy, and recognizing basic sounds and rhythms. However, many rural classrooms dedicate little time to these areas in practice. Integrating digital activities like pronunciation games or recorded dialogues could help bridge this gap by providing consistent exposure to authentic English models and motivating students to learn independently.

The problem lies in the persistent gap between what the MEP curriculum proposes and what happens in rural classrooms. While educational policies promote communicative, inclusive, and technology-based teaching, everyday practice remains traditional and limited. Students in Siquirres and similar rural areas still struggle with pronunciation and sound discrimination due to a lack of engaging resources. Exploring how technology can close this gap is, therefore, not only relevant but necessary to provide equitable and modern English learning opportunities for all Costa Rican students.

1.1.2 Problematization

As the English teacher for first cycle students at La Iberia and Grano de Oro schools, the researcher has observed the recurrent challenges in cultivating phonological awareness using traditional instructional methods. Over time, the researcher has noticed that students struggle to distinguish English sounds, rhymes, and phonemes when instruction relies largely on textbook exercises, worksheets, and repetitive pronunciation exercises without interactive auditory feedback. Limited resources, such as scarce audio recordings, a lack of quality listening materials, and minimal exposure to native pronunciation models in class, exacerbate these struggles.

In the context of Costa Rica's national educational reforms, the Ministry of Public Education (MEP) has emphasized the integration of ICT (Information and Communication Technologies) into classroom practice across subjects. For instance, the MEP published an institutional Política en Tecnologías de la Información in 2020 to guide adoption of digital tools in schools. Ministerio de Educación Pública. In addition, the country approved the Política para el Aprovechamiento de las Tecnologías Digitales en Educación (PATDE) in 2021, a long-term strategy (2022-2034) aiming to foster digital inclusion, strengthen digital citizenship skills, and promote technology as a pedagogical resource in all subject areas. Moreover, the Programa Nacional de Formación Tecnológica (PNFT) is being to add "Formación Tecnológica" as a curricular component and to support teachers from all disciplines to integrate technology in their teaching. Ministerio de Educación Pública. These institutional policies and programs expect teachers across disciplines to use technology meaningfully in the classroom.

The idea to incorporate laptops and tablets into the researcher's English classes was precisely within this, and as the researcher began experimenting with digital tasks, such as phoneme discrimination games, interactive listening apps, and pronunciation software. The researcher observed increased students' engagement and more frequent self-correction of sounds. These preliminary observations suggested that technology could bridge some of the barriers traditional methods pose, particularly in rural settings.

However, despite this potential, several critical gaps and contradictions persist:

1. Policy vs. Practice Gap: Although MEP policies such as PATDE, PNFT, and the 2020 technology policy mandate or encourage ICT integration, many rural schools lack infrastructure, teacher training, or consistent internet access. Thus, the expectation placed on teachers to use digital tools is often aspirational rather than practical.

2. Teacher Competence and Confidence: Many teachers have not received adequate professional development in digital pedagogy or in using technology for phonological instruction. As a result, implementation tends to be superficial such as showing videos rather than deeply integrated into instructional design.

3. Equity and Resource Disparities: Rural schools like La Iberia and Grano de Oro often lag behind urban schools regarding access to devices, maintenance support, and reliable connectivity. Students from low-income backgrounds may lack access to smart devices at home, limiting continuity between class and practice.

4. Curricular Alignment and Focus: The national English curriculum (MEP) emphasizes communicative competence and phonological descriptors (aligned to CEFR A1). However, classroom practice in rural settings frequently fails to dedicate adequate instructional time to listening and pronunciation. The disconnect between curricular aims and actual practices undermines phonological development.

5. Sustainability and Scale: Even when technology is introduced, there is little evidence of sustainable models in rural schools. Early successes may fade without follow up support, teacher coaching, or infrastructure maintenance.

These contradictions reveal the central problem of this research: the lack of empirical evidence about how integrating technological devices (smartphones, laptops, tablets) affects phonological awareness development in first cycle rural students under real classroom conditions, especially in schools located in geographically and socioeconomically challenged areas such as Siquirres. The researcher's dual role as teacher and researcher gives the researcher

unique insight into these dynamics, allowing the researcher to assess interventions that respond to real needs in the researcher's own classrooms.

Addressing these gaps is crucial for fulfilling national policy directives and, more importantly, ensuring and avoiding exclusion of rural children in the digital transformation of education. The outcomes of this study will illuminate what works (and what does not) when applying ICT to phonological instruction in under-resourced settings. They may guide other teachers and policymakers to bridge the persistent divide between policy aspirations and classroom realities.

1.1.3 Justification

In today's classrooms, developing phonological awareness has become one of the key foundations for learning a second language. This is especially true for young learners in rural areas, where access to diverse and updated educational resources is often limited. Phonological awareness, understood as the ability to recognize and manipulate the sound structures of language, plays a decisive role in early reading and language acquisition (Gillon, 2004).

Teaching English frequently depends on traditional materials in schools such as La Iberia and Grano de Oro, located in rural communities of Siquirres. As a result, lessons often become repetitive and centered on the teacher rather than on active student participation (González, 2016). From the researcher's experience teaching first-cycle students in these schools, the researcher has observed that while textbooks help build vocabulary and grammar knowledge, they do little to develop students' pronunciation, listening comprehension, or confidence in speaking.

Research supports this reality. When English instruction relies almost entirely on printed materials, it emphasizes grammatical accuracy and vocabulary memorization, leaving aside the development of oral fluency and listening skills (Warschauer, 1996). This imbalance limits learners' ability to communicate effectively and to recognize English as a living language rather than just a school subject.

The integration of technological resources has opened new possibilities to address this challenge. Studies have shown that interactive applications, pronunciation software, and digital games can enhance students' phonological awareness and motivate them to participate in English lessons (Ybarra & Green, 2003). According to the Ministry of Public Education (MEP, 2014), properly selecting digital tools is essential to creating inclusive and meaningful student learning experiences.

Incorporating laptops and tablets aligned with MEP's national ICT initiatives has shown promising results in the researcher's teaching practice. Students react positively when technology becomes part of the lesson, and they demonstrate more curiosity toward the English language. However, to make this process effective, teachers must know the content they teach and understand how to design clear learning goals and choose the right tools to achieve them (Ospina, 2004). This quote reinforces the idea that educational technology is not simply an accessory but a mediator that can transform students' engagement with English.

Therefore, implementing technological resources in these rural schools could become a key strategy to make English language learning more inclusive, interactive, and adapted to the realities of 21st-century students. As MEP (2014) reminds educators, "Considering the imminence of technological development in daily life and educational contexts, the important

thing is to think and decide about which are the digital technologies and the most appropriate uses for children" (p. 30).

This research is justified because it demonstrates how technology can enhance phonological awareness and contribute to a more equitable and engaging English learning experience in Costa Rican rural schools. By exploring this relationship, the study will address a local educational need and align with national efforts to modernize public education and integrate ICT in all subjects. Therefore, this will ensure that students from rural areas benefit from the same opportunities as those in urban settings.

1.2 Research Problem

1.2.1 Problem statement

First-cycle students at La Iberia and Grano de Oro elementary schools in Siquirres show difficulties developing phonological awareness during English lessons due to the limited and traditional use of technological devices.

1.2.2 Research Question

What is the impact of implementing technological devices (smartphones and laptops) and the increase of phonological awareness in students from the first cycle at La Iberia and Grano de Oro elementary schools in Siquirres, circuit 06, at the Limón Regional Bureau for Education, during the second semester of 2025?

1.3 Objectives

1.3.1 General Objective

To analyze the impact of implementing technological devices (smartphones and laptops) on the development of phonological awareness in first cycle students at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.

1.3.2 Specific Objectives

1. To identify the level of phonological awareness skills in students before and after using technological devices at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.
2. To determine the availability and use of technological devices (smartphones and laptops) in the English teaching-learning process in the selected schools at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.
3. Assess the digital competence of teachers regarding the integration of technology for phonological awareness instruction at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.
4. To examine the alignment of classroom practices with CEFR A1 phonological descriptors in the implementation of the MEP English curriculum.

1.4 Scope and Limitations

1.4.1 Scope

This study analyzes the impact of implementing technological devices, specifically smartphones and laptops, on the development of phonological awareness among first cycle students at La Iberia and Grano de Oro elementary schools in Siquirres during the second semester of 2025. The research will involve classroom activities designed to integrate technology into English lessons, including pronunciation practice, sound discrimination tasks, and interactive listening exercises. Data will be collected through classroom observations, pre and post assessments, and teacher input. The participants will include first cycle students, their English teachers, and school administrators. The results are expected to benefit students by improving their listening and pronunciation skills, teachers by expanding their digital teaching strategies, and institutions by reinforcing ICT integration within rural education contexts.

1.4.2 Limitations

Every educational study has boundaries that may influence its findings; this research is no exception. Because it will be conducted in only two rural public schools, La Iberia and Grano de Oro, located in Siquirres, Limón, the results will represent the realities of these communities. They may not fully reflect the conditions of urban or larger educational settings. The number of participants is relatively small, consisting mainly of first cycle students, their English teachers, and school administrators. Consequently, the conclusions of this research will offer valuable insights for similar rural contexts but will not be intended for broad statistical generalization.

In addition, certain logistical and contextual aspects could influence the implementation of technological activities. Rural schools in Costa Rica often face irregular internet access, limited availability of digital devices, and maintenance issues that can affect the continuity of planned lessons (Ministerio de Educación Pública [MEP], 2021). Time is another limiting factor, as the study will take place during a single academic semester, which may restrict long-term observation of changes in students' phonological awareness. External factors such as teacher workload, student attendance, or local events could also interrupt the normal rhythm of classroom interventions. Despite these natural challenges, the researcher will maintain open communication with school staff, flexible scheduling, and ethical consideration for participants' needs to ensure that the data collected accurately reflects the authentic teaching and learning process in rural Costa Rican classrooms.

Delimitations of the Study

This study is intentionally delimited in scope. It focuses exclusively on the development of phonemic awareness as a specific subcomponent of phonological awareness and does not address other related skills such as rhyme recognition, syllable segmentation, or onset–rime awareness. Additionally, the research concentrates on listening and pronunciation skills in English and does not include the assessment of reading comprehension, spelling, or writing development.

The study is delimited to first-cycle students (first, second, and third grades) in two rural public primary schools. It does not seek to generalize findings to higher grade levels, urban schools, or private educational institutions. Furthermore, the intervention is restricted to the use of specific technological tools, namely smartphones, school laptops, Speech Solution software,

Jack Hartmann's phonics videos, and Kahoot! activities. Other digital platforms or instructional technologies are not considered within the scope of this research.

Finally, the study examines learning outcomes within a short-term instructional period and does not attempt to measure long-term retention or transfer of phonemic awareness skills beyond the duration of the intervention. These delimitations were established deliberately to ensure coherence with the study objectives, the instructional context, and the curricular expectations for first-cycle English learners established by the Ministerio de Educación Pública.

Chapter II

Theoretical Framework

2.1 Historical Context

2.1.1 La Iberia and Grano de Oro Elementary Schools

La Iberia and Grano de Oro Elementary Schools are located in the rural district of La Alegría, in the canton of Siquirres, Limón, Costa Rica. Both institutions serve small agricultural communities where most families work in banana and pineapple plantations. The environment is peaceful, and the schools play an important role in the area's social and cultural life.

La Iberia School was founded in 1978, and Grano de Oro School in 2001. In their early years, both institutions started as one teacher schools (unidocentes) with only a few students from nearby farms. Over the years, they grew in population and infrastructure, becoming Dirección 1 (Grano de Oro) and Dirección 2 (La Iberia) schools, which means they now have several teachers and serve more students.

Today, both schools provide primary education from first to sixth grade. Although they have access to some technological resources such as computers and tablets, the internet connection remains slow and sometimes unstable, which limits the use of online tools. Teachers, however, show creativity and commitment, using available devices to develop interactive lessons and motivate students.

2.2 Theoretical Conceptual Context

The conceptual foundation of this study is guided by the Action-Oriented Approach (AOA) established in the MEP English Program (2016) and aligned with the CEFR (Council of Europe, 2020). Under this perspective, language learning is understood as a social, purposeful activity where learners become "social agents" who use English to accomplish tasks that resemble real-life communication. In the context of first cycle rural schools, this means that even

simple actions, such as listening, identifying familiar sounds, responding orally, or repeating short words, are meaningful tasks that help young learners build early communicative competence. The AOA provides a clear structure for making language learning active, participatory, and connected to students' daily reality.

Within this conceptual lens, digital tools such as smartphones and laptops become resources that support learners as they engage in purposeful phonemic tasks. Washer (2011) explains that digital skills are not isolated abilities, but competencies developed through meaningful, task-based engagement. In this study, technological resources like Speech Solution, Kahoot!, and selected videos serve exactly that function: helping students do things with English, such as recognizing sounds, comparing phonemes, and correcting their own pronunciation. These tools support the core idea that learning occurs through action, interaction, and continuous practice principles that guide the structure and implementation of the phonemic awareness sessions in this research.

2.3 Technology in Education

2.3.1 Understanding Technology in Education

The role of technology in education has become one of the most defining transformations of the 21st century. Around the world, schools have moved from traditional teaching models toward more interactive and digitally supported learning environments. According to UNESCO (2022), integrating Information and Communication Technologies (ICT) into education is about innovation, equity, and inclusion, since it allows students in remote or under resourced areas to access quality learning experiences. In Costa Rica, this vision is reflected in national initiatives such as the Política para el Aprovechamiento de las Tecnologías Digitales en Educación

(PATDE) and the Programa Nacional de Formación Tecnológica (PNFT), which emphasize that every student regardless of location should develop digital and linguistic competencies necessary for today's global world (Ministerio de Educación Pública [MEP], 2021).

Despite these efforts, many rural schools still face infrastructure, connectivity, and training challenges that limit the potential of technology. As González (2016) observes, teachers in Costa Rican public schools often rely on textbooks and printed resources because of limited access to digital tools and a lack of pedagogical training for integrating them meaningfully. This traditional approach results in teacher-centered classes and repetitive activities that do not always motivate students or promote language use. However, even in contexts with few resources, Digital tools open learning opportunities that go far beyond the physical limits of the classroom, offering students in rural areas a fair chance to learn meaningfully.

Warschauer (1996), one of the pioneers in Computer-Assisted Language Learning (CALL), explains that technology should be viewed as a medium for interaction rather than a substitute for traditional methods. He argues that computers and mobile devices enable learners to communicate authentically and receive immediate feedback, which is crucial for language development. His idea is especially relevant to rural schools in Costa Rica, where exposure to authentic English input is limited. Through digital tools, students can listen to native pronunciation, watch real world videos, and practice in ways that go beyond what a printed textbook can offer.

In English as a Foreign Language (EFL), technology has also proven effective for developing phonological awareness, pronunciation, and listening comprehension. Ybarra and Green (2003) highlight that interactive technological tools promote greater student participation, enhance motivation, and provide multimodal input, allowing learners to see, hear, and repeat new

language patterns. When students interact with visuals, sounds, and text simultaneously, they process information through multiple cognitive channels, strengthening understanding and memory retention. This principle is consistent with the concept of multisensory learning, often recommended for young learners in the first cycle of education.

In Costa Rica, the MEP (2014) recognized early on that digital tools should be essential for inclusive education. The Lineamientos para el uso de recursos tecnológicos en la educación primaria (MEP, 2014) state that teachers should select digital resources that allow children to explore, create, and interact with content meaningfully. This approach aligns with constructivist learning theories, which suggest that students build knowledge through active engagement rather than passive reception. However, implementing such strategies in rural areas like Siquirres still requires overcoming logistical barriers such as unstable internet connections, limited numbers of devices, and a lack of technical support.

Despite these difficulties, many Costa Rican educators have found creative ways to incorporate technology in their lessons. Teachers use laptops, projectors, or even smartphones to display pronunciation videos, listening tasks, or interactive games. As Ospina (2004) explains, technology in education only becomes effective when teachers understand how to align tools with learning objectives and outcomes. In other words, technology itself does not guarantee better learning; it must be integrated through precise pedagogical planning. This point is fundamental for the current research, which explores how smartphones and laptops can become strategic allies in developing phonological awareness in English among first-cycle students.

This strategic alignment is crucial within the English as a Foreign Language (EFL) curriculum. The success of its official approach, the Action-Oriented Approach (AOA), fundamentally depends on learners' ability to perform purposeful communicative tasks that

reflect real life language use. As Tekliuk (2020) notes, the AOA encourages students to act through language, participating in dialogues, group interactions, and pronunciation tasks that simulate authentic social situations.

The Action Oriented Approach, adopted by the Costa Rican Ministry of Public Education in 2017, replaced the former Communicative Language Teaching model. It shifts the focus from language knowledge to learners' capacity to use English as social agents in real-world contexts (Ministerio de Educación Pública [MEP], 2016).

Moreover, UNESCO (2021) emphasizes that the digital divide is no longer just a matter of having or not having access to devices but also, knowing how to use them effectively. Many rural students are familiar with technology at a basic level. They may play mobile games or watch videos, but they need guided educational experiences to develop digital literacy. Using technology in language lessons, teachers can connect learning to students' realities, increase engagement, and help them acquire 21st-century skills such as collaboration, creativity, and problem-solving.

These global challenges are reflected locally in La Iberia and Grano de Oro schools in Circuit 06 of Siquirres. Both institutions serve children from families that work mainly in agriculture and often face socio-economic limitations. For these students, learning English with technology represents a window to the world, allowing them to experience the language in dynamic and interactive ways. Incorporating technological tools into English lessons can also improve students' confidence, stimulate curiosity, and make learning more meaningful and enjoyable.

Finally, integrating technology into education must be seen as a process of pedagogical transformation rather than a simple addition of tools. As the MEP (2021) points out, the goal is to ensure that digital resources contribute to developing competencies that make students active participants in society. In rural schools, where exposure to English is often minimal, using technology to support pronunciation, listening, and vocabulary acquisition is beneficial and necessary. When applied thoughtfully, smartphones, laptops, and digital applications can transform the English classroom into a space of exploration, collaboration, and linguistic growth.

2.3.2 Technology in the Costa Rican Educational Context

In Costa Rica, integrating technology into education has been a gradual yet significant process that reflects the country's commitment to quality and equity. Since the late 1990s, the Ministry of Public Education (MEP) has recognized the importance of preparing students to face the challenges of a globalized and digital society. According to MEP (2014), incorporating digital tools in the classroom should support content learning and foster critical thinking, creativity, and communication skills. Over time, this vision has shaped several national initiatives and programs to transform traditional teaching into more interactive and meaningful learning experiences.

One of the first large-scale efforts was the creation of the Fundación Omar Dengo (FOD) in 1987, a public-private initiative that has promoted computer literacy and digital skills among Costa Rican students and teachers. The FOD, in collaboration with MEP, implemented the Programa Nacional de Informática Educativa (PRONIE-MEP-FOD), which aimed to bring computers and digital literacy training to schools across the country. This initiative laid the foundation for Costa Rica's long-term commitment to educational innovation, particularly through the use of Information and Communication Technologies (ICT).

More recently, the Política para el Aprovechamiento de las Tecnologías Digitales en Educación (PATDE) and the Programa Nacional de Formación Tecnológica (PNFT) were introduced to ensure that students develop both digital and linguistic competencies (MEP, 2021). These programs aim to strengthen teachers' pedagogical use of technology, promote the integration of ICT into all subjects, and reduce the digital divide between urban and rural schools. However, despite the quality of the policies, their implementation in rural areas like Siquirres faces multiple barriers, including limited internet access, insufficient devices, and inadequate teacher training.

As stated by UNESCO (2021), access to technology alone does not guarantee educational improvement; what truly matters is how these tools are used to support meaningful learning. Teachers in Costa Rica's rural schools often adapt to technological limitations by developing creative strategies. For example, when internet access is unstable, educators may use pre-downloaded videos, interactive slides, or offline applications to ensure students can still engage with digital content. These efforts reflect a growing culture of innovation among rural teachers who aim to make learning more dynamic despite limited resources.

In English teaching, MEP has aligned its curriculum with the Common European Framework of Reference for Languages (CEFR), promoting communicative and task-based methodologies. Within this approach, digital tools play an essential role in helping students practice pronunciation, listening, and reading comprehension. The Programa de Estudio de Inglés para I y II Ciclos (MEP, 2016) explicitly encourages the use of technology to expose students to authentic input and strengthen phonological awareness, a key component of early literacy and pronunciation.

Furthermore, Costa Rica's educational policies emphasize inclusive education as a fundamental principle. The MEP (2014) highlights that technology should serve as a bridge to inclusion, especially for students from vulnerable contexts. In the rural district of La Alegría de Siquirres, where La Iberia and Grano de Oro schools are located, many children face economic difficulties and limited exposure to English outside the classroom. For these learners, technology not only supports language learning but also motivates and empowers them by connecting them with the broader world.

Nevertheless, the gap between national policy and classroom reality remains a challenge. While the government promotes ICT integration, many schools lack the infrastructure and technical support needed to implement it effectively. Teachers often face the dual task of teaching content while also troubleshooting technological issues. Ospina (2004) noted that technology can only enhance learning when it is supported by continuous teacher training, precise pedagogical planning, and institutional support. Therefore, rural schools require consistent investment, capacity building, and community involvement to make ICT truly transformative.

Despite these challenges, Costa Rica continues to move toward digital inclusion. Projects such as Hogares Conectados and Red Educativa del Bicentenario seek to provide marginalized communities with internet access and digital devices. These initiatives align with the MEP's broader vision of integrating technology to achieve educational equity and modernization. When properly implemented, technology improves academic outcomes and nurtures critical skills that prepare students for lifelong learning.

Ultimately, the Costa Rican educational context demonstrates that technology integration is not a luxury but necessary for preparing students to thrive in a digital era. In rural schools such

as La Iberia and Grano de Oro, every digital resource, whether a laptop, tablet, or smartphone, represents a valuable opportunity to bring English learning closer to students' real-life experiences. With appropriate guidance and pedagogical strategies, technology can help bridge the educational divide and empower rural children to develop linguistic and digital competencies for the future.

2.3.3 The Use of Technology in English Language Teaching

Over the past three decades, technology has progressively transformed how English is taught and learned worldwide. Once dominated by textbooks, blackboards, and rote memorization, the traditional classroom has evolved into a more dynamic, interactive, and student-centered environment. The introduction of Computer Assisted Language Learning (CALL) in the 1990s marked the beginning of this transformation. According to Warschauer and Healey (1998), CALL shifted the focus from teaching about language to using language for communication through meaningful digital tasks. In this sense, technology became not merely an instructional aid but a mediator that allows learners to interact, receive feedback, and construct linguistic knowledge autonomously.

In the Costa Rican context, the use of technology in English teaching has followed a similar evolution, shaped by both global pedagogical trends and local educational realities. The MEP English curriculum (2016) highlights that integrating technological tools into language teaching supports communicative and task-based learning, providing students with authentic input that mirrors real-life situations. Digital tools such as videos, pronunciation software, and educational games allow learners to hear natural speech patterns, imitate correct pronunciation, and engage in active listening. These experiences are particularly valuable for first cycle students, who learn best through multisensory and interactive methods that stimulate curiosity and participation.

Numerous studies have demonstrated that technology enhances key language skills when used strategically. Ybarra and Green (2003) found that young learners who used interactive multimedia programs improved vocabulary retention, pronunciation accuracy, and listening comprehension. Similarly, Khan (2012) concluded that mobile applications and online platforms help students develop oral fluency by providing flexible opportunities for practice beyond the classroom. In both cases, learners benefited from immediate feedback and repeated exposure to authentic sounds, two essential conditions for developing phonological awareness.

Another benefit of technology in English language teaching is the promotion of learner autonomy. As noted by Benson (2011), digital environments empower students to take responsibility for their learning by allowing them to practice at their own pace and revisit content as needed. This autonomy aligns with the goals of the Action Oriented Approach (AOA), which views learners as social agents who accomplish communicative tasks through language use in real life situations. Under this approach, technology becomes a practical means to connect learning objectives with authentic communicative purposes. In rural Costa Rican schools, laptops and tablets can allow students to explore language independently, even when teacher supervision or classroom resources are limited.

Furthermore, technology provides teachers with a wide range of tools for formative assessment. Pronunciation software, speech-recognition applications, and online quizzes make tracking student progress in real time possible. For example, programs such as Speech Solution, which will be used in this research, offer visual and auditory feedback by showing learners how to position their lips and tongue to pronounce specific sounds. Such tools benefit first cycle students by providing clear and engaging models that make pronunciation practice fun and effective.

In addition to specialized software, accessible online platforms such as YouTube have become invaluable resources for EFL classrooms. Teachers frequently use educational channels like Jack Hartmann Kids Music Channel, which presents songs and videos that teach the sounds of English letters through rhythm and movement. These videos combine auditory, visual, and kinesthetic learning elements, helping children associate sounds with actions, a method strongly supported by the principles of multisensory learning (Gillon, 2004). When used alongside in-class repetition and peer interaction, such videos make the process of learning English sounds more enjoyable and memorable.

Technology also fosters collaboration and motivation among students. Applications like Kahoot! enable learners to participate in interactive quizzes reinforcing vocabulary, spelling, and pronunciation through a game-based approach. According to Dicheva et al. (2015), gamification in education increases student engagement and supports the internalization of new content through positive competition and immediate feedback. In the context of rural schools such as La Iberia and Grano de Oro, where students may have limited access to English outside of class, these digital tools serve as powerful motivators that connect learning with play.

However, it is essential to recognize that technology is not a magic solution to all educational challenges. As Ospina (2004) reminds us, the success of technological integration depends mainly on the teacher's ability to design purposeful, goal-oriented activities. Teachers must ensure that each digital task contributes directly to developing the intended language skills rather than serving as mere entertainment. In other words, the effectiveness of technology lies not in the tool itself but in how it is used within a sound pedagogical framework.

For Costa Rican rural schools, this means that professional development and contextual adaptation are indispensable. Teachers need continuous training to integrate technology into

communicative activities that address their students' specific needs. Moreover, schools must foster an environment where technology use is supported institutionally through reliable infrastructure and teachers' collaboration. When these conditions are met, technological devices can become transformative tools that enhance English teaching by making it more inclusive, motivating, and aligned with the realities of 21st century learners.

In summary, using technology in English language teaching opens new opportunities for improving pronunciation, listening comprehension, and overall communicative competence. Teachers in rural areas can turn technological limitations into creative possibilities by combining tools such as Speech Solution, Jack Hartmann videos, and Kahoot! with thoughtful pedagogical planning. For students in La Iberia and Grano de Oro, learning English through technology is an academic activity and a meaningful experience that connects them to the world beyond their community.

2.3.4 Benefits and Challenges of Technology Integration in Rural Classrooms

Integrating technology in rural classrooms offers real opportunities for inclusion, motivation, and language growth, but it also reveals practical barriers that teachers must navigate. On the benefits side, recent policy frameworks in Costa Rica explicitly connect technology with equity and meaningful learning. The Política para el Aprovechamiento de las Tecnologías Digitales en Educación (PATDE) frames digital tools as a way to strengthen citizenship, participation, and access to quality learning for all students, not only those in better-resourced areas (Ministerio de Educación Pública [MEP], 2021). This policy stance matters in schools like La Iberia and Grano de Oro because it legitimizes classroom time spent on pronunciation software, interactive listening, and game-based reviews as part of a broader national effort to modernize learning and reduce gaps.

Internationally, UNESCO (2021) emphasizes that technology should advance inclusion and human development, not only access to devices. Its recent reports highlight that digital tools are most powerful when they help learners interact, create, and collaborate in ways that build essential competencies for life and work. This translates into practical experiences in the English classroom where students can listen to authentic pronunciation, replay challenging segments, and receive immediate feedback. Game-based platforms also add a motivational layer. Dicheva et al. (2015) found that gamification encourages engagement and sustained attention, which is particularly valuable for first cycle learners who benefit from short, focused activities with immediate feedback. In this sense, technology helps teachers transform routine drills into meaningful, enjoyable tasks that reinforce listening and sound symbol relationships.

At the same time, rural teachers face structural, not merely pedagogical challenges. While Costa Rica has advanced connectivity projects such as the Red Educativa del Bicentenario (REB) to link public schools with high-speed internet, progress has been uneven, and implementation details (bandwidth, reliability, and support) vary across regions (MEP, 2022; SUTEL, n.d.). These realities affect what a teacher can do on a given day: a lesson that requires streaming may work for one week and fail the next. This inconsistency pushes teachers to prepare offline options (downloaded videos, local software, and slide decks) so learning can continue even when the connection drops. UNESCO's more recent guidance also reminds educators that "effective use" is as important as "access," calling for teacher capacity building and clear classroom routines around digital tools (UNESCO, 2023). Put simply, technology helps most when teachers are trained to integrate it purposefully and have a backup plan for low-connectivity days.

Another challenge is ensuring safe, age-appropriate use of technology. New global guidance highlights the need for clear policies, ethical use, and attention to students' data and well-being, especially as schools adopt a wider range of tools (UNESCO, 2023). In the first cycle, this means choosing simple, visual, and short tasks; avoiding distracting extras; and keeping the focus on listening discrimination, sound production, and confidence-building. Teachers also need time to adapt materials to local realities, such as large classes, mixed abilities, and limited home connectivity, so that tasks remain inclusive. For example, using Kahoot at home may depend on a parent's phone; therefore, in-class practice should not penalize children who cannot connect at home. Instead, the tool can be used as an optional reinforcement while classroom time provides the core exposure and feedback.

Finally, technology initiatives succeed when they are paired with teacher support and a practical infrastructure plan. PATDE calls for strengthening teachers' digital competencies and integrating ICT across subjects (MEP, 2021). This aligns with what many rural educators already do: they combine one laptop, a projector, and carefully selected apps to create short, consistent routines for pronunciation and listening. When the infrastructure is stable, the benefits are immediate: more exposure to authentic input, higher participation, and clearer feedback cycles. When the infrastructure is unstable, purposeful planning (offline resources, short clips, local software, and printed back-ups) keeps learning moving. In this sense, the "benefits versus challenges" is not a binary; it is an ongoing design problem that thoughtful teachers can solve with routines, backups, and realistic expectations.

In summary, the promise of technology in rural classrooms is very real: greater access to authentic English, more engaging practice, and better feedback for young learners. The challenges are also real: connectivity, training, safety, and time. Current policy and research

suggest a practical path: align tools with clear goals (phonological awareness), design short multimodal tasks, prepare offline options, and keep routines simple. With that approach, La Iberia and Grano de Oro teachers can make technology dependable to support first-cycle pronunciation and listening growth.

2.4 Phonological Awareness

2.4.1. Definition and importance of Phonological Awareness

Phonological awareness is a critical foundation for reading, writing, and communicating effectively in any language. It refers to the ability to recognize, identify, and manipulate the sounds of spoken language, such as syllables, rhymes, and phonemes, before connecting them to written symbols. As Gillon (2004) explains, phonological awareness allows learners to understand that words are composed of smaller sound units that can be analyzed, blended, and rearranged to create meaning. This understanding is particularly significant for children learning English as a foreign language (EFL), since it enables them to distinguish new sounds that may not exist in their native language, such as /θ/ in "think" or /ð/ in "this."

In early education, phonological awareness develops gradually through playful and meaningful activities such as listening to rhymes, clapping syllables, identifying initial and final sounds, and playing with word families. According to Yopp and Yopp (2000), these early experiences help children build auditory discrimination skills that form the base for reading fluency and correct pronunciation later on. For young learners in Costa Rican rural schools, where exposure to English is often limited to classroom instruction, these experiences are even more critical. Developing phonological awareness ensures that students can hear, produce, and

internalize the rhythm and melody of English skills that directly influence their confidence when speaking and reading aloud.

Several studies have highlighted the strong connection between phonological awareness and literacy acquisition. Anthony and Francis (2005) note that students with well-developed phonological skills are better equipped to decode new words, recognize patterns in spelling, and improve reading comprehension. Similarly, Adams (1990) emphasizes that early interventions focused on phonological awareness can prevent future reading difficulties by strengthening the brain's ability to process sound information. For EFL learners, these interventions also improve pronunciation accuracy and listening comprehension, which are often challenging for students whose first language has different phonetic patterns.

The importance of phonological awareness extends beyond pronunciation and reading, enhancing overall language development and communication. Linan Thompson and Vaughn (2007) argue that when students become aware of the sound structure of language, they are better prepared to engage in meaningful interactions and oral exchanges. This is because they can more easily recognize words in fluent speech, segment them into sound units, and reproduce them accurately. In the context of Costa Rica's first cycle of primary education, these skills are essential for achieving the communicative goals proposed by the Ministry of Public Education (MEP, 2014), which encourages listening, practicing pronunciation, and engaging in basic oral exchanges in English from an early age.

Furthermore, the process of developing phonological awareness in an EFL setting must consider the differences between English and Spanish phonetic systems. For example, Costa Rican students often pronounce the letter "S" as "es" or omit the final "s" sound, and they may find the "H" or "TH" sounds especially difficult since these do not exist in their mother tongue.

These challenges highlight the need for teachers to implement clear, engaging, and multisensory methods to help learners perceive and reproduce English sounds correctly. As Celce-Murcia, Brinton, and Goodwin (2010) explain, pronunciation instruction is more effective when it integrates visual, auditory, and kinesthetic elements, promoting stronger phonological learning because it engages multiple cognitive processes at once.

In summary, phonological awareness is not only a linguistic skill but also a pedagogical priority in early English education. It serves as the bridge between listening and reading, between sound and meaning. For young learners in rural Costa Rican classrooms, fostering this awareness through technology, games, and interactive tasks can make English learning more accessible, enjoyable, and sustainable. By helping students hear, feel, and play with the sounds of English, teachers give them the foundation to become confident speakers and readers in the future.

2.4.2 The Development of Phonological Awareness in Early Education

Phonological awareness begins to develop long before formal reading instruction starts. It evolves naturally as children listen to stories, sing songs, and play with words in their environment. According to Ehri (2020), young learners first become aware of larger sound units such as syllables and rhymes before they can identify and manipulate smaller ones like individual phonemes. This gradual progression from recognizing rhythms to distinguishing specific sounds is essential for literacy development. Teachers must intentionally design activities that strengthen these auditory skills through frequent and playful exposure for children in Costa Rican rural schools, where English is rarely heard outside the classroom.

In the early stages of English as a Foreign Language (EFL) learning, phonological awareness is best developed through multisensory and interactive experiences. Cameron (2021)

emphasizes that young learners must see, hear, and physically experience language to internalize new sounds. Games, chants, movement, and digital songs provide opportunities for learners to connect sound with action, which supports memory and motivation. In this sense, technological resources such as tablets or laptops can become valuable allies. Applications like Speech Solution, videos from Jack Hartmann, and interactive platforms such as Kahoot allow children to engage with English sounds through repetition, rhythm, and visual reinforcement, all essential for first-cycle learning.

The Ministry of Public Education (MEP, 2014) recognizes that phonological awareness must be addressed from the first year of English instruction. The national curriculum promotes activities that focus on listening and oral practice before reading and writing. This sequence is significant for students who are just starting to associate English sounds with letters and words. When learners are guided to identify sounds such as /ɛ/, /i/, /s/, /h/, and /θ/ in familiar vocabulary (for example, elephant, iguana, sun, hat, and thumb), they begin to establish the sound letter correspondence that later supports reading comprehension, these activities not only develop auditory discrimination but also make English more enjoyable and relatable to students' daily lives.

Teachers play a fundamental role in this process. As Rodríguez (2022) points out, educators must function as mediators between the sound system of English and students' native language, helping them notice contrasts and similarities. For instance, Spanish-speaking learners often add an "e" before initial "s" clusters (*esnake* instead of *snake*) or pronounce "h" as silent, reflecting transfer from their first language. By integrating visual cues, gestures, and technological aids, teachers can make these differences visible and help learners adjust their

pronunciation patterns in a safe, non-judgmental environment. This approach encourages participation and builds students' confidence to experiment with sounds.

Another crucial aspect is that phonological awareness should not be treated as an isolated skill. Al Ghazali (2020) states it must be linked to meaningful communication. When students use new sounds in songs, role plays, or simple dialogues, they connect phonological knowledge with real use of language. This connection transforms what could be a mechanical exercise into a communicative experience, which aligns with the Action Oriented Approach (AOA) established by the Costa Rican Ministry of Public Education (MEP, 2016), where learners engage in purposeful language tasks that integrate listening, pronunciation, and interaction. Through technology, this connection becomes even more powerful. Students can record their voices, compare pronunciation, and receive immediate feedback, turning learning into an active discovery process.

Finally, in rural contexts such as Siquirres, the development of phonological awareness is also tied to inclusion and equality. As UNESCO (2023) notes, equitable education means that all students must have access to high quality learning opportunities regardless of their socioeconomic background. When teachers integrate simple digital tools into phonological instruction, they are not just improving pronunciation but opening the door to broader communication skills and digital literacy. This approach ensures that Costa Rican rural students can learn English in ways that are engaging, relevant, and aligned with the skills needed for the future.

2.4.3 Focus on Phonemic Awareness in First Cycle Learners

Within the broad field of phonological awareness, phonemic awareness represents the most specific and advanced stage of sound recognition. It involves identifying, isolating, and manipulating individual phonemes, the smallest sound units in a word. As Ehri (2020) explains, while phonological awareness includes skills such as recognizing syllables or rhymes, phonemic awareness focuses on hearing and reproducing individual sounds, skills essential for accurate pronunciation and early reading development.

In the context of Costa Rican first cycle English education, this level of sound awareness is particularly important. The MEP English Curriculum (2014) emphasizes that early English learning should begin with listening and speaking activities that expose students to the basic sound system of the language before introducing reading and writing. Children should learn to identify, repeat, and differentiate simple sounds in the first, second, and third grades through engaging in auditory experiences such as songs, games, and pronunciation exercises. By mastering these skills, students begin to connect English sounds with corresponding letters.

For this reason, this study focuses on phonemic awareness rather than the broader field of phonological awareness. Teaching students to recognize sounds such as /Ɛ/ in elephant, /i/ in igloo, /s/ in sun, /h/ in hat, and /θ/ in thumb provides an achievable and age-appropriate goal. These particular sounds were selected because they represent common challenges for Spanish speaking learners. For example, students often pronounce scared as "escared" because they add a preceding vowel, or they may confuse the silent h sound in Spanish with its aspirated form in English. Similarly, the th sound does not exist in Spanish, making it one of the most difficult for Costa Rican learners to reproduce.

In this study, phonological awareness will be assessed through three main aspects that are suitable for the first cycle: hearing, identifying, and manipulating sounds in spoken English. This focused approach follows the idea of moving from the general concept of phonological awareness to the specific and measurable domain of phonemic awareness (as the measurable subset of phonological awareness) . It also aligns with the expectations of the MEP English Program, which promotes the development of listening and speaking skills as a foundation before formal reading or writing begins.

Developing these skills requires more than mechanical repetition. According to Gillon (2018), children become more aware of sounds when they engage in meaningful and playful activities that include listening, repeating, and manipulating sounds in context. Using technology to facilitate this process adds motivation and interaction. Digital tools such as Speech Solution allow learners to visualize the movement of the mouth and tongue while hearing the correct pronunciation. Meanwhile, Jack Hartmann's educational videos and Kahoot games provide multisensory experiences where students can practice through rhythm, color, and repetition, key elements for early phonemic development.

Furthermore, integrating phonemic awareness into classroom routines helps address the learning diversity found in rural Costa Rican schools. As UNESCO (2023) highlights, inclusive education means offering equal opportunities for all learners by using varied and accessible methodologies. Through the use of technology, teachers can adapt phonemic activities to different learning paces and create engaging environments even in classrooms with limited resources. For example, short pronunciation challenges, sound discrimination games, and mobile-based listening tasks can make English sound practice both enjoyable and achievable.

Focusing on phonemic awareness also supports Costa Rica's national goal of helping students build a strong foundation for English communication from the earliest years. It prepares students not only for reading and speaking but also for understanding how English sounds work differently from Spanish. This way, first cycle learners begin to see English as something they can hear, feel, and produce, not just memorize

2.4.4 Strategies for Teaching Phonemic Awareness through Technology

Teaching phonemic awareness, as part of the broader domain of phonological awareness, requires creative, multisensory, and motivating strategies that respond to how children learn best through play, movement, repetition, and curiosity. In rural Costa Rican classrooms, technology has become an effective bridge to make this learning process more engaging and accessible. Digital tools such as Speech Solution, Jack Hartmann's educational videos, and Kahoot! provide opportunities for students to listen, repeat, and experiment with *individual sounds* while interacting with visual and auditory stimuli that reinforce correct pronunciation. These tools support the development of listening and speaking skills and help students recognize and produce English phonemes in fun and meaningful ways.

2.4.4.1 Using Speech Solution for Phoneme Visualization and Practice

Speech Solution is a pronunciation and phonemic training software installed on laptops or tablets that allows students to see and hear the way sounds are produced. The program presents short visual demonstrations of real mouth and tongue movements, helping learners understand how to position their lips and tongue to pronounce English phonemes accurately. It also includes sound discrimination activities where students identify missing word sounds, match letters to phonemes, and practice blending and segmenting sounds.

According to Al Qahtani (2022), digital pronunciation tools that provide visual and auditory feedback significantly improve learners' ability to self-correct and internalize sound patterns. This tool offers Costa Rican first cycle students an interactive alternative to the traditional "listen and repeat" drills by turning pronunciation practice into a dynamic and visual experience. Students not only imitate sounds they also see *how* English sounds are physically formed, which helps reduce common Spanish influenced errors, such as adding an /e/ before "s" clusters (scared for escared) or mispronouncing the aspirated /h/.

2.4.4.2 Incorporating Jack Hartmann's Phonics Videos in Classroom Routines

Jack Hartmann's educational videos have become a good source for teachers collaborating with young learners because they combine music, rhythm, movement, and clear articulation. Each letter sound is presented through two short videos. In the first video, children practice writing the letter in the air while repeating its sound and several example words. In the second, they sing and move while reinforcing vocabulary through initial sounds, which is a core focus in first and second grades, according to the MEP English Curriculum (2014).

As Cameron (2021) explains, rhythm and repetition play an essential role in early language learning because they help children store sounds in long term memory. Using Jack Hartmann's videos connects learning with enjoyment, making it easier for students to recall sounds and words. These activities are particularly effective when followed by small group work where learners pronounce, identify, and draw objects that start with the target sound. For example, after watching the /s/ video, students may identify sun, snake, or sock from flashcards or digital images on the board.

Moreover, the physical movement accompanying each song helps keep attention high, especially in first cycle classrooms with short concentration spans. The combination of sound, image, and movement, core elements of Hartmann's method, constitutes multisensory learning, a cornerstone of phonemic awareness instruction (Gillon, 2018; MEP, 2014).

2.4.4.3 Reinforcing Learning through Kahoot! at Home

To extend learning beyond the classroom, Kahoot! serves as a practice and review tool accessible through smartphones. Although these schools are located in rural Siquirres, diagnostic surveys show that nearly all families have at least one mobile device with internet access. Kahoot! allows students to practice at home with interactive quizzes related to the sounds studied in class. Teachers can design short games focusing on sound recognition, initial letters, and simple vocabulary (for instance, selecting the correct word that starts with /h/).

Research on gamification supports the idea that game-based learning platforms can increase student motivation and promote participation beyond the classroom. Dicheva et al. (2015) demonstrated that digital games used for educational purposes help learners stay engaged and develop a sense of ownership over their learning. In the context of rural education, platforms such as Kahoot! can also connect home and school environments by encouraging family involvement, as parents can help children read questions and discuss answers. This digital extension of classroom activities aligns with the MEP's (2021) goal of developing digital citizenship and inclusive practices that involve the community in the educational process.

2.4.4.4 Integrating the Three Tools for Meaningful Phonemic Instruction

The combination of Speech Solution, Jack Hartmann's phonics videos, and Kahoot! creates a continuous and coherent learning process that integrates observation, imitation,

practice, and reinforcement. In class, students first explore how sounds are produced using Speech Solution; then they sing and move with Jack Hartmann's videos to connect the sound with vocabulary and rhythm; finally, they review and apply what they learned through Kahoot! quizzes at home.

This cyclical model promotes autonomy and confidence. As Warschauer and Healey (1998) explain, technology encourages learners to persist and self-correct because it provides immediate feedback and turns practice into an interactive experience. When students receive digital feedback and enjoy the learning process, they tend to stay engaged and reflect on their progress. More recent research reinforces this idea, showing that game based and interactive digital tools increase motivation, promote self-regulation, and support long-term engagement in language learning (Dicheva, Dichev, Agre, & Angelova, 2015). These tools also offer teachers valuable data about student performance and pronunciation challenges, allowing instruction to be adjusted based on evidence rather than intuition.

Ultimately, these strategies demonstrate that technology does not replace the teacher; it enhances the teacher’s ability to reach every child. In rural Costa Rican schools, where English exposure is limited, simple digital tools can transform sound practice into a rich, interactive experience that fosters listening, speaking, and joy in learning.

The effective integration of these digital tools, such as Speech Solution, Jack Hartmann’s phonics videos, and Kahoot! highlights the essential role teachers play in guiding students’ learning experiences. Technology alone does not create understanding; it becomes meaningful only through well-planned pedagogical mediation. Teachers must know how to select, adapt, and implement digital resources to match students’ developmental levels, linguistic needs, and the learning objectives established in the MEP curriculum. As the experiences in La Iberia and

Grano de Oro schools demonstrate, even the most engaging phonemic activities require thoughtful preparation and digital confidence from educators. Therefore, before analyzing how these tools influence students' outcomes, it is necessary to examine teachers' ICT competence, the skills, attitudes, and knowledge that enable them to integrate technology effectively in the English classroom, particularly in rural Costa Rican contexts.

To implement these strategies effectively, teachers must possess sufficient digital competence and confidence in using ICT tools, which is explored in the following section.

2.5. Teacher's ICT Competence in English Language Teaching

2.5.1 Understanding ICT Competence in the English Language Teaching

In the last decade, Information and Communication Technologies (ICT) have transformed the way teachers plan, teach, and assess in the English classroom. Today, ICT competence is not just an optional skill but a professional requirement that allows educators to connect traditional teaching with the digital realities of 21st-century students. According to UNESCO (2023), ICT competence refers to the teacher's ability to integrate digital tools effectively and ethically in teaching and learning, considering both pedagogical and technological aspects. In simple terms, it is not just about knowing how to use computers or software but understanding why and when to use them to improve students' learning outcomes.

In the context of English as a Foreign Language teaching, ICT competence becomes even more essential because technology allows teachers to bring authentic language experiences into the classroom. As Warschauer (1996) initially argued, technology can support interaction, feedback, and learner communication, an idea echoed by recent research showing that strategic technology integration improves language outcomes, engagement, and social interaction

(Assylzhanova et al., 2024). Nowadays, tools such as interactive videos, pronunciation software, and mobile applications enable students to hear and practice authentic accents, repeat and record themselves, and gain immediate feedback. These opportunities are especially valuable in rural schools like La Iberia and Grano de Oro, where students have little or no exposure to English-speaking environments.

For a teacher to be considered digitally competent, it is not enough to use technology occasionally. As Ospina (2004) explains, the proper integration of ICT in education happens when the teacher plans learning experiences based on specific goals and chooses technological tools that support those goals meaningfully. In this sense, ICT competence means being able to select the right digital resources, design engaging activities, and evaluate students' progress through the use of technology. Costa Rica's Ministerio de Educación Pública (MEP) reinforces this idea through its Política para el Aprovechamiento de las Tecnologías Digitales en Educación (PATDE) (2021), which defines digital competence as a teacher's capacity to use technology to innovate pedagogy, foster inclusion, and improve learning results.

Developing ICT competence requires continuous training, reflection, and adaptation. The Estado de la Educación 2023 report highlights that, although Costa Rica has made significant progress in equipping schools with digital tools, there are still significant gaps in teachers' professional development. Many educators, especially in rural areas, report feeling uncertain about using ICT in their lessons or aligning digital tools with the curriculum. This situation is not just the result of unwillingness but of the lack of structured mentoring and consistent access to professional support. Therefore, ICT competence is a progressive process that grows through experience, collaboration, and guided practice rather than one-time workshops.

In English language teaching, this competence translates into concrete classroom actions: using digital dictionaries or pronunciation software for vocabulary and phonemic awareness, recording short listening activities, incorporating online games like Kahoot! or using applications such as Speech Solution to visualize mouth movements and correct articulation. Each practice reflects an active use of ICT to enhance phonological and communicative learning. Moreover, by developing their ICT competence, teachers improve their professional performance and empower students to become active, responsible, and digitally literate learners.

As UNESCO (2021) emphasizes, preparing teachers to integrate technology effectively is fundamental to achieving equitable and inclusive education. In Costa Rica, especially in rural schools, this preparation is essential to ensure that all children can access modern and motivating learning experiences regardless of socioeconomic conditions. For English teachers, ICT competence opens the door to creativity, autonomy, and real communication opportunities for students who are often geographically and socially distant from authentic English contexts.

In conclusion, ICT competence in EFL teaching bridges innovation and equity. It empowers teachers to connect global educational trends with local classroom realities, making technology not an obstacle but an ally. In this thesis, ICT competence plays a central role, since the effectiveness of the proposed activities using tablets, laptops, and interactive software depends mainly on how teachers design, adapt, and guide their use in developing phonological awareness and communication skills in young learners.

2.5.2 ICT Policies and Implementation in Costa Rica

Costa Rica has made significant efforts to promote ICT integration in public education. The Política para el Aprovechamiento de las Tecnologías Digitales en Educación (PATDE 2022–

2034) establishes that digital tools must be used to foster innovation, inclusion, and active student participation (Ministerio de Educación Pública [MEP], 2021). Earlier initiatives, such as the Programa Nacional de Formación Tecnológica (PNFT) and the Lineamientos para el uso de recursos tecnológicos en la educación primaria (MEP, 2014), provided the foundation for introducing ICT-based activities in schools. These policies ensure that every Costa Rican child, regardless of geographic location, has meaningful opportunities to use technology as part of their learning process.

However, implementation remains uneven across the country. According to the Informe Estado de la Educación (Programa Estado de la Nación, 2023), many rural schools still face challenges related to insufficient connectivity, limited devices, and gaps in teacher training. Although more institutions now have access to digital infrastructure, effective pedagogical use of technology is still being developed. Teachers require continuous professional support to transition from traditional instruction to technology-enhanced learning experiences. Despite these limitations, the national agenda recognizes ICT as a key factor for equity, innovation, and quality in education. This commitment reflects Costa Rica's vision of preparing citizens to thrive in a digital, interconnected world.

2.5.3 Teacher's Digital Competence and Challenges

Teachers' digital competence is central to integrating technology in EFL classrooms. As Ospina (2004) observed, the presence of technological tools alone does not guarantee meaningful learning; rather, the teacher's pedagogical ability to align those tools with learning objectives determines their effectiveness. Recent perspectives expand this idea, defining digital competence not only as technical proficiency but also as the capacity for ethical, critical, and creative

technology use (González, 2016; UNESCO, 2022). This broader understanding highlights the teacher's role as facilitator and reflective practitioner.

In Costa Rica, the Estado de la Educación (2023) reported that although many teachers have access to digital resources, several still feel uncertain about selecting appropriate tools or assessing their pedagogical impact. MEP has attempted to address this gap through online courses and training programs, yet inequalities persist between urban and rural teaching contexts. For example, English teachers in schools like La Iberia and Grano de Oro often rely on personal initiative and creativity to adapt technological resources to their classroom realities. Their dedication reflects professional resilience, but institutional support remains essential to sustain effective digital learning.

As UNESCO (2021) points out, schools must move from simple technology adoption to meaningful integration, where digital tools become embedded in pedagogical design rather than added as optional extras. This shift requires continuous reflection, peer collaboration, and professional learning communities that empower teachers to innovate within their own contexts.

2.5.4 Benefits and Pedagogical Impact of ICT Integration

In the context of this research, these benefits are directly related to the development of phonemic awareness, since technological tools provide auditory and visual support that helps first-cycle students recognize and reproduce English sounds accurately.

Integrating ICT into English language teaching provides multiple pedagogical benefits beyond technical skill development. Studies have shown that technology increases student motivation, participation, and collaboration while promoting learner autonomy and creativity (Assylzhanova et al., 2024; Redecker, 2017). Digital resources such as interactive games,

pronunciation applications, and multimedia presentations promote multisensory learning, an efficient approach for young learners in the first cycle. As Motteram (2013) notes, technological innovations have a real educational impact only when they are integrated within a coherent pedagogical framework that supports meaningful interaction and learner autonomy. When students can see, hear, and repeat information simultaneously, they process it through multiple cognitive channels, strengthening understanding and long-term retention. This aligns with the European Framework for the Digital Competence of Educators (Redecker, 2017), which emphasizes that teachers need both technical and pedagogical knowledge to integrate technology meaningfully in their classrooms.

In rural classrooms, ICT also serves as a bridge toward inclusion and equality. The Informe Estado de la Educación (Programa Estado de la Nación, 2023) highlights that integrating technology allows students from remote or disadvantaged areas to access educational experiences similar to those in urban regions. Moreover, ICT supports the Action-Oriented Approach (AOA) promoted by MEP (2016), enabling learners to perform authentic communicative tasks that reflect real life language use. This pedagogical alignment reinforces the purpose of English education in Costa Rica: to help students communicate meaningfully and develop as active participants in their communities.

Nevertheless, the process also involves ongoing challenges such as connectivity issues, lack of technical support, and the need for continuous professional training. As MEP (2021) states, the success of ICT integration depends on the collective commitment of teachers and institutions to promote equitable access and innovation. When ICT is implemented effectively, it transforms classrooms into dynamic, inclusive, and interactive spaces, that bridge linguistic, technological, and social gaps in the Costa Rican educational context.

2.6 CEFR and MEP Alignment for the First Cycle

2.6.1 The CEFR Foundations in Costa Rica´s English Curriculum

The Ministry of Public Education (MEP) of Costa Rica officially adopted the Common European Framework of Reference for Languages (CEFR) as the guiding standard for the design of English programs across all educational levels. The 2016 Programa de Estudio de Inglés para I y II Ciclos establishes that students in public primary schools must reach A1 proficiency by the end of the first cycle and A2 proficiency by the end of the second cycle (MEP, 2016). These levels reflect students' ability to use English in simple, everyday contexts, demonstrating comprehension and production of familiar words, phrases, and expressions related to daily life.

According to the MEP (2016), Costa Rica's curriculum aligns with the CEFR principle that students should be viewed as social agents who perform communicative tasks to achieve specific purposes. The curriculum's structure revolves around three competence areas: linguistic, sociolinguistic, and pragmatic, which together promote holistic language learning. Within these areas, phonological accuracy, pronunciation, and listening comprehension are essential to developing effective oral communication, especially in the early stages of learning.

The CEFR (Council of Europe, 2020) defines A1 learners as capable of recognizing familiar words, understanding slow and clear speech, and using short, memorized expressions to satisfy basic needs. The descriptors for this level correspond closely with Costa Rica's goals for the first cycle, in which students are expected to develop foundational listening and speaking abilities. Therefore, phonological awareness activities, such as identifying letter sounds, recognizing rhymes, and discriminating between similar phonemes, are not peripheral but central to achieving A1 competence.

The Council of Europe (2020) clarifies that the CEFR views language users as "social agents who develop a range of communicative language activities in order to carry out tasks" (p. 28). These tasks require learners to use language purposefully, combining knowledge of sounds, vocabulary, and context to achieve clear communicative goals. In the case of Costa Rica, the MEP (2016) adopts this same vision by encouraging first cycle students to engage in simple, meaningful exchanges, such as introducing themselves, naming familiar objects, or responding to classroom instructions using basic phonological accuracy. This link between the CEFR and national standards ensures that language learning begins with active use, not passive repetition, from the earliest grades.

2.6.2 The Action-Oriented Approach as Implementation of CEFR Principles

The adoption of the Common European Framework of Reference for Languages (CEFR) in Costa Rica marked an important shift in English language teaching, introducing the Action-Oriented Approach (AOA) as the main pedagogical model. This approach replaced the former Communicative Language Teaching method and views students as active participants who use English to complete real-life tasks inside and outside the classroom (MEP, 2016). Rather than learning isolated vocabulary or grammar structures, learners develop language through meaningful interaction and purposeful actions that connect directly to their daily lives.

In the first cycle, this involves designing lessons around simple but authentic tasks such as greeting classmates, describing personal objects, or following short classroom instructions. These communicative actions help young learners use English to achieve concrete goals while gradually developing confidence and fluency. For example, tasks like "Listen and point to the correct picture" combine listening comprehension with phonemic recognition, while "Say the word that starts with the same sound" reinforces phonological awareness through speaking.

When these tasks are supported by digital tools, such as pronunciation software, interactive games, or applications like Speech Solution, they naturally align with the AOA and the CEFR's principles of interaction, participation, and learner autonomy (Council of Europe, 2020). This connection demonstrates how technology can strengthen task-based learning by making English practice more engaging and relevant to students' real contexts.

2.6.3 Phonological and Phonemic Awareness in the A1 learning Context

At the A1 level, students are expected to recognize, repeat, and produce familiar sounds and words as part of their early communicative development. The MEP (2016) curriculum includes phonological competence as an essential component that supports listening and speaking skills. In first cycle classrooms, this competence is usually fostered through multisensory and contextualized activities that connect sound recognition with meaningful actions.

Phonemic awareness represents the foundation of this process, as it focuses on helping learners identify individual sounds (phonemes) and associate them with written symbols. For Costa Rican students in the first cycle, these skills include recognizing initial vowel sounds such as /Ɛ/ and /i/, and consonant sounds like /s/, /h/, and /θ/ ("th"), which often present difficulties because they do not exist in Spanish. Integrating technology enhances this process by providing students with auditory models, visual mouth movements, and opportunities for self-correction. For instance, programs like Speech Solution (Edusoft Ltd., 2024) display the position of the lips and tongue during pronunciation, while Kahoot! (2025) and phonics songs from Jack Hartmann Kids Music Channel (2024) reinforce sound recognition through interactive and multisensory practice. These strategies are consistent with the Action Oriented Approach (MEP, 2016), as students learn through purposeful participation rather than passive repetition.

2.6.4 Curriculum Alignment and Practical Implications

Although the CEFR and the Action Oriented Approach provide a clear pedagogical framework, their implementation differs across Costa Rican schools. The Informe Estado de la Educación (2023) points out that many teachers, especially in rural areas, face limitations in training related to CEFR descriptors and in access to technological resources. These conditions make it difficult to ensure uniform learning opportunities for all students.

Nevertheless, integrating technology, as proposed in this study, can help reduce these differences. By aligning lessons with A1 descriptors such as recognizing familiar words, following short spoken instructions, and responding to simple questions, teachers can use digital tools to make English learning more equitable and engaging. Continuous exposure to authentic sounds and accents through technological resources also reinforces the pronunciation standards defined by the MEP curriculum. In this way, technology functions as a pedagogical ally that supports both linguistic and pragmatic goals, promoting greater participation and confidence among students as active social agents in their learning process.

Chapter III

Methodological Framework

This chapter explains how the study will be conducted to analyze the impact of using technological devices (smartphones and laptops) on phonemic awareness in first-cycle students at La Iberia and Grano de Oro elementary schools of the Circuit 06, Siquirres, Limón, during the second semester of 2025. It details the research design, participants, instruments, procedures, data analysis, and ethical considerations. The approach follows Costa Rica's Action Oriented Approach (AOA) and first cycle priorities in the MEP English Program, which are listening and speaking, and is aligned with CEFR A1 descriptors. Classroom activities and assessments focus on three measurable age-appropriate skills for this level: hearing, identifying, and manipulating sounds in spoken English. Tools include Speech Solution (articulation modeling), selected Jack Hartmann videos (initial sounds), and Kahoot! as at-home reinforcement with family smartphones.

3.1 Type of research

3.1.1 Purpose: Applied

This research is an applied study. Its purpose is not to build a new theory, but to solve a practical classroom needed in two rural public schools: helping young learners improve phonemic awareness with realistic, low-cost technology. The study assesses a sequence that teachers can actually use as a baseline (pre-test), short, technology-supported lessons, and a post-test to see whether students get better at hearing, identifying, and manipulating target sounds (/ɛ/, /i/, /s/, /h/, /θ/). The expected contribution of this research is to provide instructional guidance that can be implemented directly by teachers working in similar educational contexts with limited technological resources. This focus is consistent with applied research, which aims to solve practical educational problems and generate solutions for real classroom settings (Creswell & Creswell, 2018).

3.1.2 Temporal dimension: Transversal

The temporal dimension of this study is transversal, as the research is conducted during a short and specific period of time within a single academic term. The study takes place during the second semester of 2025 and covers approximately three to four weeks. This design allows the researcher to observe changes in students' phonemic awareness within a limited instructional period, without extending data collection over multiple stages or school years.

The research includes a pre-test, an intervention phase, and a post-test, all implemented within the same school term. During this period, students participate in English lessons supported by technological tools such as Speech Solution, Jack Hartmann's phonics videos, and Kahoot! activities, which aim to strengthen their ability to hear, identify, and manipulate English sounds. Short-term designs of this nature are commonly used in educational research to examine learning outcomes within a defined instructional timeframe and to reflect authentic classroom conditions (Creswell & Creswell, 2018).

This temporal approach is appropriate for the Costa Rican public-school context, where English instruction is limited to a few hours per week and access to technological resources is restricted. By concentrating the intervention within a single academic period, the study captures immediate learning changes while remaining realistic and feasible for rural classroom settings

3.1.3 Framework: Mega-macro-micro

This research follows a structured framework divided into three complementary levels: mega, macro, and micro dimensions. Each level connects to the others and helps explain how the study fits within the wider educational context, the institutional reality, and the classroom environment where the project takes place.

At the mega level, the study aligns with the national vision of improving English education in Costa Rican public schools, as established by the Ministry of Public Education (MEP). This level represents the country's broader educational goals and policies that aim to strengthen bilingual education, promote technological inclusion, and ensure equal learning opportunities for students in rural areas. The focus on integrating digital tools into English lessons supports MEP's current emphasis on innovation and communicative learning for young learners.

The macro level refers to the institutional and local context in which the research takes place La Iberia and Grano de Oro Primary Schools in Circuit 06, Siquirres, Limón. Both schools are located in agricultural rural areas, where access to technology and internet connection is still limited. However, teachers and students show strong motivation to use technological resources as part of their daily learning process. This level highlights how the project responds to real classroom conditions and supports rural teachers who wish to incorporate technology into their English lessons effectively.

Finally, the micro level represents the teaching learning process that will be observed during the research. At this level, the study focuses on students from first, second, and third grades in the first cycle, exploring how they develop phonemic awareness through the use of technological resources such as Speech Solution software, Kahoot! Website, and Jack Hartmann's videos on YouTube.com. The micro level is where learning experiences, classroom interactions, and assessment results are analyzed directly to understand the impact of technology on students' ability to hear, identify, and manipulate initial English word sounds.

This multi-level framework is consistent with ecological approaches to education, which emphasize the interaction between broader educational policies, institutional contexts, and

individual learning experiences (Bronfenbrenner, 1979). In addition, it aligns with the curricular structure of English education in Costa Rica, which connects national objectives with classroom practice (Ministerio de Educación Pública, 2016

3.1.4 Hypothesis

The working hypothesis of this study is that, after using technological devices such as smartphones and laptops, first-cycle students will demonstrate improvement in their phonemic awareness during English lessons. The independent variable is the use of technological devices as learning tools, while the dependent variable is students' level of phonemic awareness, observed through their ability to hear, identify, and manipulate English sounds.

Although phonological awareness is considered the broader construct in this research, the analytical focus is placed on phonemic awareness as its most observable and measurable component in early EFL learning. The use of a working hypothesis is appropriate in applied educational research, as it guides the analysis of learning outcomes without implying strict causal claims, particularly in classroom-based and mixed-methods studies (Cohen, Manion, & Morrison, 2018).

3.1.5 Nature: (Mixed, qualitative dominant)

Research can be classified according to the type of data it collects and how it analyzes it. McLeod (2025) explains that qualitative research focuses on exploring attitudes, behaviors, and experiences through observation, description, and interpretation, while quantitative research relies on numerical data and statistical analysis to measure change or comparison.

This study uses a mixed methods approach with a qualitative emphasis. Although some numerical data are collected from pre-tests and post-tests, these serve mainly to support the

qualitative interpretation of students' learning progress. The study aims to describe how students respond to technological tools and how these tools influence their ability to hear, identify, and manipulate English sounds.

A qualitative-dominant mixed-methods design is appropriate in educational research when the goal is to understand learning processes within real classroom contexts while also incorporating quantitative indicators to strengthen the analysis (Creswell & Plano Clark, 2018). By combining descriptive observations with measurable outcomes, this study provides a more comprehensive and realistic understanding of the impact of technology on phonemic awareness in rural classrooms.

3.1.6 Character

In this study, the character of the research is both correlational and experimental. The correlational aspect focuses on the relationship between the use of technological devices (smartphones and laptops) and the development of phonological awareness among first-cycle students. In other words, this part of the study seeks to determine whether the integration of technology in English lessons is associated with improvements in students' ability to hear, identify, and manipulate English sounds. Correlational approaches in educational research are commonly used to explore relationships between instructional variables and learning outcomes within real classroom contexts (Cohen, Manion, & Morrison, 2018).

On the other hand, the experimental character involves testing specific technological resources within the classroom to observe their impact on students' learning. The implementation of tools such as Speech Solution, Jack Hartmann's videos, and Kahoot! activities allows the researcher to compare students' performance before and after the intervention. Pre-

test and post-test designs are frequently used in classroom-based research to examine the effects of instructional strategies on student learning (Creswell & Creswell, 2018).

This character reflects a deliberate and systematic effort to identify whether using these devices produces a measurable improvement in phonological awareness. Rather than aiming for laboratory-level control, the study prioritizes pedagogical relevance and instructional feasibility, which is consistent with applied educational research conducted in authentic school settings (Creswell & Creswell, 2018).

Finally, this approach is realistic and context-based, as it takes place in rural Costa Rican schools where teachers face limited access to digital resources. By testing and observing real classroom practices, this study contributes evidence that can inform future strategies for English teaching in similar educational environments.

3.2 Subjects and sources of information

3.2.1 Subjects

In this section, the researcher identifies two different ways to classify the population to be studied: the universe and the sample.

The universe includes all first cycle students from La Iberia and Grano de Oro Elementary Schools, located in Circuit 06, Siquirres, Limón, Costa Rica. Both schools are small rural institutions that belong to the public education system and follow the English curriculum established by the Ministry of Public Education (MEP). The communities are surrounded by agricultural and farming areas, and most families are engaged in agricultural activities or small local businesses.

Both institutions share similar characteristics: limited technological resources, low speed internet connection, and a high level of student motivation toward learning English with the use of digital tools. The English subject is taught five times per week in both schools, although the number of lessons per day varies according to each school's schedule.

The sample consists of students from first, second, and third grades at La Iberia Elementary School and students from first and second grades at Grano de Oro Elementary School. The total number of participants is distributed as follows:

- La Iberia School
    - First grade: 13 students
    - Second grade: 18 students
    - Third grade: 14 students
- Grano de Oro School
    - First grade: 15 students
    - Second grade: 18 students
    - Third grade: 10 students

Each group receives five English lessons per week. In La Iberia, classes are distributed across three days with one lesson each and two days with two lessons. In Grano de Oro, classes are organized two days per week, with three lessons on one day and two on the next.

According to the MEP English Program (2017) and the workshops provided to teachers, it is suggested that phonemic awareness be practiced approximately once per week (one lesson out of five). This limitation in time reduces the opportunities for students to make consistent progress in developing their sound recognition skills.

The participants' ages range from six to nine. All students are at the beginner level of English (CEFR A1) and receive their lessons from the same English teacher, who also serves as the researcher in this study. This dual role allows the researcher to observe the teaching–learning process directly and record the progress of each group throughout the intervention.

3.2.2 Sources of information

Table 1

Primary sources used in the research process

Author(s) Name	Book or Article Title	Year
Gillon	Phonological Awareness: From Research to Practice	2004
Yopp & Yopp (2000)	Supporting Phonemic Awareness Development in the Classroom	2000
Celce-Murcia, Brinton & Goodwin	Teaching Pronunciation: A Course Book and Reference Guide	2010
Warschauer & Healey	Computers and Language Learning: An Overview	1998
Ospina	Uso de las TIC en la enseñanza del inglés como lengua extranjera	2004
Council of Europe	Common European Framework of Reference for Languages: Companion Volume	2020

Ministerio de Educación Pública (MEP)	Programa de Estudio de Inglés para I y II Ciclos	2016
Ministerio de Educación Pública (MEP)	Política para el aprovechamiento de las tecnologías digitales en educación (PATDE 2022–2034)	2021

Source: Developed by David Molina Solís (2025)

Table 2

Secondary sources used in the research process

Author(s) Name	**Book or Article Title**	**Year**
Ospina	Uso de las TIC en la enseñanza del inglés como lengua extranjera. Revista Iberoamericana de Educación	2004
Assylzhanova, Myrzabekova & Turganbayeva	Digital Pedagogy and Teacher Readiness for ICT Integration in Foreign Language Education. International Journal of Learning and Teaching	2024
Motteram	*Innovations in Learning Technologies for English Language Teaching.* British Council.	2013
Dicheva et al.	Gamification in Education: A Systematic Mapping Study. Educational Technology & Society	2015
Redecker	European Framework for the Digital Competence of Educators (DigCompEdu). Publications Office of the European Union.	2017
UNESCO	Reimagining Our Futures Together: A New Social Contract for Education. UNESCO	2021
UNESCO	ICT Competency Framework for Teachers (Version 3). UNESCO	2022
Ministerio de Educación Pública (MEP)	Lineamientos para el uso de recursos tecnológicos en la educación primaria. Dirección de Recursos Tecnológicos en Educación	2014
Programa Estado de la Nación	*Informe Estado de la Educación 2023.* Programa Estado de la Nación, Consejo Nacional de Rectores (CONARE)	2023

Source: Developed by David Molina Solís (2025)

3.3 Sampling and Type

3.3.1 Non-probabilistic

In this research, the selection of participants follows a non-probabilistic sampling method, specifically convenience sampling with a purposive criterion. As the English teacher in both schools, the researcher has direct access to the students, which makes convenience sampling appropriate for this context. Convenience sampling is commonly used in educational settings where time, school schedules, and classroom dynamics limit the possibility of random selection. According to Etikan, Musa, and Alkassim (2016), this sampling method is useful when the study needs to work with the population that is readily available and willing to participate.

However, to ensure representation of different learning levels, a purposive criterion was also applied. This means that students with varying performance levels (high, medium, and low) were intentionally included in the sample. This decision allows the study to observe how the use of technological devices supports phonemic awareness across different learning profiles, which is especially relevant in rural schools where exposure to English may vary among students.

The population includes students from first, second, and third grades at La Iberia and Grano de Oro elementary schools. To make the intervention manageable within the weekly lesson structure and available time, ten students per grade level were selected, creating a sample that is both feasible and representative of the classroom diversity.

School	Grade Level	Total Students	Selected Sample	Sampling Type
La Iberia	1st grade	13	10	Convenience + Purposive (mixed abilities)
La Iberia	2nd grade	18	10	Convenience + Purposive (mixed abilities)
La Iberia	3rd grade	14	10	Convenience + Purposive (mixed abilities)
Grano de Oro	1st grade	15	10	Convenience + Purposive (mixed abilities)
Grano de Oro	2nd grade	18	10	Convenience + Purposive (mixed abilities)
Grano de Oro	3rd grade	10	10	Convenience

Final sample size: 60 students.

Source: Developed by David Molina Solís (2025)

This sampling approach reflects real classroom conditions, allows the researcher to implement the technological activities within the school schedule (5 lessons per week, with phonemic awareness recommended 1 lesson per week by MEP), and provides useful data on how students with different learning levels respond to the intervention.

3.4 Techniques and Instruments

This section describes the techniques and instruments used to collect data during this research. A total of five instruments were designed and applied to evaluate the development of phonemic awareness among first cycle students and the impact of using technological tools in English lessons. These instruments were created according to the specific objectives and aligned with the variables of the study.

The first instrument is a diagnostic checklist and pre-test, applied to determine students' initial level of phonemic awareness. It evaluates criteria such as sound recognition, identification of initial sounds, and pronunciation accuracy. The pre-test used a three-point scale: 0 (does not recognize the sound), 1 (partially recognizes it), and 2 (correctly identifies and produces the sound). This instrument was applied during the first week of the intervention to establish a baseline for comparison.

The second instrument is the phonemic awareness post-test, which measures students' improvement in identifying and producing English sounds. The post-test followed the same 0–2 scoring scale and criteria as the pre-test to ensure fair comparison. The primary technological tool used was the Speech Solution application in the school´s laptops, which provided pronunciation models and visual feedback. Jack Hartmann's phonics videos supported auditory recognition, and Kahoot! was used both during the learning process and in the post-test as an interactive assessment platform. During the teaching phase, Kahoot! was applied through short quizzes to familiarize students with the format, reinforcing listening and recognition skills. For the post-test, the researcher created a Kahoot! game of ten questions, each with a 20 second limit, where students identified the initial sound of images already practiced in class and in the pre-test, but on this occasion, the students do the activity at home using their smartphones and doing the assessment as a homework assignment. This design followed the Ministerio de Educación Pública (MEP, 2016) guidelines, which recommend assessing students using familiar vocabulary and content previously taught.

The use of a phonemic awareness post-test responds to the theoretical approach presented in the theoretical framework of this study, where phonemic awareness is addressed as a specific subcomponent of phonological awareness and as the most developmentally appropriate focus for

early EFL instruction. In accordance with the English curriculum established by MEP, first cycle students are expected to develop listening and speaking skills, particularly the recognition and production of English sounds in familiar vocabulary during the first years of primary education. Since the instructional intervention emphasized phoneme-level skills such as initial sound identification and pronunciation accuracy through technological resources, assessing phonemic awareness in the post-test ensured methodological coherence, curricular alignment, and a valid measurement of the learning outcomes targeted in this research.

The third instrument is an anecdotal record or teacher logbook, completed by the researcher during the implementation of the technological activities. This qualitative instrument allowed the researcher to record specific classroom events, student reactions, attitudes, and comments related to the use of digital tools such as Speech Solution, Jack Hartmann videos, and Kahoot!. It included brief daily notes about student engagement, pronunciation attempts, motivation, collaboration, and challenges observed during the activities. The logbook provided valuable reflective evidence of student progress and supported the interpretation of quantitative results.

The fourth instrument used in this study was a teacher questionnaire, designed to gather qualitative and descriptive information about teachers' digital competence and their use of technological resources to support phonological awareness instruction. This instrument was applied to five English teachers from Circuit 06 in Siquirres, including teachers working in rural contexts similar to La Iberia and Grano de Oro Primary Schools.

The questionnaire was created using Google Forms and included a combination of open-ended questions and multiple choice items. The open-ended questions allowed teachers to express their perceptions, experiences, and challenges in their own words, while the closed

questions helped identify patterns related to frequency of technology use, confidence levels, access to digital resources, and perceived alignment with the MEP English curriculum.

The purpose of this instrument was not to evaluate teacher performance, but to complement the student data by providing a broader professional perspective on the institutional and instructional conditions that influence the integration of technology in first cycle English classrooms. The information collected through the questionnaire contributed to the analysis of the variable digital competence of teachers and supported the interpretation of the findings in relation to the use of technological tools for phonemic awareness instruction. The complete questionnaire is included in Annex E.

The fifth instrument used in this study was a comparison chart designed to analyze the alignment between the CEFR A1 phonological descriptors and the English curriculum indicators established by the Ministerio de Educación Pública for First Cycle. The researcher developed this analytical tool to ensure that the instructional activities, assessment tasks, and learning outcomes of the intervention were consistent with both national curricular expectations and international language standards, as established by the Common European Framework of Reference for Languages.

The chart compares CEFR A1 descriptors related to listening, pronunciation, and phonemic awareness with the corresponding objectives and indicators outlined in the MEP English Program. It also identifies the classroom activities implemented in the study and the instruments used to collect evidence for each descriptor. This comparison allowed the researcher to verify curricular coherence and pedagogical validity throughout the intervention process.

The CEFR-MEP alignment chart supports the interpretation of results by demonstrating that the use of technological tools such as Speech Solution, Kahoot!, and Jack Hartmann's phonics videos was not supplementary, but directly aligned with official curricular goals for first-cycle English learners. The complete chart is presented and analyzed in Section 4.1.6.

Furthermore, these instruments were validated by professionals who work as teachers in different fields and specialists in education: Evelyn Ramirez Hernandez, an English teacher at MEP; Jonathan Trejos Camacho, an English teacher at MEP; Yanory Arguedas Carballo at Universidad Hispanoamericana, a curriculum and assessment specialist at Universidad Hispanoamericana; Dinnia Mesén Azofeifa, a Curriculum and Assessment Specialist; and Mayela Solís Alvarado, an Educational Psychologist and Philologist in 2025.

3.5 Variables (all the chart operational and theoretical definitions)

The following chart for the operational variables presents how the researcher analyzes the different variables, and the instruments used to validate them.

The operational variables chart is an indispensable component of a well-designed research study. It translates the theoretical framework and research questions into concrete, measurable actions. This systematic approach enhances the consistency and reproducibility of the research, allowing others to understand exactly how each variable was defined, measured, and validated. The chart explains the process of identifying the specific objectives, the corresponding variable for each objective, and the conceptual definition. Additionally, it includes an instrumental definition outlining the tools and techniques used to collect data. Lastly, the operational definition details how the validity of the variable is determined.

Table 3

Title: The Impact of Implementing Technological Devices (Smartphones and Laptops) and the Increase of Phonological Awareness in Students from First Cycle at La Iberia and Grano De Oro Elementary Schools in Siquirres, Circuit 06, at the Limón Regional Bureau for Education, during the Second Semester of 2025.

VARIABLES CHART

- **General Objective:** To analyze the impact of implementing technological devices (smartphones and laptops) on the development of phonological awareness in first-cycle students at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.

Specific Objectives	Variable	Conceptual Definition	Instrumental Definition	Operational Definition
To identify the level of phonological awareness skills in students before and after using technological devices at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the	Level of phonological awareness skills in students at La Iberia and Grano de Oro elementary schools.	The specific difficulties and limitations that associated with students' ability to hear, identify, and manipulate English sounds as a key element in phonological awareness.	Instruments: **a diagnostic checklist** and a pre-test to determine students' initial level of phonemic awareness. It evaluates criteria such as sound recognition, identification of initial sounds, and pronunciation accuracy.	In Checklist 1, In the diagnostic assessment, the variable is valid if the researcher observes that at least 70% of the criteria if achieved regarding the objectives of the instrument.

second semester of 2025.			**Pre-test**: a series of tasks assigned using contents that the students are studying in class. It is carried out to measure knowledge of students in the objective being evaluated.	In the pre-test the variable is valid if the researcher obtains at least 70% or more of correct answers from students who can achieve the tasks of the instrument.
To determine the availability and use of technological devices (smartphones and laptops) in the English teaching-learning process at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.	The features of technological devices (smartphones and laptops) in the English teaching-learning process	The specific characteristics and functionalities of technological devices (smartphones and laptops) in the English teaching-learning process when learning phonological awareness	**Anecdotal journal:** Journaling about students in each session to learn about their work and progress, plus motivation and attitude in class. **Post-test**: a series of tasks assigned using contents that the students are studying in class. It is conducted to assess the	In this Observational assessment, the researcher collects data in each session using technological devices to learn about the students' progress, motivation, and attitude in class. (Mini perception observation per session.

			improvement of the students with the objective being tested.	In the pre-test, the variable is valid if the researcher obtains at least 70% or more of correct answers from students who can achieve the tasks of the instrument.
To assess the digital competence of teachers regarding the integration of technology for phonological awareness instruction at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.	The digital competence of teachers regarding the integration of technology for phonological awareness instruction at La Iberia and Grano de Oro elementary schools in Siquirres,	The measurable competence of teachers regarding the integration of technology for phonological awareness instruction	Instrument: **Questionnaire** aims to identify the perception of teachers regarding the integration of technology for phonological awareness instruction	In the **questionnaire** , the variable is valid if the researcher observes that 70% or more of teachers meet the criteria of the instrument.

To examine the alignment of classroom practices with CEFR A1 phonological descriptors in the implementation of the MEP English curriculum	Alignment of CEFR A1 phonological descriptors in the implementation of the MEP English curriculum	The measurable competence of alignment of CEFR A1 phonological descriptors in the implementation of the MEP English curriculum	Comparison chart of the alignment of CEFR A1 phonological descriptors in the implementation of the MEP English curriculum	Through a deep analysis of the alignment of CEFR A1 phonological descriptors in the implementation of the MEP English curriculum

Source: Developed by David Humberto Molina Solís (2025).

Chapter IV

Analysis and Interpretation of Data

This chapter analyzes the findings related to the implementation of technological resources to enhance phonological awareness in first cycle English classrooms at La Iberia and Grano de Oro Primary Schools, Circuit 06, under the Limón Regional Bureau for Education. The information collected through different instruments was analyzed systematically to determine the effect of integrating digital tools specifically laptops and smartphones on students' ability to recognize and produce English sounds.

Through these devices, the researcher implemented several interactive resources, including Speech Solution, Kahoot!, and Jack Hartmann phonics videos, all aligned with the Action-Oriented Approach (AOA). Laptops were primarily used in class under teacher supervision to carry out listening and pronunciation activities, while smartphones were used at home as reinforcement tools to continue practice outside of school hours. This combination allowed students to connect school-based learning with home environments, ensuring ongoing exposure to English phonemes.

The instruments selected to collect data include a pre-test, a post-test, two checklists, an anecdotal journal, a teacher questionnaire, and a CEFR–MEP alignment chart. The data obtained provides meaningful insights into students' listening and pronunciation progress after the technological intervention, as well as teachers' digital competence and classroom participation. Quantitative data were collected through the pre- and post-tests, while qualitative information came from classroom observations, teacher reflections, and anecdotal records.

This section presents the description and interpretation of the data collected, focusing on students' performance before and after the use of technological devices. The first part introduces the diagnostic context and the purpose of each instrument, while the following sections describe and interpret the results obtained. Tables and figures illustrate the improvement in students'

phonemic awareness, showing their gradual ability to discriminate and produce English sounds with more accuracy and confidence.

The final section of this chapter includes an interpretation and discussion of the findings, relating the results to the specific objectives and the theoretical principles discussed in Chapter II. This analysis intends to demonstrate how the integration of laptops and smartphones used through digital tools such as Speech Solution, Kahoot!, and Jack Hartmann phonics videos can strengthen students' phonemic awareness and consequently improve their listening and speaking performance. The conclusions and recommendations presented in the next chapter are grounded on the evidence discussed in this analysis.

4.1 Diagnosis of the Current Situation

This section presents the diagnostic analysis of the current teaching and learning conditions in both La Iberia and Grano de Oro Primary Schools.

The researcher, who also serves as the English teacher in both institutions, observed the classroom environments, the availability and use of technological devices, and the students' engagement in language learning prior to the application of the technological tools Speech Solution, Kahoot!, and Jack Hartmann videos.

At La Iberia School, English classes take place in regular classrooms since there is no designated English room. The school owns one Omar Dengo Foundation cart with 29 HP laptops, 5 of which are not fully functional, and 6 tablets reserved for kindergarten. Additionally, there are 20 Dell laptops without installed programs or applications that can be borrowed from the kindergarten area with prior authorization. Each HP laptop includes a headset and a mouse.

The school's Wi-Fi connection is a monthly, limited-service 50 Mbps plan donated by a private company and is restricted to administrative use. Because of this limitation, activities requiring an Internet connection are conducted in small groups to avoid overloading the network. Electrical infrastructure is fragile, preventing the simultaneous use of multiple devices. Despite these challenges, students are motivated to use technology during lessons, and the environment encourages curiosity and engagement.

Grano de Oro School presents similar conditions, though it has an old multipurpose room used for English, Music, and Physical Education. The room is spacious but poorly equipped, with only two sockets and minimal lighting. The technological resources are limited to the Omar Dengo cart, which contains laptops in similar condition to La Iberia's. Internet access (25 Mbps) is not limited by data but has weak coverage across the school, especially in the multipurpose room. Despite these constraints, students demonstrate enthusiasm and adaptability when working with digital tools. Both principals strive to provide the minimum resources possible, but the lack of institutional budget impedes the maintenance and renewal of technological equipment.

4.1.1 Pre-test

Before applying the technological resources, a pre-test was conducted to determine the students' initial level of phonemic awareness. The instrument was designed in accordance with the MEP English Program for First Cycle and the CEFR A1 descriptors, emphasizing listening and speaking skills. The pre-test focused on five English phonemes: /ɛ/, /ɪ/, /s/, /h/, and /θ/ using familiar vocabulary such as egg, elephant, igloo, insect, student, scared, hat, hippo, thumb, and three.

The test was applied individually and consisted of two main sections: Listening and Speaking. Each student had approximately 10 to 15 minutes to complete the assessment, depending on the grade level. During the pre-test, the teacher guided the students through the exercises and recorded their responses using the diagnostic checklist. The atmosphere was kept relaxed and supportive, as this was the students' first formal exposure to phoneme recognition and production in English.

- **Listening Section (25 points total)**

The listening section was divided into two parts: phoneme identification and phoneme discrimination, with a combined maximum of 25 points.

1. Phoneme Identification (15 points):

   In this task, students listened to words pronounced by the teacher and had to match the sound they heard to the correct image. For example, after hearing /s/ student or /h/ hat, students pointed to the image that represented the correct initial sound. Each sound included two corresponding images, and points were assigned as follows:

   - 2 points: both target words correctly identified,
   - 1 point: only one word correctly identified,
   - 0 points: neither word was correctly identified.

     The total score for this part was obtained by summing the points for all items, for a maximum of 10 points.

2. Phoneme Discrimination (10 points):

   In this part, students listened to two words and had to decide whether they started with the same initial sound or with different sounds.

   Example pairs included: hat–hippo (same) and thumb–student (different).

   Each correct answer received 1 point, and incorrect answers received 0 points, for a total of 5 points.

   This task measured students' ability to perceive sound differences and recognize contrasts between English phonemes, an essential skill for developing accurate pronunciation.

- Speaking Section (10 points total)

The speaking section measured the students' ability to produce initial English sounds orally after listening to the teacher's model. Students were shown images representing the target words and were asked to pronounce them aloud, focusing on the initial sound.

Each sound was evaluated based on pronunciation accuracy, clarity, and effort to reproduce the English phoneme. Scoring was as follows:

- 2 points: both target words pronounced correctly with clear initial sound production.
- 1 point: one of the two words pronounced correctly, or both partially correct but with Spanish influence (e.g., /estudent/ instead of /student/).
- 0 points: no attempt, or both words mispronounced without a clear target sound.

The speaking section also included short feedback moments in which students repeated the sound after the teacher's correction, helping the researcher observe self-correction behavior and phoneme awareness. The total score for this section was 10 points.

- Scoring Scale and Descriptive Bands

The total pre-test score was 50 points, combining both listening and speaking results. The diagnostic checklist recorded every student's performance under three criteria: recognition, discrimination, and production.

Based on their total scores, students were classified into four descriptive bands that represent their level of phonemic awareness:

- Developing (0–19 points): The student shows limited recognition or production of English phonemes; difficulty distinguishing or articulating initial sounds.
- Emerging (20–29 points): The student demonstrates partial awareness and can identify some sounds, but with frequent confusion and limited pronunciation accuracy.
- Approaching (30–39 points): The student recognizes and produces several target phonemes correctly, showing improvement but still inconsistent accuracy.
- Ready (40 -50 points): The student accurately identifies and pronounces most target phonemes, showing strong awareness and control of initial English sounds.

These results provided a baseline to compare with the post-test and served to determine whether the integration of technological tools: Speech Solution, Kahoot!, and Jack Hartmann videos had a significant impact on students' phonemic awareness development. See Annex A

4.1.2 Diagnostic Checklist (Pre-test)

The diagnostic checklist was the main instrument used during the pre-test to register students' performance in both listening and speaking activities. It provided a structured way to document each student's level of phonemic awareness and classify their progress according to the four descriptive bands explained in the previous section. This instrument was essential for determining the validity of the variable, which was considered achieved if at least 70% of the criteria were met by the group.

The checklist included three key components: phoneme identification, phoneme discrimination, and initial sound production. For each task, the researcher observed and marked the level of achievement using a scale of 0 to 2 points per item. The information gathered was then converted into percentages to provide a quantitative overview of each group's performance.

Overall, the pre-test results revealed that students from both La Iberia and Grano de Oro schools presented low levels of phonemic awareness. The general average across all groups was 48% in listening and 38% in speaking, which indicates that most students struggled to identify and reproduce English phonemes accurately. These findings confirmed the researcher's initial observations that learners had not yet developed the ability to differentiate sounds in English and that their pronunciation was strongly influenced by their native language (Spanish).

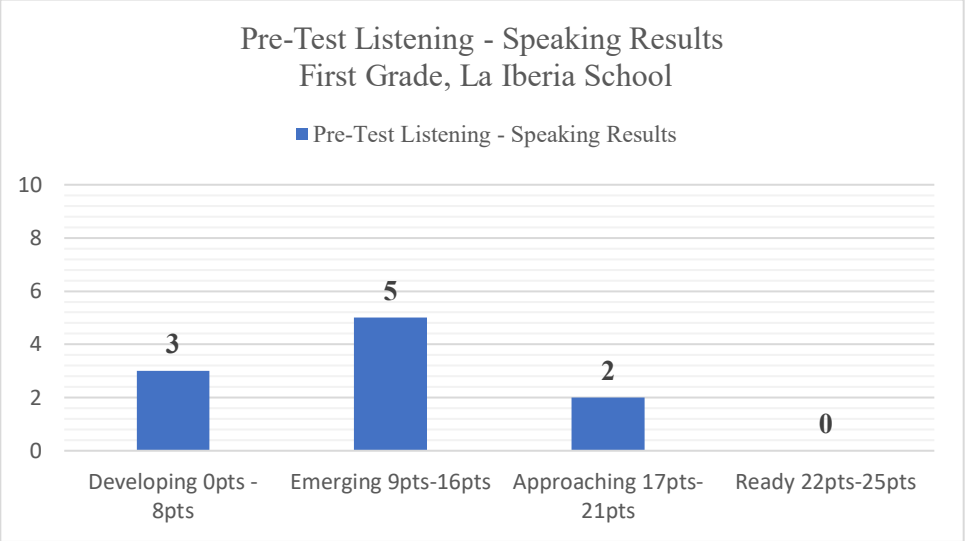
When analyzing the data per grade level, first-grade students obtained the lowest results, followed by second-grade and third-grade groups, whose averages were slightly higher but still below the expected 70% criterion. This demonstrates that exposure to English sounds alone was not enough to ensure comprehension or correct production, and that specific phonemic awareness training was needed.

Despite the overall low performance, the diagnostic checklist results also showed positive behaviors that reflected students' potential. Some students demonstrated curiosity when hearing unfamiliar sounds, tried to imitate the teacher's pronunciation, and even self-corrected after receiving feedback. These reactions indicated that although the learners lacked knowledge, they possessed a natural ability and motivation to learn through sound-based activities.

In conclusion, the pre-test and checklist results provided an accurate baseline for the research. They confirmed that phonemic awareness instruction using traditional methods was limited and that there was a clear need for implementing new strategies involving technological resources. These results supported the decision to apply Speech Solution, Kahoot!, and Jack Hartmann videos as part of the intervention phase that followed. See Annex B.

The results obtained from the diagnostic checklist and pre-test applied to identify students' initial level of phonemic awareness are presented in the following figures. These results show the performance of first, second, and third grade students from La Iberia and Grano de Oro Schools. The results are shown in Figures 1 through 7.

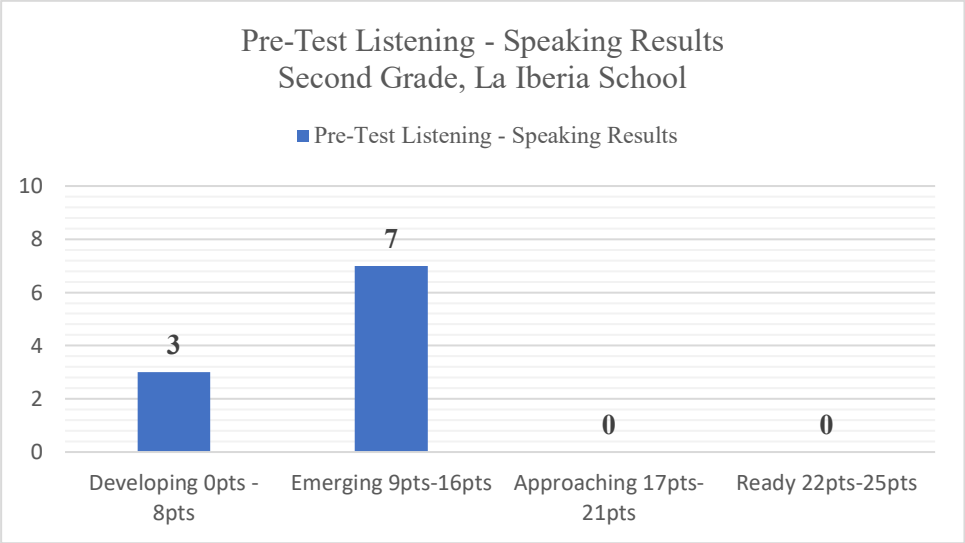
Figure 1. La Iberia School First Grade Listening and Speaking Pre-Test Results



Source: Instrument applied to determine the specific challenges and areas for improvement in English phonemic awareness initial sounds among first grade students at La Iberia Primary School before implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, September - October 2025.

Figure 1 shows the overall phonemic awareness performance of first graders at La Iberia School according to the four descriptive bands. The results indicate that most students began the process with very limited skills. Specifically, 30% of the group (3 out of 10 students) were placed in the Developing band (0–8 points), showing minimal recognition of initial English sounds. Another 50% (5 out of 10 students) fell into the Emerging band (9–16 points), demonstrating partial consistency with familiar phonemes, such as /s/, /e/, and /ɪ/, but still struggling significantly with more complex sounds like /h/ and /θ/. Only 20% of students (2 out of 10) reached the Approaching band (17–21 points), suggesting that a small portion of the class was beginning to accurately identify and produce initial sounds with occasional support. None of the students (0%) reached the Ready band (22–25 points), confirming that the group entered the intervention with a generally low baseline in phonemic awareness.

Figure 2. La Iberia School Second Grade Listening and Speaking Pre-Test Results

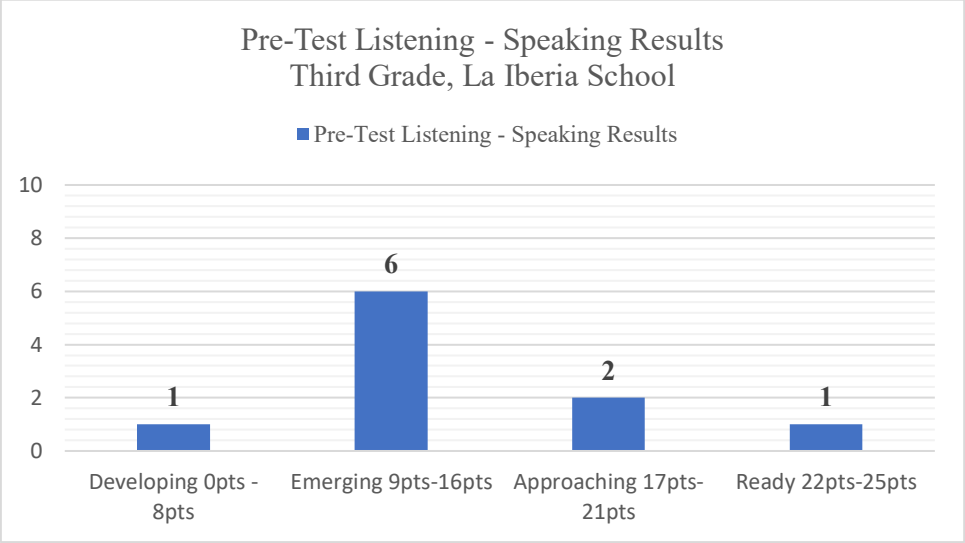


Source: Instrument applied to determine the specific challenges and areas for improvement in English phonemic awareness initial sounds among second grade students at La Iberia Primary School before implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, September - October 2025.

Figure 2 presents the distribution of second graders at La Iberia School across the four descriptive performance bands. The results show that although this group demonstrated a slightly stronger baseline compared to first grade, their overall phonemic awareness was still limited. Only 30% of the students (3 out of 10) were placed in the Developing band (0–8 points), indicating very low recognition of initial sounds. The majority of the class, 70% (7 out of 10 students), fell into the Emerging band (9–16 points), showing partial familiarity with some phonemes, particularly /s/, /e/, and /ɪ/, but still presenting noticeable difficulty with the /h/ and /θ/ sounds.

No portion of the group, 0% (no students), reached the Approaching band (17–21 points). Finally, 0% of the class (no students) scored within the Ready band (22–25 points), showing that none of the students have a stronger command of initial sounds and a more consistent phonemic foundation.

Figure 3. La Iberia School, Third Grade Listening and Speaking Pre-Test Results



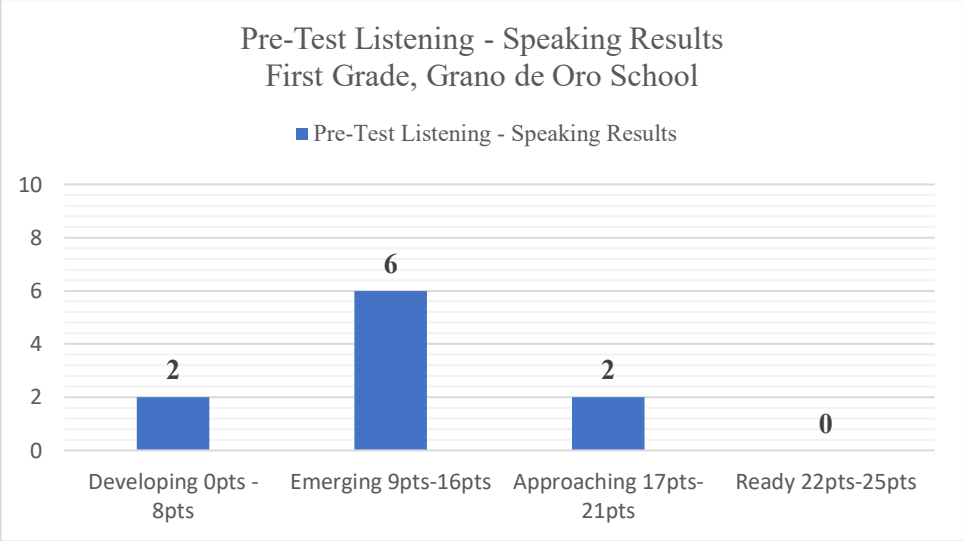
Source: Instrument applied to determine the specific challenges and areas for improvement in English phonemic awareness initial sounds among third grade students at La Iberia Primary School before implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, September - October 2025.

Figure 3 shows the phonemic awareness performance of third graders at La Iberia School, distributed across the four descriptive bands. The results indicate that although this group demonstrated a slightly stronger baseline compared to first and second grade, their overall performance still reflected significant areas for improvement. Only 10% of the students (1 out of 10) were placed in the Developing band (0–8 points), showing very limited recognition of initial English sounds.

The largest portion of the group, 60% (6 out of 10 students), fell into the Emerging band (9–16 points), suggesting partial consistency with familiar phonemes but persistent difficulties with more challenging sounds such as /h/ and /θ/. Additionally, 20% of the class (2 out of 10 students) reached the Approaching band (17–21 points), demonstrating a more solid initial understanding and the ability to recognize and produce most sounds accurately, although still requiring occasional support.

Just one student of the group, 10% reached the Ready band (22–25 points), which confirms that while some third graders showed promising initial skills, they entered the intervention with a fully developed phonemic awareness foundation.

Figure 4. Grano de Oro School, First Grade Listening and Speaking Pre-Test Results



Source: Instrument applied to determine the specific challenges and areas for improvement in English phonemic awareness initial sounds among first grade students at Grano de Oro Primary School before implementing the use of laptops and smartphones with Speech Solution, Kahoot! and Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, September - October 2025.

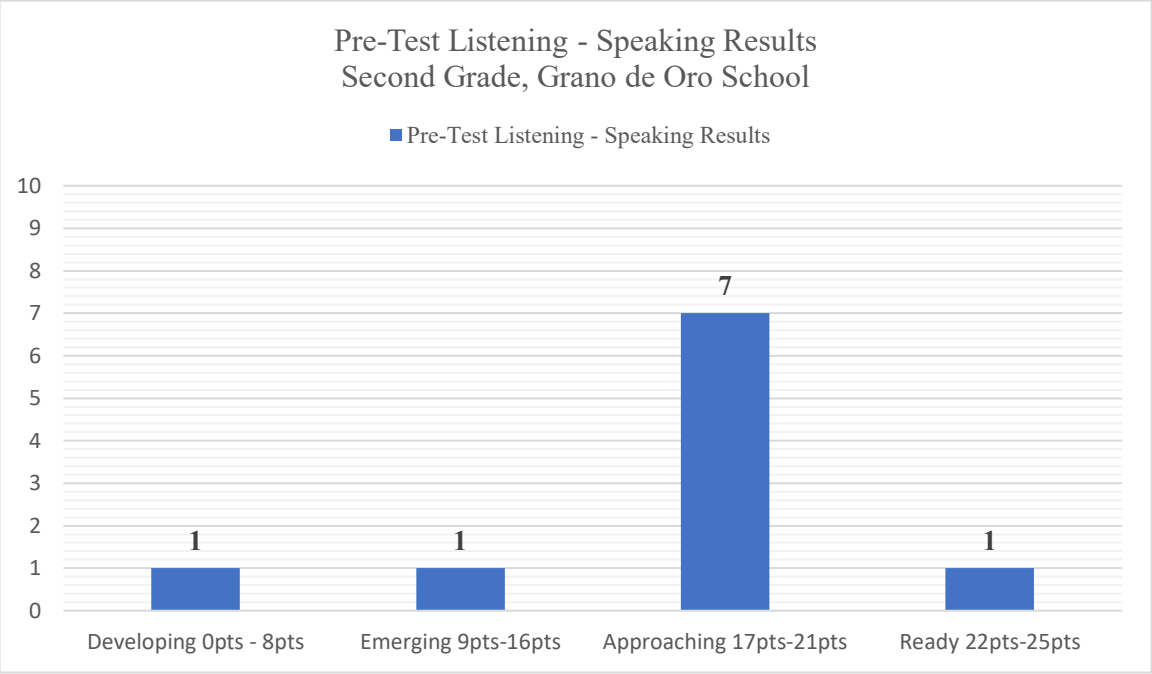
Figure 4 presents the distribution of first graders at Grano de Oro School across the four descriptive performance bands. The results show that the group entered the intervention with an overall limited level of phonemic awareness. Specifically, 20% of the students (2 out of 10) were placed in the Developing band (0–8 points), which displays very limited recognition of initial English sounds.

The majority of the class, 60% (6 out of 10 students), fell into the Emerging band (9–16 points), indicating that while students showed some consistency with common phonemes, such as /s/, /e/, and /ɪ/, they continued to experience evident challenges with the /h/ and /θ/ sounds. In addition, 20% of the group (2 students) reached the Approaching band (17–21 points), showing a

stronger baseline and the ability to identify and produce most initial sounds with occasional support.

None of the students reached the Ready band (22–25 points), confirming that although a few students demonstrated promising early skills, the group as a whole required structured instruction to strengthen phonemic awareness.

Figure 5. Grano de Oro School, Second Grade Listening and Speaking Pre-Test Results



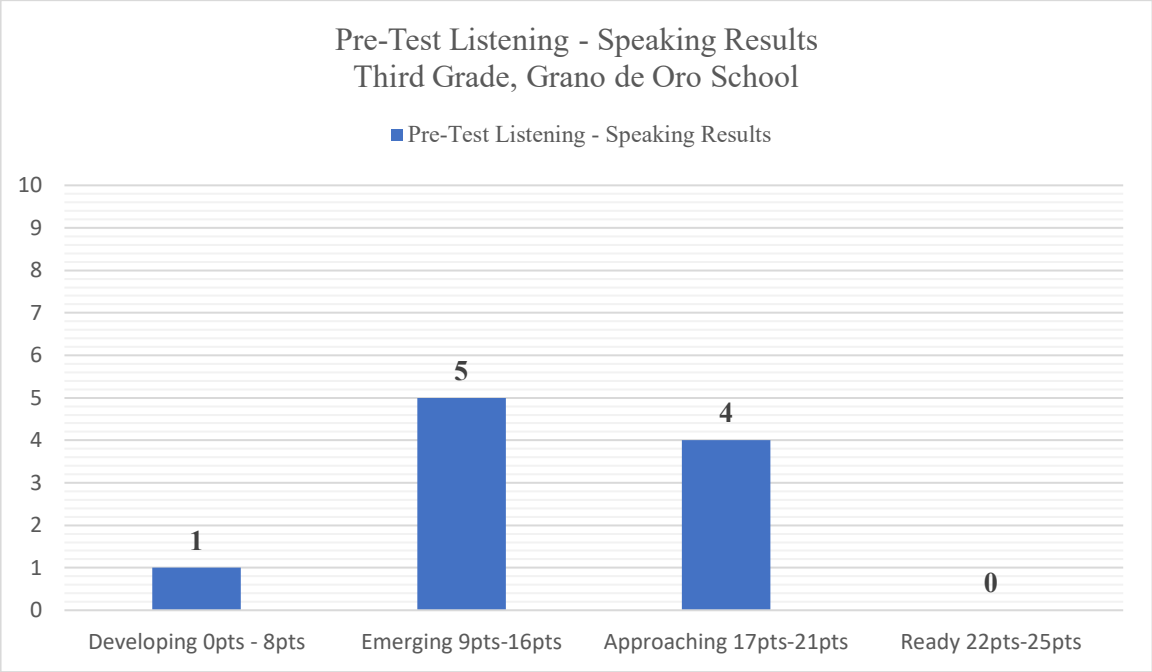
Source: Instrument applied to determine the specific challenges and areas for improvement in English phonemic awareness initial sounds among second grade students at Grano de Oro Primary School before implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, September - October 2025.

Figure 5 shows the pre-test distribution of second graders at Grano de Oro School across the four descriptive performance bands. The results reveal that, much like in La Iberia, this group demonstrated a modest baseline in phonemic awareness with a strong concentration in the middle ranges. Only 10% of the students (1 out of 10) were placed in the Developing band (0–8 points), indicating very limited recognition of English initial sounds.

One student of the class, 10% (1 out of 10 students), fell into the Emerging band (9–16 points). This suggests that while students managed to identify some common phonemes, especially /s/, /e/, and /ɪ/, students continued to show struggles with more unfamiliar sounds, such as /h/ and /θ/. In addition, 70% of students (7 out of 10) reached the Approaching band (17–21 points), reflecting a more solid initial understanding and the ability to produce most sounds with occasional support.

Another 10% of the group (1 student) reached the Ready band (22–25 points), showing a strong initial command of the target phonemes and a higher level of consistency compared to their peers. Although this single student demonstrated an advanced baseline, the group as a whole still required structured instruction to strengthen phonemic awareness before moving forward.

Figure 6. Grano de Oro School, Third Grade Listening and Speaking Pre-Test Results



Source: Instrument applied to determine the specific challenges and areas for improvement in English phonemic awareness initial sounds among third grade students at Grano de Oro Primary School before implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, September - October 2025.

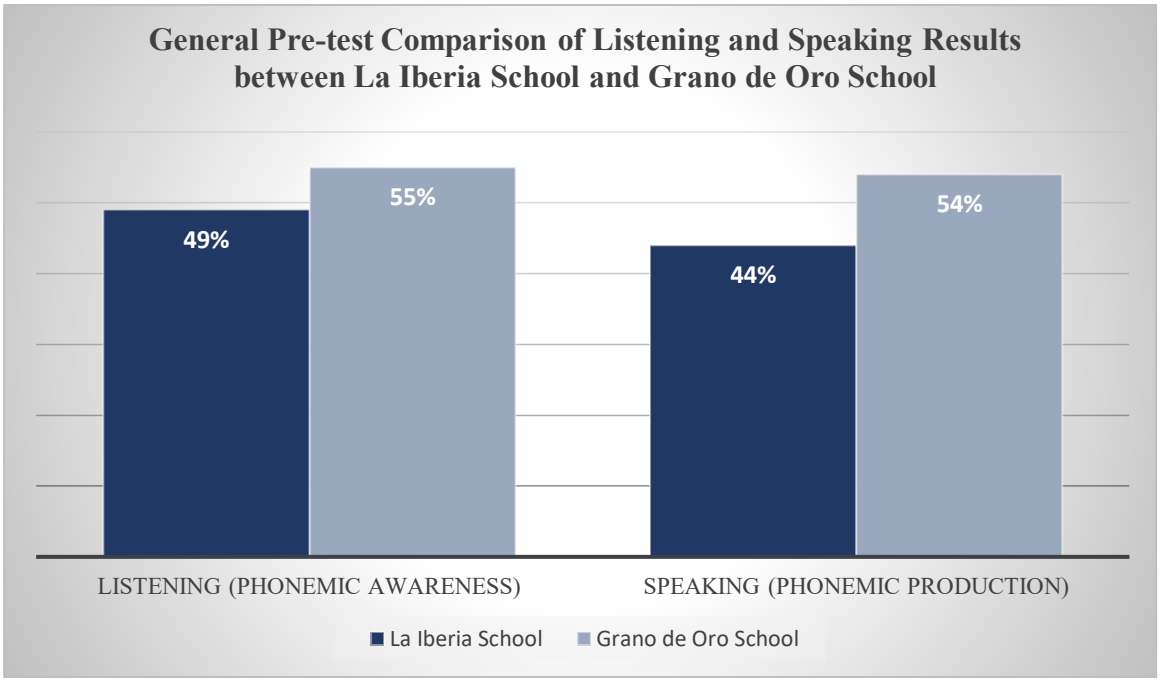
Figure 6 shows the distribution of third graders at Grano de Oro School across the four descriptive performance bands. The results indicate that although this group demonstrated the strongest baseline within the school, their overall phonemic awareness was still developing. Only 10% of the students (1 out of 10) were placed in the Developing band (0–8 points), displaying very limited recognition of initial English sounds.

Half of the class, 50% (5 out of 10 students), fell into the Emerging band (9–16 points), suggesting partial consistency with more familiar phonemes such as /s/, /e/, and /ɪ/, while still experiencing difficulty with the /h/ and /θ/ sounds. In addition, 40% of students (4 out of 10) reached the Approaching band (17–21 points), showing a stronger initial command of the target

phonemes and the ability to identify and produce most of the initial sounds with occasional support.

No students reached the Ready band (22–25 points), which indicates that even though a good portion of the class displayed promising skills, none demonstrated full mastery of the initial sounds prior to the intervention. These results confirm that structured instruction was still necessary to consolidate their phonemic awareness.

Figure 7. General Pre-test Comparison of Listening and Speaking Results between La Iberia School and Grano de Oro School



Source: Data derived from the diagnostic checklist and pre-test applied to first-, second-, and third-grade students at La Iberia and Grano de Oro Primary Schools to identify initial levels of English phonemic awareness before implementing the use of laptops and smartphones with Speech Solution, Kahoot!, and Jack Hartmann's phonics videos. Data collected and analyzed by David Humberto Molina Solís, September–October 2025.

Figure 7 presents a general comparison of pre-test listening and speaking results between La Iberia School and Grano de Oro School. The chart summarizes the average performance of first, second, and third grade students in each institution, providing an overview of students' initial phonemic awareness levels prior to the intervention.

As shown in the figure, students from both schools obtained results below the expected 70% criterion in listening and speaking. Although Grano de Oro School shows slightly higher percentages in both skills, the overall results indicate that learners from both institutions experienced similar difficulties in identifying and producing English sounds at the beginning of the study. These findings reinforce the diagnostic purpose of the pre-test and confirm the need for targeted instructional support before the implementation of technology-based activities.

4.1.3 Post-Test

A After completing the instructional phase with the technological tools, a post-test was administered to evaluate the progress students made in their phonemic awareness, specifically their ability to hear, identify, and manipulate initial English sounds. This assessment was designed to be identical to the pre-test, following the guidelines of the MEP English Program for First Cycle, which states that students must be evaluated using the same content and skills taught during instruction. For this reason, the post-test used the same five target phonemes (/Ɛ/, /ɪ/, /s/, /h/, and /θ/) and the same familiar vocabulary items practiced throughout the learning process, including egg, igloo, student, hat, and thumb.

The post-test was applied after the students completed several weeks of instruction supported by three technological tools on laptops and smartphones: Speech Solution, Kahoot!, and Jack Hartmann videos. These resources were used to strengthen students' listening and

speaking skills and to provide multiple opportunities for phonemic practice, both at school using laptops and at home using smartphones in the case of Kahoot! Together, these digital experiences aim to create a more meaningful environment for students to recognize sounds, reproduce them orally, and self-correct when necessary.

As in the pre-test, the post-test consisted of two main sections: Listening and Speaking, administered individually in a calm, supportive environment. Each student spent approximately 10 to 15 minutes completing the tasks. The teacher followed the same procedures, ensuring consistent pacing, instructions, and scoring criteria.

• Listening Section (25 points total)

The structure of the listening section remained the same to ensure reliable comparison:

1. Phoneme Identification (15 points):
2. Students listened to spoken words and matched the initial sound they heard to the correct image.
3. Scoring remained unchanged:

- 2 points: Both images were correctly identified
- 1 point: one image correct
- 0 points: both incorrect

1. Phoneme Discrimination (10 points):
2. Students listened to two words and determined whether they shared the same initial sound.

- 1 point per correct answer
- 0 points per incorrect answer

• Speaking Section (10 points total)

The speaking section again focused on students' ability to accurately produce initial English sounds after hearing a model.

- 2 points: both words pronounced correctly
- 1 point: one word correct or partially correct
- 0 points: no accurate production

This Section also allowed the teacher to observe students' growing ability to self-correct, one of the key indicators of phonemic awareness.

• Scoring Scale and Descriptive Bands

As in the pre-test, total post-test scores were classified into four descriptive bands:

- Developing (0-8 points)
- Emerging (9-16 points)
- Approaching (17-21 points)
- Ready (22-25 points)

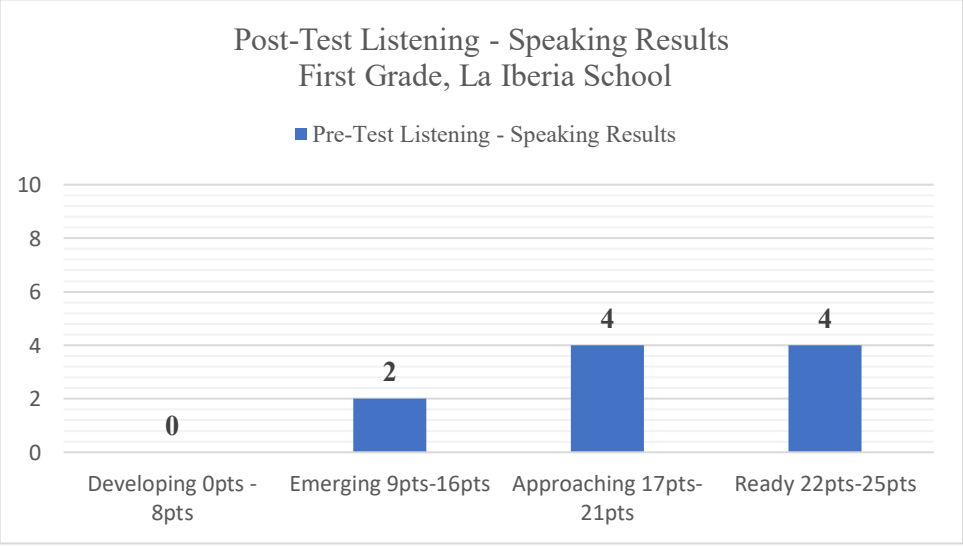
Using the same structure and descriptive scale allowed for a clear comparison between both assessments and helped determine whether the integration of technological tools

implemented through laptops at school and smartphones at home had a significant impact on students' ability to hear, identify, and manipulate initial English phonemes.

4.1.4 Post Test Checklist

The same diagnostic checklist used in the pre-test was applied again during the post-test. No changes were made to the instrument, as using the same criteria and scoring scale (recognition, discrimination, and production) allows for an accurate comparison between both assessments. The checklist was therefore used just to record and classify the students' post-test performance into the four established descriptive bands (Developing, Emerging, Approaching, and Ready). The detailed explanation of the instrument appears in Section 4.1.2. The results are shown in Figures 7 through 12.

Figure 7. La Iberia School, First Grade Listening and Speaking Phonemic Post-Test Result



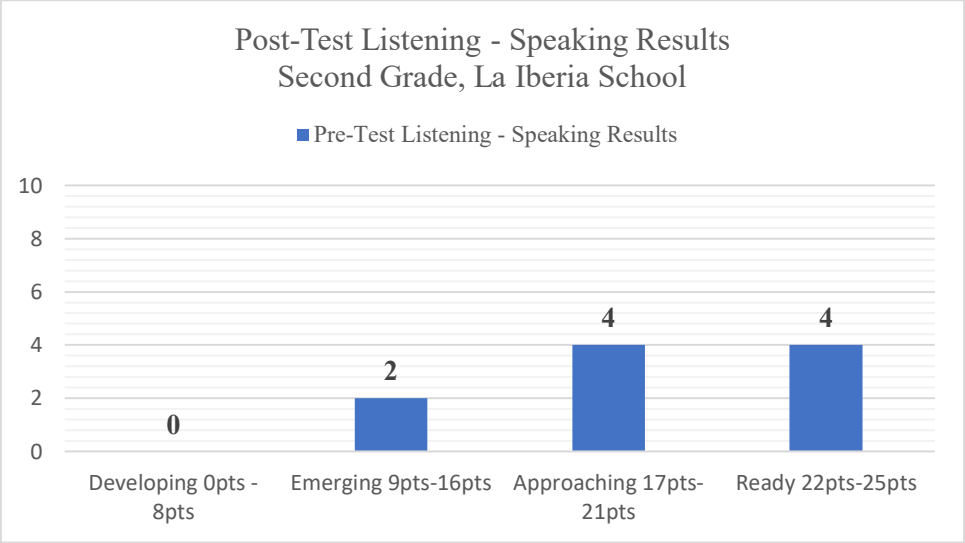
Source: Instrument applied to identify the improvement in English phonemic awareness initial sounds among first grade students at La Iberia Primary School after implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

Figure 7 shows the distribution of first graders at La Iberia School across the four descriptive performance bands in the post-test. The results reveal a notable improvement compared to the pre-test. None of the students fell into the Developing band (0%), indicating that all learners demonstrated at least a basic level of phonemic awareness after4 the instructional period.

A small portion of the class, 20% (2 out of 10 students), were placed in the Emerging band (9-16 points), showing partial consistency with the target phonemes but still presenting mild difficulty with /h/ and /θ/. The largest group, 40% (4 out of 10 students), reached the Approaching band (17-21 points), demonstrating accurate identification and production of the initial sounds with only occasional support needed.

Another 40% (4 students) achieved the Ready band (22-25 points), showing a strong baseline in recognizing and producing the target phonemes. Compared to the pre-test, when no student reached this level, the post-test results reveal substantial progress. In total, 80% of the group (8 students in the descriptive bands of approaching and ready) met the 70% benchmark for this variable.

Figure 8. La Iberia School, Second Grade Listening and Speaking Phonemic Post-Test Result



Source: Instrument applied to identify the improvement in English phonemic awareness initial sounds among third grade students at La Iberia Primary School after implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

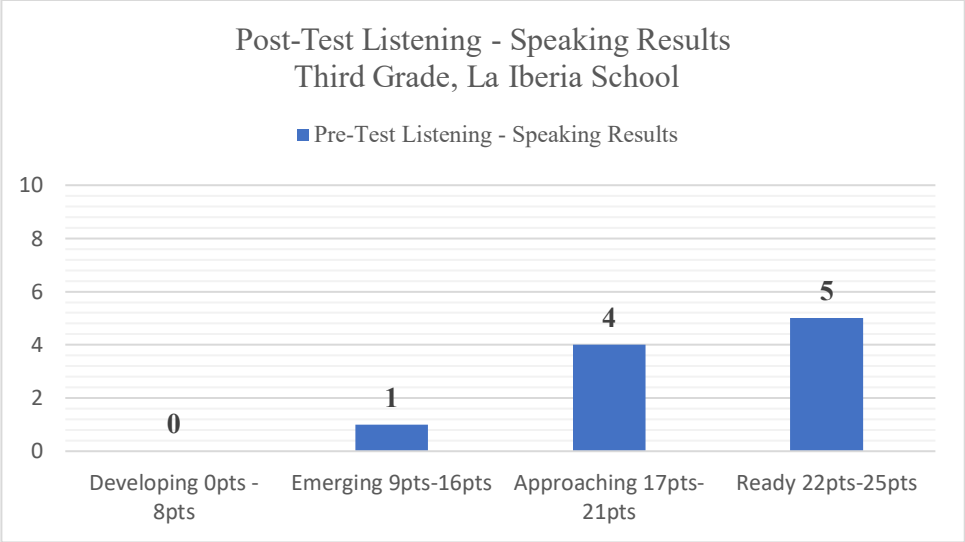
Figure 8 presents the post-test distribution for second graders at La Iberia School. As with first grade, the results show a clear and consistent improvement across the group. No students were placed in the Developing band (0%), confirming that all learners performed above the lowest level after the intervention.

A total of 20% of the group (2 out of 10 students) fell into the Emerging band (9-16 points), showing partial recognition of the phonemes but some confusion with /h/ and /θ/. Meanwhile, 40% of students (4 out of 10) reached the Approaching band (17-21 points), mainly demonstrating accurate identification and pronunciation of the target sounds.

Another 40% (4 students) achieved the Ready band (22-25 points), showing strong, consistent performance across all phonemic tasks. Compared to the pre-test, where only one student reached this level, the results indicate significant growth in phonemic awareness.

In total, 80% of the group (8 students in the descriptive bands of approaching and ready) met the 70% benchmark for this variable.

Figure 9. La Iberia School, Third Grade Listening and Speaking Phonemic Post-Test Results



Source: Instrument applied to identify the improvement in English phonemic awareness initial sounds among third grade students at La Iberia Primary School after implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

Figure 9 shows the post-test performance of third graders at La Iberia School across the four descriptive bands. The results reflect a solid improvement, positioning this group as the strongest within the school. As in the previous grades, no students fell into the Developing band (0%), which indicates that all learners surpassed the lowest performance level after the instructional period.

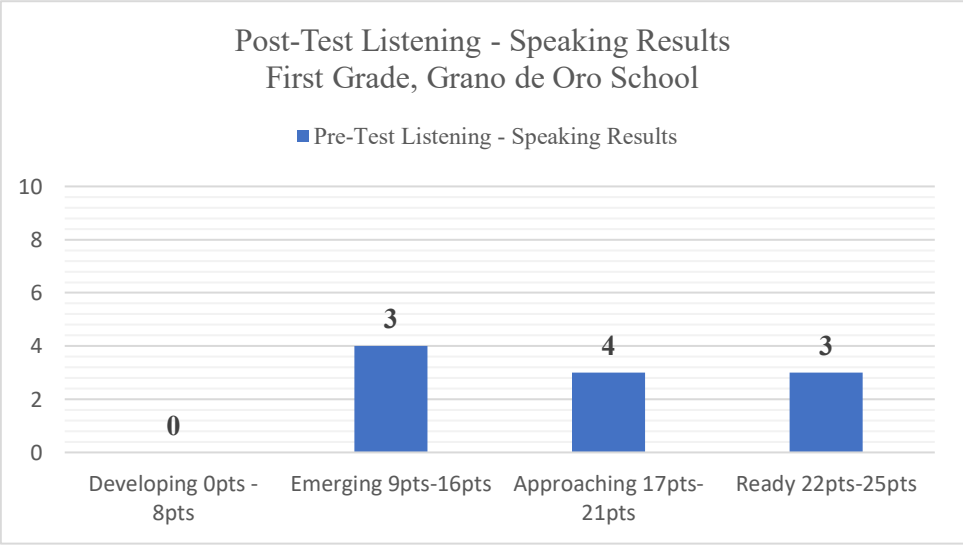
Only 10% of the class (1 out of 10 students) were placed in the Emerging band (9-16 points), showing partial consistency with familiar phonemes but still presenting some difficulty with the /h/ and /θ/ sounds. A larger portion of the class, 40% (4 out of 10 students), reached the

Approaching band (17-21 points), demonstrating accurate recognition and production of the initial sounds with occasional support.

The highest-performing group consisted of 50% of students (5 out of 10) who achieved the Ready band (22-25 points), demonstrating firm control of the target phonemes and consistent accuracy across the listening and speaking tasks. Compared to the pre-test, where no student reached the Ready level, this represents a substantial evolution in their ability to hear, identify, and manipulate English initial sounds.

Overall, 90% of the third-grade group met the 70% standard (9 students in the descriptive bands of approaching and ready) making this the highest performing grade at La Iberia in the post-test.

Figure 10. Grano de Oro School, First Grade Listening and Speaking Phonemic Post-Test Results

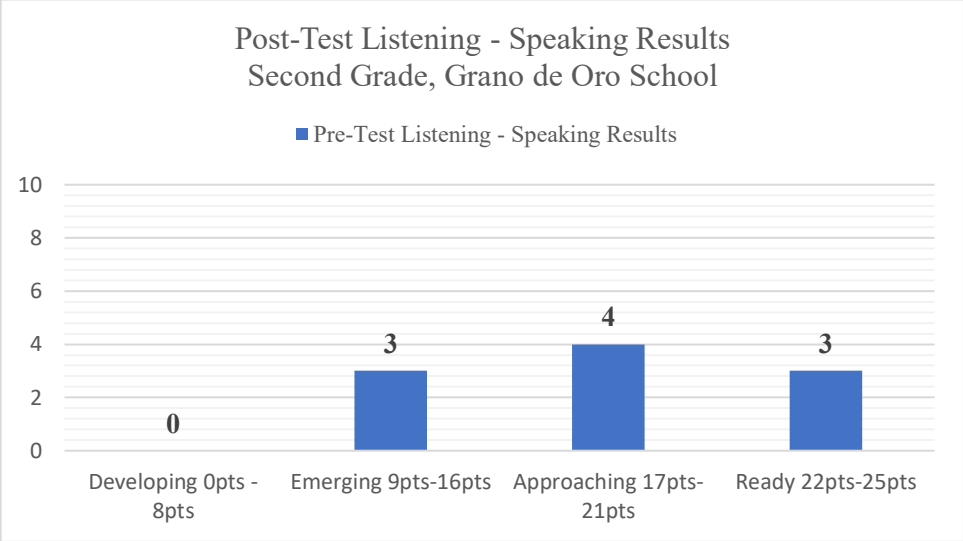


Source: Instrument applied to identify the improvement in English phonemic awareness initial sounds among first grade students at Grano de Oro Primary School after implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

The post-test results for first grade at Grano de Oro show a clear and meaningful improvement in students' phonemic awareness after the implementation of technological tools. None of the students remained in the Developing band, which already reflects a positive shift from the pre-test. Three students (30%) were placed in the Emerging band, demonstrating partial control of the initial English sounds but still requiring support, particularly with /h/ and /θ/. Four students (40%) reached the Approaching band, showing consistent recognition and production of most target phonemes. Additionally, three students (30%) achieved the Ready band, indicating strong awareness and accurate articulation of initial sounds such as /s/, /ɛ/, and /ɪ/.

When grouping the Approaching and Ready students, those who met the expected benchmark, the results show that 7 out of 10 students (70%) successfully reached the required level of achievement. According to the operational definition for this instrument, the variable is considered valid when at least 70% of students met the 70% benchmark scoring within the higher bands.

Figure 11. Grano de Oro School, Second Grade Listening and Speaking Phonemic Post-Test Results



Source: Instrument applied to identify the improvement in English phonemic awareness initial sounds among second grade students at Grano de Oro Primary School after implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

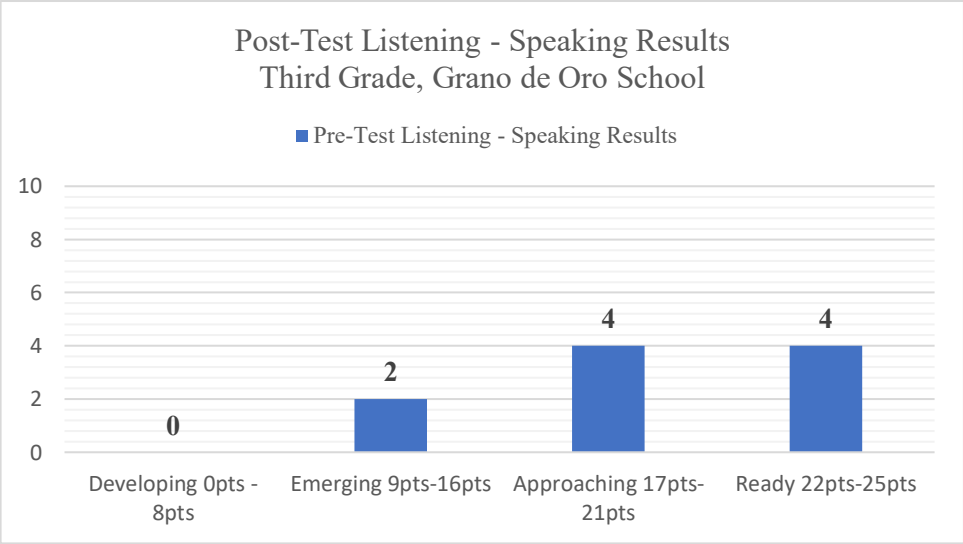
Figure 11 presents the post-test performance of second graders at Grano de Oro School, showing clear improvements across all levels. As with the other groups, there were no students in the Developing band (0%), indicating that all learners surpassed the lowest level after the instructional intervention.

A total of 30% of the group (3 out of 10 students) were classified in the Emerging band (9-16 points), demonstrating partial awareness of initial sounds but still showing some confusion with /h/ and /θ/. The most significant portion of the class, 40% (4 students), reached the Approaching band (17-21 points), mainly showing accurate recognition and production of the target phonemes with only occasional support.

Additionally, 30% of the students (3 out of 10) were placed in the Ready band (22-25 points), reflecting strong and consistent control over the initial sounds. Compared to the pre-test, where only one student reached this level, the group shows notable growth in phonemic awareness.

In total, 70% of the second-grade group (7 students in the Approaching and Ready descriptive bands) met the 70% benchmark.

Figure 12. Grano de Oro School, Third Grade Listening and Speaking Phonemic Post-Test Result



Source: Instrument applied to identify the improvement in English phonemic awareness initial sounds among third grade students at Grano de Oro Primary School after implementing the use of laptops and smartphones with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

Figure 12 shows the post-test distribution for third graders at Grano de Oro School. This group demonstrated the strongest overall results within the institution. As with the previous classes, no students were placed in the Developing band (0%), confirming that all learners performed above the minimum threshold after the intervention.

Only 20% of the class (2 out of 10 students) were placed in the Emerging band (9-16 points), suggesting that most of the group had overcome the earlier difficulties with unfamiliar sounds such as /h/ and /θ/. A larger portion of the class (40%, four students) reached the Approaching band (17-21 points), demonstrating accurate identification and production of the target phonemes.

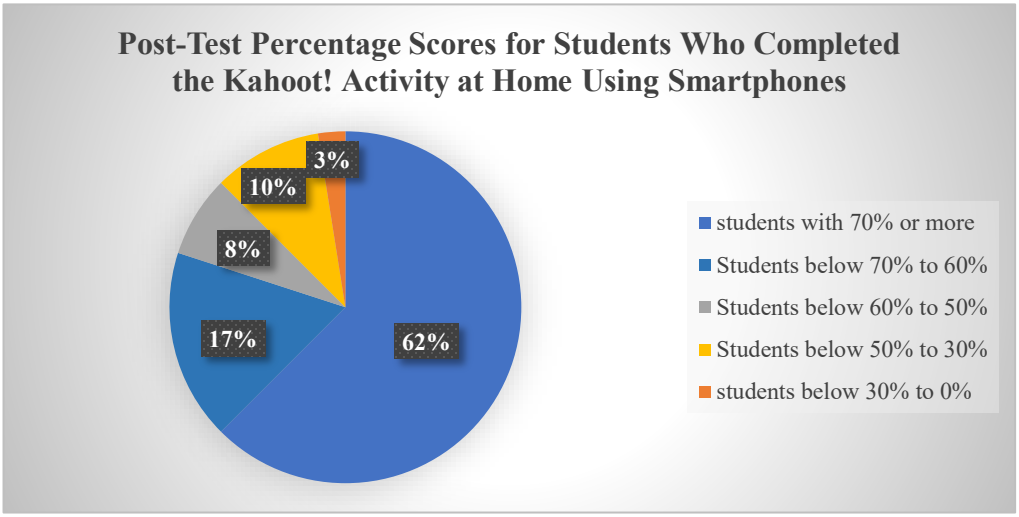
Another 40% of the students (4 out of 10) achieved the Ready band (22-25 points), demonstrating strong consistency and precise control of the initial sounds. This result reflects a remarkable improvement when compared to the pre-test.

Overall, 80% of the third-grade group (8 students in the Approaching and Ready descriptive bands) met the 70% benchmark, making them the highest-performing class in Grano de Oro on the post-test.

- **Kahoot Homework Assignment Analysis**

To complement the post-test findings, students also completed an online homework activity using Kahoot!, a digital quiz platform accessed through smartphones at home. This activity was designed to reinforce the same five target phonemes practiced during the intervention /e/, /ɪ/, /s/, /h/, and /θ/ through listening and visual recognition tasks aligned with CEFR A1 and the MEP First Cycle Program. The purpose of including Kahoot! was not only to extend phonemic practice beyond the classroom but also to observe students' ability to transfer what they learned using technology in an autonomous environment.

Figure 13. Post-test Scores for Students who completed the Kahoot! Activity at home using smartphones



Source: Online instrument applied to identify the improvement in English phonemic awareness initial sounds among students at Grano de Oro Primary School and La Iberia School, after implementing the use of laptops with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

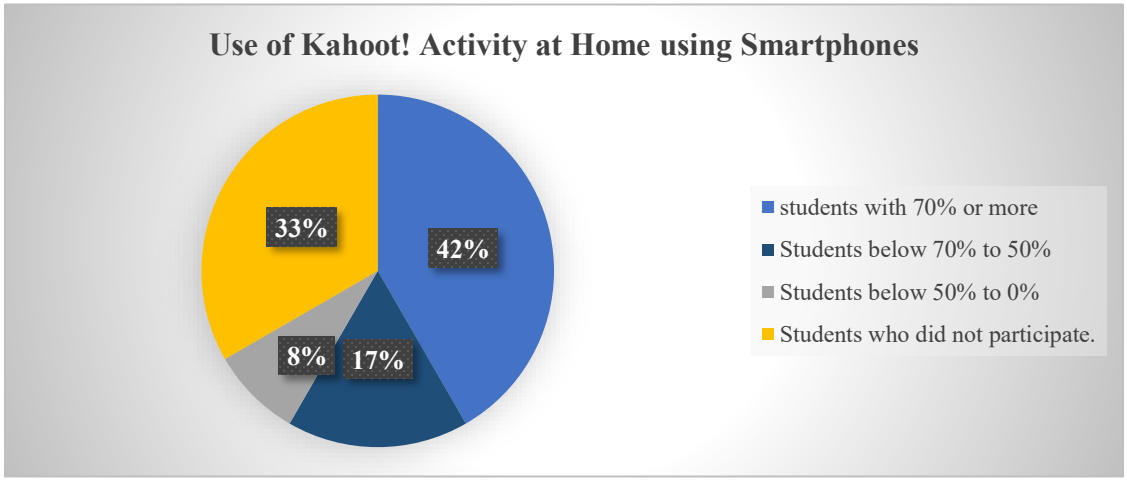
The chart displays the post-test percentage scores for students who completed the Kahoot! activity at home. Out of the total participants who engaged with the task, 62% achieved a score of 70% or higher, which indicates a strong level of mastery and retention of the target sounds. These students demonstrated consistency when identifying initial phonemes and showed clear evidence of the progress described in the post-test results. Meanwhile, 17% scored between 70% and 60%, suggesting partial mastery with occasional confusion in similar sounds such as /h/ and /ɪ/. An additional 8% achieved scores between 60% and 50%, while 10% fell between 49% and 30%, and 3% scored below 30%, indicating difficulties in completing the activity or limited recognition of the target sounds.

In the Kahoot!, In classwork and homework assignments, the researcher implemented a challenge in question 3 using “sleepy instead of scared,” in question 1 using “snake instead of

scared“, and in question 8 using “thin instead of three.” Those vocabulary words are ones that students across the three levels identify immediately because the researcher, as the regular English teacher, uses them to target the initial sound during vocabulary practice or phonemic awareness lessons.

These results reflect the expected variation within a rural context where some students depend heavily on family support or intermittent internet connectivity. Still, the fact that nearly two-thirds of participants reached the mastery threshold demonstrates that the technological intervention was meaningful and accessible for a majority of learners.

Figure 13. Post-test Scores for Students who completed the Kahoot! Activity at home using smartphones



Source: Online instrument applied to identify the improvement in English phonological awareness of initial sounds among students at Grano de Oro Primary School and La Iberia School, after implementing the use of laptops with Speech Solution, Kahoot! And Jack Hartmann´s videos. Data collected by David Humberto Molina Solís, October - November 2025.

The second chart (Figure 14) shows the overall participation in the Kahoot! homework. In this case, 42% of students completed the activity and attained the expected mastery range (70% or more). Another 17% participated but scored between 70% and 50%, and 8% performed below 50%, which is consistent with the challenges observed during the pre-test and in-class tasks. A significant 33% of students did not participate in the activity at all. This absence is particularly relevant because it provides insight into the broader challenges faced in rural educational contexts, such as limited access to devices, unstable internet connections, or lack of parental guidance at home.

Despite these constraints, the majority of participating students showed meaningful progress. The results suggest that when students have access to smartphones and clear guidance, they can successfully use digital tools to reinforce phonemic awareness. Furthermore, the improvements observed in Kahoot! are aligned with the gains documented in the post-test, supporting the idea that technology created opportunities for practice, repetition, and independent learning.

Overall, the Kahoot homework results strengthen the evidence that integrating technological resources, specifically smartphones and interactive digital platforms, had a positive effect on students' recognition of English phonemes. Even though participation was not universal, the students who engaged with the tool were able to connect classroom learning with autonomous practice at home, which is a meaningful achievement within this rural educational environment.

Global Summary Findings

The results obtained throughout this study reveal a clear and meaningful progression in students' phonemic awareness after the integration of technological tools such as Speech Solution, Kahoot!, and Jack Hartmann videos. The pre-test established a baseline marked by limited recognition and production of the target English phonemes (/e/, /ɪ/, /s/, /h/, and /θ/). Across both schools, La Iberia and Grano de Oro, most students initially fell within the Developing and Emerging bands, indicating partial understanding and frequent confusion in identifying or producing English initial sounds. Very few students demonstrated readiness at the beginning of the process, confirming the need for structured and engaging phonemic support.

After the intervention, the post-test results demonstrated consistent and noticeable improvement in every grade level across both institutions. A significant number of students advanced to the Approaching and Ready bands, showing greater accuracy in recognizing and producing the target phonemes. Many students who previously struggled in the pre-test demonstrated clearer pronunciation, stronger discrimination between similar sounds, and improved confidence when responding orally. In all six groups, the majority of students reached the 70% mastery criterion, which was defined as the operational target of the research variable. This consistent pattern suggests that the integration of technology supported students in achieving the expected outcomes established by the CEFR A1 descriptors and MEP First Cycle Program.

The Kahoot! homework results further reinforced these findings. Even though participation was affected by rural connectivity limitations and the level of home support, the students who completed the activity showed encouraging performance. 62% of participants achieved scores of 70% or higher, indicating that students were able to transfer their learning from the classroom to

an autonomous environment using smartphones. The overall participation chart also showed that 42% of the total population mastered the activity, indicating that technological tools can indeed extend learning beyond the school setting, especially when students are motivated by interactive, familiar digital formats.

These results show a positive and consistent trajectory from the pre-test to the post-test and through the independent homework activity. The data suggest that implementing technological resources in rural classrooms can effectively support phonemic awareness, even within contexts where access to digital devices and connectivity is limited. Students demonstrated not only progress but also engagement, which is a key factor in early literacy development. Additionally, the tools used allowed the teacher to personalize feedback, reinforce challenging sounds, and provide repeated exposure to elements that are essential for the acquisition of phonemic awareness in a foreign language.

Overall, the findings confirm that the use of technology when applied with structure, purpose, and sensitivity to the rural context can become a valuable pedagogical supporter. The improvements observed across the six groups indicate that students benefited from having multiple modes of exposure to English phonemes: visual, auditory, interactive, and autonomous. These combined experiences helped them strengthen their early reading readiness in a second language, preparing them more confidently for the literacy demands of the following academic levels.

4.1.4 Anecdotal Journal

The researcher maintained a reflective logbook throughout the implementation stage to record the progress of the intervention, students' attitudes, and the effectiveness of the technological resources used during English lessons. Each session was observed and described in terms of participation, motivation, and challenges related to phonemic-awareness development. The following entries summarize the most relevant classroom experiences documented during the four-week implementation period.

Day 1: Introduction to Technological Tools (40 minutes)

During the first session, students were introduced to the structure of the phonemic-awareness lessons and to the three main technological tools that would be used: Jack Hartmann videos, Kahoot!, and the Speech Solution program. The teacher explained that Jack Hartmann's songs would be used to model authentic English pronunciation of initial sounds in a fun and energetic way, Kahoot! would serve as an interactive game for classroom contests and reviews, and Speech Solution would allow students to visualize and practice mouth and tongue positions while producing the target phonemes.

The session began by exploring the sounds that would be practiced in the coming weeks. Students observed how the Speech Solution software displayed the correct articulation of each sound. From the very beginning, learners showed visible enthusiasm and curiosity; they laughed, participated, and asked questions about how to use the programs. Across all six groups, first, second, and third grades, the reaction was consistently positive. This strong motivation confirmed that introducing technology into the English class generated high engagement and emotional connection, setting a positive foundation for the following sessions.

Day 2: Pre-Test Application Day

On the second day of the intervention, the teacher-researcher dedicated three full lessons with prior authorization to the application of the phonemic awareness pre-test in all six groups. In La Iberia School, this assessment was conducted on Friday, while in Grano de Oro it was administered the following Monday. The session focused exclusively on evaluating students individually using printed image cards and the official diagnostic checklist (see Annex A).

During this day, the teacher maintained a calm and supportive environment to help students feel comfortable with the test. To ensure clarity, all instructions were provided in Spanish, allowing students to understand the task without anxiety. This was especially important because the assessment was formal yet still aligned with the way students are regularly evaluated in listening and speaking activities. Students were already familiar with pointing at picture cards and responding orally, as this method is part of their ongoing oral evaluations in English.

At the beginning, several students appeared distracted or hesitant. To keep them engaged, the teacher explained that this activity counted as a 10% classwork grade, which immediately helped capture their attention and encourage a more serious attitude toward the task. This strategy proved essential, especially in first grade, where students had never received English instruction in kindergarten. This gap was reflected in their performance: many first graders struggled to recognize or identify English initial sounds, revealing an important starting point for the intervention.

The pre-test produced highly variable results across the groups, showing differences in prior exposure and phonemic development. Some students performed confidently, while others needed

constant encouragement to attempt to make the sounds. In every case, the teacher provided patience, motivation, and emotional support to ensure students completed the assessment.

By the end of the day, all 60 students (10 per group) had been evaluated. The teacher then began gathering the results from the checklist, organizing them carefully to determine each student's descriptive band before beginning the technological intervention.

Day 3: First Practice with the Speech Solution Program

During the second session, students began working directly with the Speech Solution program. Their excitement was evident from the start, as they had been waiting nearly a week to begin this phonemic-awareness sequence. Each student worked individually at a computer using headsets, allowing them to listen, repeat, and monitor their own pronunciation.

The lesson focused on the initial sound /s/. To begin, the teacher introduced the sound using Jack Hartmann's videos, which modeled both letter recognition and pronunciation through rhythmic movement and repetition. Students first practiced the sound while standing beside their computers, tracing the letter shape in the air and articulating the /s/ sound with the video.

Afterward, students explored Speech Solution to observe how the sound is produced. They used the program's visual interface to examine the position of the tongue, lips, and airflow. For two minutes, students practiced independently, listening to their own production of the sound and comparing it with the model. The session ended with a second Jack Hartmann video, which reinforced vocabulary associated with the initial letter S. Students were required to recall the words at the end of the video and match them with the correct initial sound.

Across all three groups at La Iberia School, students showed consistent motivation and engagement. Many were fascinated by the way the software displayed mouth movements, and

one student made a particularly thoughtful observation, commenting: “Teacher, it’s curious how we make sounds like animals do.” This reflection demonstrated that technological tools could spark not only motivation but also metacognitive awareness, as students began to think critically about how sounds are formed and the physical process of speaking. The session reaffirmed that technology could create meaningful spaces for curiosity, analysis, and self-reflection in young learners.

Day 4 – Practicing the / Ɛ/ /θ/ Sounds and Integrating Kahoot! for Reinforcement

The third session was conducted at La Iberia and Grano de Oro Schools on different days but following the same methodological sequence. The lesson focused on the initial vowel sound /e/ (the epsilon phoneme). The same structure from Day 2 was maintained: first exposure and modeling through Jack Hartmann videos, followed by guided and independent pronunciation practice using the Speech Solution program, and finally reinforcement of vocabulary and phonemic recognition through a Kahoot! The game is projected with the video beam.

Students reviewed the sounds of the letters E and S through multimedia tasks that combined listening, repetition, and image recognition. Attendance, however, was affected by absenteeism, a recurrent situation in rural schools; several students were absent and therefore missed the day’s practice. Those who attended were highly engaged and showed great motivation to continue using the technological tools.

The Kahoot! activity was particularly motivating. The class participated in a “Rematch Contest,” a year-long challenge where groups accumulate points and compete for prizes. For this lesson, the competition was set as Boys vs Girls. Students had ten seconds to identify the initial sound of each displayed word by selecting the correct letter corresponding to the image shown.

The game promoted spontaneous use of listening and pronunciation skills while maintaining a playful, cooperative spirit.

Interestingly, in all six groups across both schools, the girls obtained higher scores in both the speaking production and the Kahoot! recognition rounds. The activity not only provided laughter and excitement but also maintained clear academic focus, demonstrating that gamified learning can sustain motivation and attention even in large, mixed-ability rural classes.

Day 5: Practicing Short /Ɛ/ and /h/ Sounds Through Collaborative Kahoot! Activities

The fourth session focused on the short vowel /e/ and the initial consonant /h/ sounds. The lesson followed the same thematic sequence as previous sessions: modeling through Jack Hartmann videos, articulation practice using Speech Solution, and reinforcement through an interactive Kahoot! activity. Students first watched and repeated the target sounds using the videos and software, identifying how mouth and tongue positions changed when pronouncing /e/ and /h/.

After completing the pronunciation practice, the class participated in a short, informal Kahoot! activity, similar to the previous Rematch Contest but designed primarily for exploration and collaboration. This time, selected students went to the front of the classroom to manipulate the computer and participate directly in the game, while their peers supported them by calling out answers and giving suggestions within the ten-second limit for each item. The teacher served as an observer, guiding the dynamics but allowing students to lead the process and negotiate answers collaboratively.

This approach created a collaborative and participatory classroom atmosphere, encouraging peer interaction and shared responsibility for learning. Students were able to discuss, predict, and

correct one another's answers, demonstrating genuine engagement and cooperative learning. The activity was conducted successfully with all six groups, three at Grano de Oro School and three at La Iberia School, with approximately sixty students participating overall. The students' enjoyment and involvement confirmed that technology-supported tasks can effectively promote active learning, communication, and teamwork, consistent with the Action-Oriented Approach advocated by the MEP (2016).

Days 6 and 7: Final Sessions and Post-Test Practice with Speech Solution

The last two sessions focused on individual and peer practice before the administration of the post-test. Each group worked for approximately forty minutes, using the Speech Solution program as the main technological resource. During this activity, students recorded their own voices while producing the target phonemes previously studied: /s/, /ɛ/, /ɪ/, /h/, and /θ/. After each recording, learners listened to their own pronunciation and compared it with the native model provided by the software.

The teacher guided students to reflect on whether their production sounded similar to the target sound. If necessary, they were encouraged to re-record and repeat the sound until they felt improvement. Once individual practice was completed, students worked in pairs to share and discuss their recordings. Peer feedback became a meaningful part of this process: for example, students often identified common pronunciation issues such as inserting an extra vowel sound before /s/ (e.g., "a student" instead of "student"). The teacher monitored these exchanges, offering corrective feedback and modeling the correct articulation whenever both partners produced the same error.

This collaborative structure allowed students to become active agents of their own learning. Rather than relying solely on teacher correction, they began to self-monitor and self-evaluate their pronunciation. The sessions revealed that when learners are given structured opportunities to listen, analyze, and reflect on their own speech, they demonstrate increased confidence and awareness of how English sounds differ from Spanish phonology.

The activity was carried out with all six groups, first, second, and third grades from both La Iberia and Grano de Oro Schools, and it represented a significant transition from guided practice to autonomous performance. These two sessions closed the implementation stage, preparing students for the formal post-test evaluation while consolidating their understanding of the initial phonemes through technology-based, reflective learning.

Day 8: Post Test Evaluation

The final day of the intervention was dedicated to the administration of the post-test, applied after completing all technological sessions with Speech Solution, Jack Hartmann videos, and Kahoot!. The evaluation required two full lessons per school. At La Iberia, it took place on Thursday, while at Grano de Oro it was conducted on Tuesday. As in the pre-test, the teacher assessed 10 students per group, reaching a total of 60 students between both institutions. A few students were absent on the assigned day; however, the post-test was applied to them individually as soon as they returned to class, ensuring that every student completed the process.

The atmosphere during this session felt different from the pre-test. Students showed greater confidence and curiosity as they listened carefully to the sounds, analyzed the options, and attempted to produce the correct initial phonemes. One of the most significant and heart-warming observations was how students self-corrected as soon as they realized they were

producing the sound inaccurately. When the teacher offered them the opportunity to reconsider their response, simply asking, "¿Quieres pensarlo otra vez? Many students paused, analyzed the sound again, and selected the correct answer. This demonstrated not only knowledge, but also metacognition, something rarely seen in first-cycle English lessons without technological support.

Some students required minimal guidance from the teacher-researcher, especially when distinguishing the /h/ or /θ/ sounds, but even in those cases, the difference from the pre-test was clear. Students attempted the sounds with determination, often remembering the visual cues from Speech Solution on how the tongue moved, how the lips shaped the sound, or how Jack Hartmann exaggerated the articulation in his videos. Others recalled the competitive moments from the Kahoot "Rematch" activities, smiling when they recognized words they had practiced in those challenges.

Throughout the evaluation, it was evident that students were not simply repeating a memorized word. Instead, they were thinking, comparing, and applying what they had learned across the eight sessions. This reflective behavior, which is rare in many rural primary classrooms, became one of the most meaningful outcomes for the researcher.

From a professional and personal standpoint, this post-test day was deeply fulfilling. Even with years of experience teaching English in primary education, this process offered a new perspective on how phonemic awareness can be taught more effectively. Moving beyond worksheets and simple memorization, the integration of laptops, smartphones, and multisensory digital tools helped students create genuine awareness of English initial sounds. Their progress, their curiosity, and their willingness to self-correct highlighted the real impact of combining technology with clear phonemic instruction.

The results of this post-test, presented in the following section, confirm this growth and provide solid evidence of the positive influence of technological tools on the development of phonemic awareness in both schools.

4.1.5 Teacher´s Questionnaire

In order to complement the findings with a broader professional perspective, a short questionnaire was administered to five English teachers from Circuit 06 in Limón, Siquirres, including the colleague who collaborates with the researcher at Grano de Oro School. To make this questionnaire more reliable and realistic to the rural situation where this investigation takes place, the researcher invited teachers who work in similar rural contexts and who face comparable technological and instructional conditions. The questionnaire was created through Google Forms and included both open ended questions, which allowed teachers to express their perceptions in their own words, and multiple-choice items, which helped identify common patterns in their digital competence and access to technological resources. The purpose of gathering this information was not to judge teachers, but to better understand the level of support, training, and availability of digital tools that currently shape phonemic awareness instruction in rural public schools. These teachers´ insights enrich the analysis by providing a realistic view of the opportunities and limitations that influence the integration of technology in first cycle English classrooms. See Annex E.

General Information

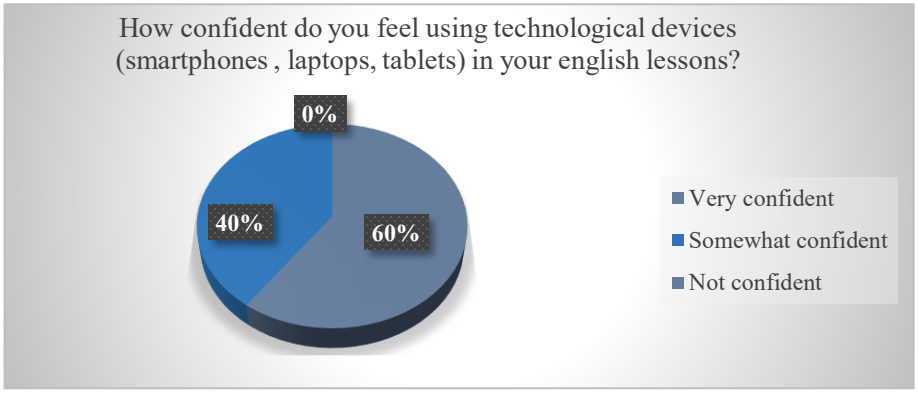
Question 1 What is teacher digital competence?

All five teachers provided short but meaningful definitions. Most of them associate digital competence with the ability to use technological tools effectively in the teaching process. One teacher defined it as “the skill a teacher has to use and apply technology in the classroom”, while another described it as “the level of knowledge a teacher has to implement tech resources in class.” A recurring idea across the responses is that digital competence is both knowledge and practical skill, and that it involves selecting the right tools rather than simply having access to devices. Although none of the teachers used technical terms from official frameworks, their answers show an intuitive understanding that digital competence involves handling devices, platforms, and programs to support learning.

Overall, the responses indicate that teachers in Circuit 06 have a basic conceptual understanding of digital competence, even if they lack formal terminology or deeper training.

Question 2 How confident do you feel using technological devices (smartphones, laptops, tablets) in your English lessons?

Figure 1. Confidence using technological devices in English lessons.



Source: Instrument applied to determine how teacher feel using technological devices in their English lessons. Data collected by David Humberto Molina Solís, October -November 2025.

The results indicate that most teachers show a positive attitude toward the use of technological devices in their English lessons. According to the data, 60% of the teachers (3 out of 5) reported feeling very confident using tools such as smartphones, laptops, or tablets during instruction. Meanwhile, 40% (2 out of 5) indicated feeling somewhat confident, demonstrating that although they use technology regularly, they still experience occasional limitations or uncertainty when applying specific resources or platforms.

Importantly, none of the teachers selected the “Not confident” option (0%), which highlights that all participants possess at least a basic operational competence when integrating digital tools into their instructional practices. Overall, these results reflect a generally favorable digital disposition among teachers in Circuit 06 and align with the movement toward incorporating ICT in English education.

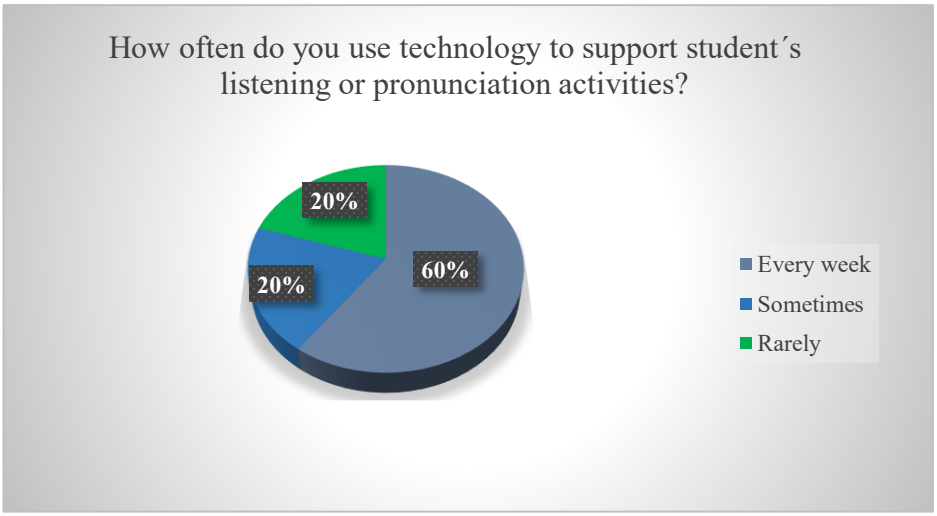
Question 3. What digital tools have you used for phonological awareness?

Teachers reported using a variety of tools, ranging from simple devices to more interactive platforms. Some mentioned video beam projectors, computers, digital books, and YouTube, while others added smartphones, tablets, music players, and AI apps. Only two teachers mentioned tools that specifically support phonemic awareness, such as text to speech websites or pronunciation apps.

The pattern suggests that while teachers use technology frequently, most tools are general purpose, not specialized for phonological instruction. This connects directly to the study's purpose: rural teachers rely heavily on whatever device the school provides, but they lack access to or knowledge of more structured phonemic tools, which reinforces the importance of initiatives like this research project.

Question 4. How often do you use technology to support students' listening or pronunciation activities?

Figure 2.



Source: Instrument applied to determine how often teachers use technology in class activities. Data collected by David Humberto Molina Solís, October -November 2025.

The data show that most teachers integrate technology into listening or pronunciation activities with moderate consistency. 60% of the teachers (3 out of 5) reported using technology every week, which reflects an ongoing effort to create meaningful digital learning experiences for their students. Meanwhile, 20% (1 teacher) indicated that they sometimes incorporate technological resources, suggesting that their use varies depending on lesson planning, school conditions, or access to devices.

Another 20% (1 teacher) answered rarely, which may be associated with contextual challenges such as limited connectivity, lack of training, or insufficient classroom equipment, common realities in rural Costa Rican schools.

Overall, these results illustrate that while a majority of the teachers make weekly attempts to embed ICT tools into their phonological activities, there is still variability in frequency due to environmental, institutional, or personal factors.

Question 5. What technological equipment or devices are available in your institution for English classes? Are they functional and suitable for teaching phonemic awareness?

Responses varied depending on each school's reality. Most teachers mentioned having basic equipment such as laptops, projectors, televisions, and internet access. However, their comments reveal significant limitations:

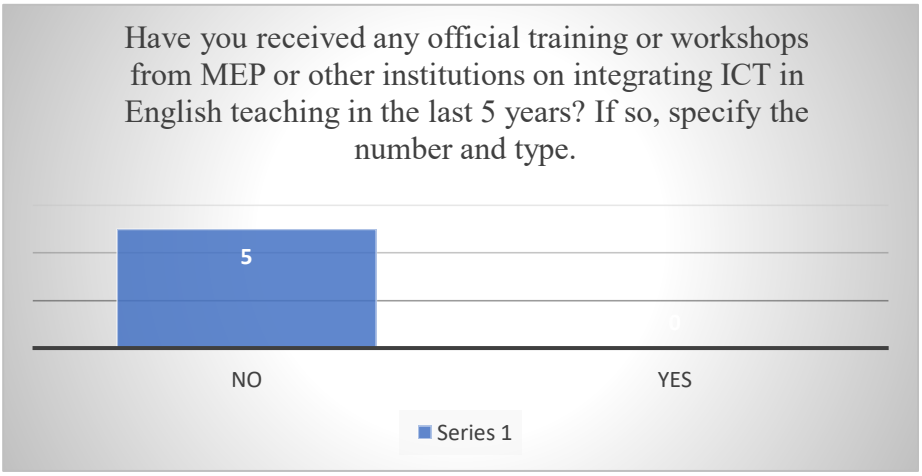
- In some schools, equipment depends on whether the principal or class teachers are using it.
- One teacher highlighted having digital screens and tablets, noting they are "very useful for phonemic teaching."

- Another teacher stated that equipment can be useful, but only if teachers find the correct websites, because there is little institutional support for training.
- The last response described access to smart TVs, speakers, keyboards, and headphones, but again without specific resources aligned to phonemic awareness.

All the answers together show that schools do have some devices, but functionality and availability are inconsistent, and effective use depends largely on the teacher's personal initiative.

Question 6. Have you received any official training or workshops from MEP or other institutions on integrating ICT into English teaching in the last 5 years? If so, specify the number and type.

Figure 3. ICT Training Received in the Last Five Years



Source: Instrument applied to determine the training received in the last 5 years on integrating ICT into English lessons by the MEP. Data collected by David Humberto Molina Solís, October -November 2025.

A significant finding emerged from this item. According to the results, none of the teachers have received official ICT training or workshops in the past five years. All five participants (100%)

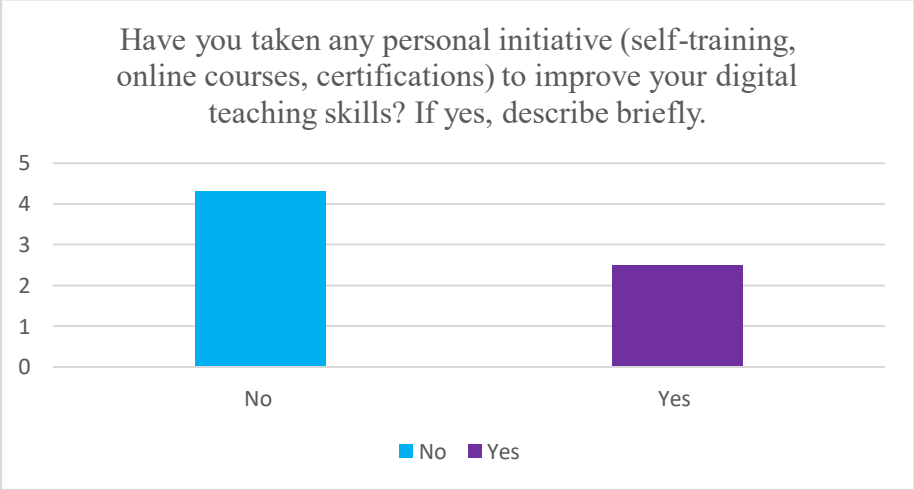
selected NO, indicating they have not been trained by MEP or external institutions in the integration of technology for English teaching.

This result suggests that teachers' current knowledge and confidence with technology is largely self developed, learned through personal initiative or informal peer collaboration. In rural contexts, this reality is common, as access to structured training opportunities is often limited.

Although this study does not provide recommendations in the results section, it is relevant to highlight that this lack of training contextualizes the teachers' responses and helps explain the mixed frequency of ICT implementation shown in the previous question

Question 7. Have you taken any personal initiative (self training, online courses, certifications) to improve your digital teaching skills? If yes, describe briefly.

Figure 4. The teacher´s personal initiative to improve digital teaching skills.



Source: Instrument applied to determine teacher´s personal initiative to improve their digital teaching skills.

Data collected by David Humberto Molina Solís, October -November 2025.

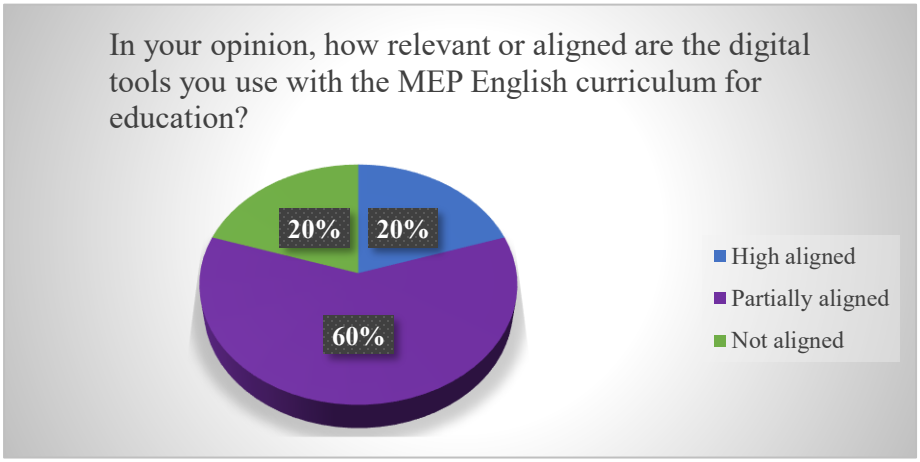
The seventh question explored whether teachers had taken any personal initiative to improve their digital teaching skills through online courses, certifications, or self-directed learning. Three out of the five teachers (60%) answered "No," indicating that they have not pursued any

additional training beyond their regular teaching duties. In contrast, 40% of the teachers (two participants) reported that they engage in some form of self-training. One teacher mentioned watching online videos and learning from other educators' methods and practices, while another described self training with technological devices and AI based applications. These responses show that although formal institutional training is absent (as confirmed in the previous question), a minority of teachers demonstrate initiative and curiosity toward improving their digital competence independently.

Question 8.

In your opinion, how relevant or aligned are the digital tools you use with the MEP English curriculum for education?

Figure 5. How relevant or aligned are the digital tools teacher´s use with MEP curriculum



Source: Instrument applied to determine teachers´ personal initiative to improve their digital teaching skills.

Data collected by David Humberto Molina Solís, October -November 2025.

The results show that most teachers perceive only partial alignment. Exactly, 4 out of 5 teachers (80%) selected "Partially aligned", indicating that the tools they use support some aspects of the curriculum but are not designed for or adapted to the specific phonemic awareness goals or learning outcomes required by MEP.

Only one teacher (20%) considered the tools “Not aligned”, suggesting that, in their experience, the digital resources available do not effectively address the curricular demands. Importantly, no teacher selected “Highly aligned” (0%), indicating that none feel their current digital tools align completely and systematically with the MEP curriculum. This reinforces the idea that, although teachers are making efforts to integrate ICT, they often use generic tools rather than resources specifically designed for the Costa Rican English program or for phonemic awareness at the A1 level.

According to the operational definition, the variable Digital Competence of Teachers is considered valid when at least 70% of the participants demonstrate sufficient confidence, frequency of use, curricular alignment, and some form of professional development in ICT integration. The questionnaire results show that 60% of teachers feel very confident using technological devices, and 60% report using technology every week to support listening and pronunciation activities. However, regarding curricular alignment, 80% of teachers perceive their tools as only partially aligned with the MEP English curriculum, 20% as not aligned, and none consider them highly aligned. In addition, 100% of teachers reported not receiving official ICT training in the last five years, and only 40% engage in any self training. These findings indicate that teacher digital competence in this context is developing but does not fully meet the 70% threshold established in the operational criteria. There is an apparent willingness and effort to integrate technology, but this potential still requires stronger institutional support, better aligned resources, and systematic training opportunities.

4.1.6 Alignment of CEFR A1 Phonological Descriptors and the MEP English Curriculum

This analytical tool compares the CEFR A1 descriptors with the phonological awareness indicators established by MEP (2016). It ensures that the instructional and assessment activities implemented in this study align with both national and international language-learning standards. The chart supports the fourth specific objective.

CEFR–MEP Alignment Chart: Phonemic Awareness A1 Instructions:

CEFR A1 Descriptor	MEP (2016) Objective/Indicator	Relation to Study Activities	Evidence/Instrument	Alignment Level
Recognizes familiar words when speech is clear.	Identifies familiar words and initial sounds.	Students match initial phonemes to pictures using Speech Solution and Kahoot! activities.	Pre-/Post-Test (Listening)	High
Can distinguish basic phoneme contrasts.	Shows progress in discriminating consonant and vowel sounds.	Students complete discrimination tasks (same/different sounds) using image cards and listening prompts.	Pre-/Post-Test/ Checklist.	High
Can repeat short words or phrases.	Reproduces English sounds modeled by the teacher or audio input.	Students pronounce target vocabulary (e.g., student, hat, thumb) following teacher models.	Pre-test / Pro-test (Speaking)	High
Pronunciation is understood with effort.	Shows improvement in the articulation of	Students refine initial sound production after	Anecdotic Journal / Post-Test	High

	consonant and vowel sounds.	feedback in Speech Solution recordings and class practice		
Can interact with visual or audio cues.	Participates in guided digital tasks.	Students complete tasks on Kahoot! using images, audio models, and interactive prompts.	Anecdotic Journal / Checklist	Medium (Since access to technology varied among students.)
Can imitate teacher models	Uses imitation and prepetition strategies during pronunciation tasks.	Students imitate phoneme models from Jack Hartmann videos and Speech solution audio clips.	Logbook / Observation	High

The alignment chart demonstrates that the activities applied during this study correspond directly with both the CEFR A1 phonological descriptors and the MEP English Program for First Cycle. The CEFR expectation that learners recognize familiar sounds, repeat short words, and produce basic phonemes with support aligns with MEP indicators focused on identifying, discriminating, and pronouncing initial English sounds. The technological activities used Speech Solution, Kahoot!, and Jack Hartmann videos helped students meet these descriptors through guided listening, imitation, and sound-matching tasks. Overall, this alignment confirms that the intervention was pedagogically consistent with national curriculum standards and international language benchmarks, ensuring that students' learning experiences were age appropriate and educationally meaningful.

Chapter V

Conclusions and Recommendations

5.1 Introduction

This chapter shares the main conclusions from the research and data analysis. As a teacher and researcher in rural Costa Rican schools, the researcher assessed how technology affects students' phonemic awareness and reflected on teaching practices and the realities in communities like La Iberia and Grano de Oro.

Although this investigation followed a structured methodology, the learning that emerged feels strongly grounded in human and classroom experiences. The results became clearer each day as I observed students interacting with the tools, correcting themselves, supporting one another, and showing genuine curiosity about the English sounds. These moments helped me understand that technology, when used with clear pedagogical purposes, can become a meaningful bridge for students who often have limited access to resources.

The following conclusions are organized by the study's main objectives. They sum up the evidence from the pre-test, post-test, teacher questionnaire, and classroom sessions. Each conclusion aims to show not just the data, but also what the results mean for teaching English in rural areas and how this experience helped students develop phonemic awareness and digital skills.

5.2 Conclusion

The purpose of this study was to examine how the integration of technological tools, specifically laptops, smartphones, Speech Solution, Kahoot!, and Jack Hartmann videos, could support the development of phonemic awareness in First Cycle students from two rural schools in Siquirres, Circuit 06. After completing all stages of the research, several conclusions can be made.

First, the diagnostic stage demonstrated that most students had a very limited ability to recognize, discriminate, and produce English initial sounds. This was especially evident in first grade, where students entered school with no previous exposure to English in preschool. The pre-test revealed that the majority of students fell within the Developing or Emerging bands, with minimal pronunciation clarity and frequent confusion among the target phonemes. This confirmed the need for additional support and the relevance of implementing digital tools as part of their learning process.

Second, the implementation of technological resources proved to be highly beneficial for student engagement and participation. During the eight sessions, students showed visible excitement toward the laptops, the interactive exercises, and the audiovisual materials. This motivation played a key role in helping them practice repeatedly and voluntarily, a behavior rarely seen in traditional phonics lessons. Even students who were usually shy or reluctant showed willingness to try, make mistakes, and try again.

Third, the results from the post-test clearly indicate that students improved significantly. Across all six groups, most students moved into the Approaching or Ready bands. This means they were able to identify and reproduce initial sounds more accurately, and many of them even corrected themselves when they noticed pronunciation mistakes. This self-correction was one of the most meaningful findings of the study, because it shows internal awareness a skill that the researcher believes is the heart of phonemic development.

Fourth, Kahoot! as a homework tool showed mixed results. Only 67% of the students completed it, which reflects a common challenge in rural areas: limited parental support and inconsistent access to devices at home. However, those who participated demonstrated high levels of achievement, with more than 60% reaching the expected 70%. This confirms that when

students have access and support, digital tools used at home can reinforce what they learn at school.

Fifth, the questionnaire completed by five English teachers from Circuit 06 revealed that most teachers have a cheerful outlook toward ICT and recognize its importance for English teaching. However, the results also showed that many teachers lack formal training in ICT integration and that schools do not always provide functional digital resources aligned with the MEP English curriculum. This shows that ICT integration is not only a pedagogical task, but it also depends on the institutional context, and the support teachers receive.

Finally, the comparison between the CEFR A1 phonological descriptors and the MEP English Program for First Cycle confirmed that both frameworks emphasize listening and speaking skills, initial sound recognition, and accurate pronunciation. This alignment supports the idea that digital tools are not an "extra," but rather a valid and meaningful way to reinforce the goals established by Costa Rican educational policy.

Overall, the study demonstrates that integrating technology into phonemic awareness instruction is not only possible in rural schools but also effective and highly motivating for students. The researcher, as the English teacher of both schools, also grew throughout the process, discovering new ways to guide students and appreciating the impact that simple, accessible technological tools can have on early literacy skills.

5.3 Recommendations

For Classroom Practice

It is strongly recommended that First Cycle English teachers continue integrating technological tools such as Speech Solution and Kahoot!. The results of this study showed that

these resources not only increased students' motivation but also produced measurable improvements in phoneme identification, discrimination, and production. Their multisensory nature (visual, auditory, and articulatory modeling) aligns well with the learning needs of young learners.

Teachers should maintain short, repetitive, and multisensory activities. This approach proved effective during the intervention, helping students internalize sounds through consistent auditory exposure and visual cues. Repetition supported confidence-building, especially among students who initially struggled with the pronunciation of /θ/, /h/, and /s/.

It is advisable to continue fostering peer correction activities. Throughout the sessions, students demonstrated significant awareness of their own errors when guided by their classmates. Peer feedback not only increased participation but also helped students correct Spanish influenced pronunciations such as "estudent" or *"tanks" instead of "thanks".

Given the limited number of laptops available in rural schools, teachers should work in rotating groups or stations. This strategy was effective in both La Iberia and Grano de Oro Schools, allowing all students to interact meaningfully with digital tools despite infrastructure limitations.

For School Administrations

School principals and administrative staff should prioritize the maintenance and functionality of the technological devices provided by Fundación Omar Dengo. This research revealed that non-functional laptops and poor electrical systems hinder the use of digital resources necessary to develop phonemic awareness.

Improving internet connectivity should be considered a necessary investment rather than a luxury. Online tools such as Kahoot! depend on stable internet access, and teachers in both schools reported recurring difficulties that affected the learning flow.

Administrations should ensure that basic printing materials (such as cardstock, ink, and lamination) are available for English lessons. Printed images were essential during the pre-test and post-test, and they continue to be fundamental for early phonemic awareness activities aligned with MEP guidelines.

For Teachers' Professional Development

It is recommended that teachers in Circuit 06 receive formal and continuous ICT training specifically focused on phonological and phonemic awareness. While most teachers demonstrated general digital competence, the questionnaire results showed that formal training remains limited, affecting the confidence and variety of tools used.

Schools and regional supervisors should promote professional learning communities where teachers can share strategies, digital resources, and classroom experiences. Collaborative spaces help reduce the isolation often experienced in rural contexts and encourage ongoing pedagogical growth.

Teachers should continue exploring free and curriculum aligned tools that support sound recognition, pronunciation, and listening discrimination. Digital platforms, even simple ones, proved to be powerful complements to traditional phonics instruction.

For Future Research

Future studies should examine the long-term effect of technological intervention across a full academic year. This would allow researchers to determine whether improvements in phonemic awareness translate into better reading, writing, and general communicative competence.

Researchers may also explore the role of families and their ability to support technology-based homework. The analysis of Kahoot! assignments showed that approximately one-third of students did not complete the activity, suggesting a need for further exploration of home learning dynamics in rural contexts.

Comparative studies between rural and urban schools could provide insight into how technological availability and digital literacy impact phonemic awareness outcomes. Such comparisons would be valuable for regional educational planning and resource allocation.

Chapter VI

Proposal

6.1 Name of Proposal

The title of the current proposal is *Integrating Smartphones and Laptops to Support Phonological Awareness in Rural Costa Rican Public Schools. This proposal addresses the research on the impact of implementing technological devices (laptops and smartphones) to increase the phonological awareness in students from the first cycle at La Iberia and Grano de Oro Elementary Schools in 2025.*

6.2 Description

This proposal presents a short and structured pedagogical intervention designed to strengthen phonological awareness in first-cycle students from La Iberia and Grano de Oro elementary schools, located in Circuit 06, Siquirres, Limón. The proposal focuses on three essential early-literacy skills that are appropriate for students in first, second, and third grade: hearing, identifying, and manipulating sounds in spoken English. These skills respond directly to the MEP English Program's I Cycle and CEFR A1 descriptors.

The intervention will be developed over four weeks during the second semester of 2025. It includes a pre-test, a sequence of classroom lessons using technological tools, and a post-test. The technological devices used are smartphones and laptops already available at schools. Students will work with tools such as Speech Solution (for articulation modeling), Jack Hartmann phonics videos (for initial sound recognition), and Kahoot! games (for reinforcing learning both in class and at home). These activities are simple, low cost, and adapted to the rural context, where internet access is slow but functional.

The proposal is flexible and can also be applied in other rural public schools with similar conditions. It was designed to support teachers with limited technological resources who want to innovate in their English lessons.

6.3 Place to be Developed

The intervention will take place at La Iberia and Grano de Oro Elementary Schools, both located in the rural district of La Alegría, in the canton of Siquirres, province of Limón. These communities are mostly agricultural, and families work in farming and other outdoor activities. Because of these rural conditions, access to stable and high-speed internet is limited. However, both schools possess basic technological equipment that allows students to use laptops and smartphones during some lessons.

- La Iberia School: Founded in 1978, originally a unidocente school. Today, it is classified as Dirección 2 and serves first, second, and third grade groups with an average of 13 to 18 students per class. English is taught 5 lessons per week.
- Grano de Oro School: Founded in 2001, it also started as a unidocente institution and has grown to become Dirección 1. The researcher works with first and second grade in this school, with 15 to 18 students per group and 5 weekly English lessons.

Even though these schools face challenges such as slow connectivity and limited equipment, students show motivation to learn English, and teachers are open to integrating technology when possible. This proposal supports that effort.

6.4 Organization

To conduct the proposal, the principals of both institutions have granted the necessary permissions. The participating teachers collaborate in the organization of spaces, resources, and schedules for the implementation of the activities.

The population involves approximately 60 students, but the research will work with a sample of 10 students per group, following a convenience sampling approach. This is appropriate because the researcher teaches these groups and can select the students who are present regularly and show willingness to participate. This method is suitable for small-scale research in real school contexts (Etikan, Musa & Alkassim, 2016).

The proposal is organized in three stages:

1. Diagnostic stage: Pre-test application.
2. Intervention stage: Weekly lessons using technology to develop phonological awareness.
3. Evaluation stage: Post-test application and comparison of results.

6.5 Involved Population

The target population of this proposal involves students from 1st to 3rd grade in both schools with a low to intermediate level of English proficiency, enrolled at an elementary school.

6.6 Objectives of the Proposal

6.6.1 General Objective

To strengthen phonological awareness in first cycle students by integrating technological devices (smartphones and laptops) into the English teaching-learning process in rural schools during the second semester of 2025.

6.6.2 Specific Objectives

- To reinforce the skills of hearing, identifying, and manipulating English initial sounds through technological tools.
- To use Speech Solution, Jack Hartmann videos, and Kahoot! games as support resources for phonological awareness practice.
- To motivate students to participate in short pronunciation activities using laptops and smartphones.
- To compare students' initial and final performance through a pre-test and a post-test.

6.7 Chronogram of Activities

Week 1: Diagnostic Evaluation

Students complete the pre-test measuring hearing, identifying, and manipulating initial sounds (/Ɛ/, /i/, /s/, /h/, /θ/). This establishes their starting level.

Week 2: First Cycle Technology Sessions

Students work with Speech Solution on laptops to practice pronunciation and articulation. The

teacher guides short sessions in which children listen, observe mouth movements, and repeat sounds.

Week 3: Reinforcement Through Videos and Games

Students watch selected Jack Hartmann phonics videos in class. They practice initial sounds through songs and repetition.

During the second lesson of the week, they play Kahoot! to reinforce the sounds learned.

Week 4: Final Practice and Post-Test

Students complete a final review with a short sound identification activity using pictures. Then, they complete the post-test with parallel items to the pre-test.

Table 4

Chronogram of Activities

Week	Activity	Description	Objective	Resources	Evidence	Responsible
Week 1	Pre-test application	Students complete the pre-test to evaluate hearing, identifying, and manipulating initial sounds. The teacher uses picture cards and	Measure initial phonological awareness level.	Picture cards, teacher script, scoring sheets.	Pre-test results.	English teacher.

		individual prompts.				
Week 2	Speech Solution practice (2 sessions)	Students use laptops and headphones to practice articulation. They observe mouth movements and repeat the model sounds.	Improve articulation and sound repetition.	Laptops, headphones, Speech Solution software.	Observation notes and screenshots.	English Teacher
Week 3	Jack Hartmann videos + Kahoot!	Students watch short phonics videos to reinforce initial sounds. Then they play Kahoot! to practice sound discrimination in a fun way.	Reinforce sound recognition and discrimination.	Laptop/smartphone, YouTube, Kahoot.	Participation records.	English Teacher
Week 4	Post-test application	Students take the post-test with parallel items to the pre-test to compare progress in phonological awareness.	Measure improvement after the intervention.	Picture cards, evaluation sheets.	Post-test results and comparison chart.	English Teacher

Source: Developed by David Humberto Molina Solís (2025).

6.8 Budget for its Implementation

This Proposal will not require a financial budget, but it is essential to have access to the internet and a video beam, projector, or computers and tablets.

6.9 Suggested Bibliography

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Annexes

Annex A

David Humberto Molina Solís

Specific Objective: To identify the level of phonological awareness skills in students before and after using technological devices at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.

This pre-test instrument was developed as part of the research project conducted at La Iberia and Grano de Oro Primary Schools, Circuit 06, Siquirres, Limón, Costa Rica. The goal is to establish baseline data on students' phonemic awareness before implementing the intervention using technological tools. It is aligned with the Ministry of Public Education (MEP, 2017) English Program for I and II Cycles and the Common European Framework of Reference for Languages (CEFR) A1 level descriptors.

Pre-Test

1. **Purpose & Alignment**

The purpose is to establish baseline levels of phonemic awareness (initial sounds) before the intervention, considering the rural context and limited prior exposure.

Target sounds: /e/ (E), /I/ short sound (I), /s/ (S), /h/ (H), /θ/ (TH).

2. Constructs Assessed

• **Phoneme Identification (Listening):** Match a spoken initial sound to a picture/word.

(2points both identified, 1point one image identified)

• **Phoneme Discrimination (Listening):** Decide if two words start with the same or different initial sound. (1 point for each correct discrimination)

• **Initial Sound Production (Speaking):** Produce the initial sound/word after a model.

(2 points for both words pronounced correctly, 1 point for one word, 0 points for no word pronounced)

3. Test Structure (by Grade)

Grade 1 (8–10 min): Sound–Picture Match, Same/Different Initial Sound, Repeat the Sound.

Grade 2 (10–12 min): Sound–Picture Match, Initial Sound Choice, Repeat + Isolate Initial Sound.

Grade 3 (12–15 min): Sound–Picture Match, Initial Sound Choice, Minimal Oral Production.

4. Materials (Low-Tech & Tech-Supported)

Low-tech: Picture cards, sound cards, teacher script, scoring sheet.

Tech-supported (optional): Simple audio models, headphones (if available).

Note: Do not use Speech Solution, Kahoot or Jack Hartmann during the pre-test.

5. Administration & Timing

Setting: Quiet corner/classroom.

Language: Short Spanish prompts allowed for comprehension.

Pacing: Clear, slow models. Allow one repetition if needed.

6. Scoring & Rubrics

Phoneme Identification (Listening): Match a spoken initial sound to a picture/word.

(2points both identified, 1point one image identified, 0points no image)

• Phoneme Discrimination (Listening): Decide if two words start with the same or different initial sound. (1 point for each correct discrimination, 0 points for not discriminating)

• Initial Sound Production (Speaking): Produce the initial sound/word after a model.

Total = 25 points per student.

7. Cut-Scores (Descriptive Bands)

Developing (0–8): Very limited recognition.

Emerging (9–16): Some consistency with E, I, S; difficulty with H/TH.

Approaching (17–21): Mostly accurate; some support needed.

Ready (22–25): Strong baseline for initial sounds.

8. Data Capture (Simple Sheets)

For each student:

• A: 10-item grid (Listening)

• B: 5-item grid (Listening)

• C: 5-item grid (Speaking)

• Notes: E, I, S, H, TH observations.

9. Accessibility & Fairness

• Use visual supports.

• Allow approximate pronunciation for TH and the sound of the initial /S/

• Repeat once if unclear.

• Use Spanish prompts to ensure comprehension.

10. Quick Item Bank and images of the items

E (/Ɛ/): egg, elephant.

I (/I/): igloo, insect.

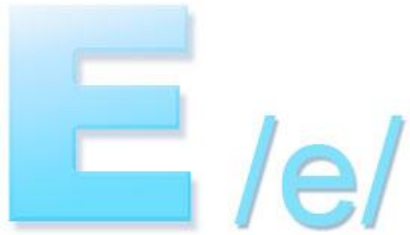
S (/s/): student, scared (observe /e/ insertion: “estudent”, “escared”)

H (/h/): hat, hippo.

TH (/θ/): thumb, three.

Distractors images: dog, cat, ball, fish, volcano, zebra

Didactic Material: Card Images



E sound: Egg, Elephant

I sound (short sound) : Igloo , Insect

S sound (initial sound) Student , Scared

H sound: Hippo , Hat

Th sound: (voiceless sound /θ/ Thumb , Three

Thumb up and down for phonemic discrimination (Listening activity)

Distractors: fish, volcano, cat, dog, zebra, ten

Annex B – Pre-test and Post-test Checklist

David Humberto Molina Solís

Student Name	Listening (0-15pts)	Speaking (0-10pts)	Points obtained	R 22-25pts	A 17-21pts	E 9-16pts	D 0-8pts	Comments / Observations
Student 1								
Student 2								
Student 3								
Student 4								
Student 5								
Student 6								
Student 7								
Student 8								
Student 9								
Student 10								

Cut-Scores (Descriptive Bands)

Developing (0–8): Very limited recognition.

Emerging (9–16): Some consistency with E, I, S; difficulty with H/TH.

Approaching (17–21): Mostly accurate; some support needed.

Ready (22–25): Strong baseline for initial sounds.

Post-Test: Phonological Awareness Final Evaluation

The post-test measures students' progress after the implementation of technological tools such as Speech Solution, Kahoot!, and Jack Hartmann videos. It maintains the same structure and vocabulary as the pre-test to ensure assessment validity and alignment with MEP (2016) guidelines. It also supports the first specific objective.

The post-test has the same structure, vocabulary, and scoring as the pre-test, administered four weeks later via Speech Solution and Kahoot! measures improvement in listening and pronunciation.

Annex C

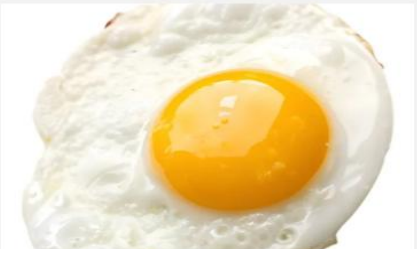
David Humberto Molina Solís

Kahoot for classwork and homework assignments

1 -Quiz **WHAT IS THE FIRST SOUND?**

S
T
E
B

2 -Quiz **WHAT IS THE FIRST SOUND?**



O
U
A
E
No answer

3 -Quiz **WHAT SOUND DOES IT START WITH?**

R
L
S
A
No answer

20s time limit

4 -Quiz **WHAT IS THE FIRST SOUND?**

E
I
L
U
No answer

20s time limit

5 -Quiz **WHAT IS THE FIRST SOUND?**

S
I
A
C

6 -Quiz **WHAT IS THE FIRST SOUND?**

T
H
D
S

7 -Quiz **WHAT IS THE FIRST SOUND?**

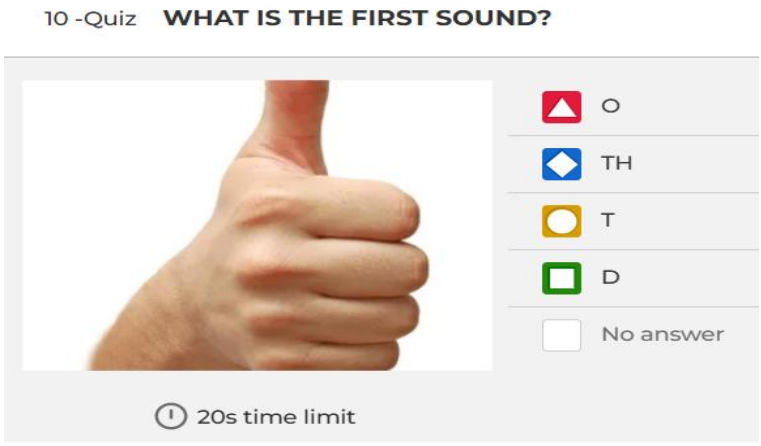
I
A
C
E
No answer

20s time limit

8 -Quiz **WHAT IS THE FIRST SOUND?**

M
U
TH
D
No answer

20s time limit



In the Kahoot!, In classwork and homework assignments, the researcher implemented a challenge in question 3 using “sleepy instead of scared,” in question 1 using “snake instead of scared“, and in question 8 using “thin instead of three.” Those vocabulary words are ones that students across the three levels identify immediately because the researcher, as the regular English teacher, uses them to target the initial sound during vocabulary practice or phonemic awareness lessons.

Annex D

David Humberto Molina Solís

Specific Objective: To determine the availability and use of technological devices (smartphones and laptops) in the English teaching-learning process in the selected schools at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.

This qualitative instrument documents the researcher's classroom observations throughout the intervention. It records student reactions, motivation, and pronunciation attempts while using technological devices. It supports the second specific objective by providing contextual evidence of how technology influenced students' engagement and learning.

1. Anecdotal Record / Teacher Logbook

Content:
Daily brief notes on:

- Student engagement and motivation
- Pronunciation attempts and self-correction
- Collaboration and challenges

Annex E

David Humberto Molina Solís

Specific Objective: To assess the digital competence of teachers regarding the integration of technology for phonological awareness instruction at La Iberia and Grano de Oro elementary schools in Siquirres, Circuit 06, under the Limón Regional Bureau for Education during the second semester of 2025.

This semi-structured questionnaire aims to assess teachers' digital competence regarding the integration of ICT in phonological-awareness instruction. It gathers information on teachers' access to technology, training received, personal initiatives, and perceived challenges. The instrument supports the third specific objective.

Questionnaire / GOOGLE FORM

Objective: Identify teachers' perceptions and digital competence.

Participants: Two English teachers (researcher + colleague).

No.	Question	Type of Response
1	What is teacher´s digital competence ?	Open answer
2	How confident do you feel using technological devices (smartphones, laptops, tablets) in your English lessons?	☐ Very confident ☐ Somewhat confident ☐ Not confident
3	What digital tools have you used for phonological awareness?	Open Answer

4	How often do you use technology to support students' listening or pronunciation activities?	☐ Every week ☐ Sometimes ☐ Rarely ☐ Never
5	What technological equipment or devices are available in your institution for English classes? Are they functional and suitable for teaching phonemic awareness?	Open answer:
6	Have you received any official training or workshops from MEP or other institutions on integrating ICT into English teaching in the last 5 years? If so, specify the number and type.	Open answer:
7	Have you taken any personal initiative (self-training, online courses, certifications) to improve your digital-teaching skills? If yes, describe briefly.	Open answer:
8	In your opinion, how relevant or aligned are the digital tools you use with the MEP English curriculum for education?	☐ Highly aligned ☐ Partially aligned ☐ Not aligned

Annex F

David Humberto Molina Solís

Specific Objective: To examine the alignment of classroom practices with CEFR A1 phonological descriptors in the implementation of the MEP English curriculum.

This analytical tool compares the CEFR A1 descriptors with the phonological awareness indicators established by MEP (2016). It ensures that the instructional and assessment activities implemented in this study align with both national and international language-learning standards. The chart supports the fourth specific objective.

CEFR–MEP Alignment Chart: Phonemic Awareness A1Instructions:

CEFR A1 Descriptor	MEP (2016) Objective/Indicator	Relation to Study Activities	Evidence/Instrument	Alignment Level
Recognizes familiar words when speech is clear.	Identifies familiar words and initial sounds.	Students match initial phonemes to pictures using Speech Solution and Kahoot! activities.	Pre-/Post-Test (Listening)	High
Can distinguish basic phoneme contrasts.	Shows progress in discriminating consonant and vowel sounds.	Students complete discrimination tasks (same/different sounds) using image cards and listening prompts.	Pre-/Post-Test/ Checklist.	High
Can repeat short words or phrases.	Reproduces English sounds modeled by the teacher or audio input.	Students pronounce target vocabulary (e.g., student, hat,	Pre-test / Pro-test (Speaking)	High

		thumb) following teacher models.		
Pronunciation is understood with effort.	Shows improvement in the articulation of consonant and vowel sounds.	Students refine initial sound production after feedback in Speech Solution recordings and class practice	Anecdotic Journal / Post-Test	High
Can interact with visual or audio cues.	Participates in guided digital tasks.	Students complete tasks on Kahoot! using images, audio models, and interactive prompts.	Anecdotic Journal / Checklist	Medium (Since access to technology varied among students.)
Can imitate teacher models	Uses imitation and prepetition strategies during pronunciation tasks.	Students imitate phoneme models from Jack Hartmann videos and Speech Solution audio clips.	Logbook / Observation	High

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