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THE TEACHER AS A MEDIATOR OF TECHNO-PEDAGOGICAL STRATEGIES BASED ON AI FOR THE TEACHING OF PHONOLOGICAL AWARENESS FROM THE EDUCATIONAL REGULATORY FRAMEWORK

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Abstract

In the digital age, pedagogical methodologies require re-evaluation, especially regarding the integration of technological tools into learning processes. Their proper implementation represents a significant opportunity to enhance students' cognitive development. This article presents the findings of a study that analyzed the impact of the Graphogame app on the development of phonological awareness, as well as the role of the teacher as a mediator and the challenges this entails. The research was conducted at the Sonia Ahumada District Educational Institution and the CEB 201 (Barranquilla, Colombia), using a rationalist epistemological approach, a critical paradigm, a mixed design, and an empirical, theoretical, and propositional phase. A Likert-scale questionnaire was administered to teachers at the selected institutions, and the data were analyzed using exploratory factorial statistics, employing the KMO and Bartlett's sphericity tests, to validate the instrument's structure. The results that students' motivation to use technological tools, the mediating role of the teacher, resistance to change, and the relevance of integrating digital platforms into the curriculum are determining factors.

It is concluded that the use of Graphogame has a positive effect on the development of phonological awareness, provided that it is accompanied by enhanced teacher training to optimize its implementation.

Keywords: Mediation, technology, Graphogame, teacher role, phonological awareness.

Introduction

The integration of digital tools in education is an ongoing challenge, while offering significant opportunities to enhance cognitive processes. Accept the challenge of changing traditional methodologies and particularly those aimed at the development of fundamental skills such as reading and writing.

The objective of this research was to analyze the impact and effectiveness of the Graphogame application on the development of phonological awareness, identifying key

factors such as teacher mediation and adaptation to emerging technologies. A mixed design was adopted, combining qualitative and quantitative data to achieve a comprehensive understanding of the phenomenon. To this end, a questionnaire with a Likert scale was applied to teachers, which allowed exploring their role as mediators, resistance to change and the possibilities of incorporating the application into the school curriculum.

The teaching of reading in the early stages has historically been guided by traditional practices based on repetition and memorization, which, although they have shown effectiveness, tend to generate routines that are not very dynamic that contrast with the various current learning styles. In this sense, the proposal of Emilia Ferreiro et al. (1982) understands reading as a process of coordination of information from the reader and the text, whose ultimate goal is the construction of meanings.

The development of phonological awareness is a fundamental axis in the initial processes of reading and writing, since it facilitates in students the identification, segmentation and manipulation of language sounds, essential skills to consolidate reading and writing in the early school stages. Recent research has shown that there is a significant correlation between phonological awareness and reading and writing performance in childhood, establishing itself as a bridge for reading comprehension and academic progress (Sevillano, 2021; Ascope, 2022).

In this framework, teacher mediation acquires a central role. Various studies have pointed out that traditional pedagogical practice, focused on mechanical repetition and memorization, is insufficient to meet the current needs of students and promote solid language skills (Aranda & Caldera, 2018). In contrast, innovative approaches based on school mediation and active teacher accompaniment have shown favorable results in the training of competent readers and in the consolidation of reading habits (Santillán, 2021).

The use of digital tools represents, in this context, an opportunity to transform the teaching of reading and enhance phonological awareness. International research shows that the incorporation of interactive technological resources favors children's commitment, motivation, and participation in early literacy, providing innovative strategies to the learning process (Naeem & Khan, 2024). Similarly, parental and school mediation in the use of technologies has been shown to contribute significantly to academic performance (Halpern, Piña & Ortega, 2021). However, gaps persist around the systematic implementation of these tools in vulnerable contexts with limited access to resources.

In the case of Colombia, and particularly in public educational institutions in low-income rural and urban sectors, they show multiple limitations: the absence of solid preschool structures, the illiteracy present in some family members, the lack of reading habits and the deficit in adequate technological resources. These conditions make it even more necessary to explore pedagogical proposals that, from the use of technology and didactic innovation, contribute to the strengthening of phonological awareness and the comprehensive development of reading and writing in elementary school students.

From this perspective, educational technology is conceived as an alternative to transform teaching-learning processes in a significant and dynamic way. According to Sancho Gil et al. (2015), this is configured through the planning and implementation of resources, spaces and times, based on clear pedagogical intentions. In this framework, Graphogame emerges as an interactive and playful tool that contributes to the strengthening of phonological awareness, maintaining high levels of motivation in students.

Consequently, the purpose of this article is to analyze the role of phonological awareness in the learning of reading and writing, as well as the relevance of the use of digital tools in this process, highlighting the active role of the teacher in the transformation of educational practices that allow overcoming traditional models and responding to the needs of populations in conditions of socioeconomic vulnerability.

Methodology

The research was framed in a rationalist epistemological approach and under a critical paradigm, oriented to the transformation of educational practices in contexts of social vulnerability. A mixed design was adopted, with a predominance of the quantitative component, complemented by qualitative elements derived from the documentary analysis and the interview.

The population was made up of first-grade students, teachers and educational directors of the Sonia Ahumada District Educational Institution (IEDSA) and CEB 201, both located in the southwest of the city of Barranquilla, Colombia. These institutions serve the population of socioeconomic stratum 1, characterized by the absence of reading habits at home, the presence of illiterate relatives and little preschool experience in the children, which accentuates the conditions of academic and social vulnerability. The sample was defined through simple random probabilistic sampling at the Sonia Ahumada IED and intentional non-probabilistic sampling at CEB 201, due to the small size of students. The distribution was made up as follows:

Table 1.
Sample of the population under study

Target population	IEDSA	CEB 201	Total
1st and 2nd grade students	147	74	221
Teachers	30	10	40

Source: Authors' elaboration (2025).

For data collection, the survey was used as the main technique, applied through a questionnaire with a Likert scale of five response options, composed of 50 items. The instrument was designed to evaluate two main variables:

The first variable corresponds to the development of phonological awareness, structured in the following dimensions: Language skills, Metalinguistic skills. The second is Technological Mediation based on reading habits, made up of the following dimensions: Technological, Technological Mediation, Socio-Emotional and Reading Habits.

The questionnaire was applied directly by the researchers in July 2024, during school hours, inside classrooms and under the supervision of tenured teachers, due to the young age of the participating students and teachers in academic meetings.

The content validity of the instrument was determined by the judgment of three education experts who evaluated the relevance, clarity, and coherence of the items with respect to the study variables. Reliability was estimated using Cronbach's alpha coefficient,

obtaining a value of 0.978, which, according to Ruiz Bolívar (2013), represents a very high internal consistency.

The data were processed with the SPSS v.25 statistical software. Descriptive statistical techniques were used to characterize the variables, and internal consistency tests (Cronbach's alpha) were used to confirm the reliability of the instrument. In addition, analysis of the dimensions proposed was carried out to identify patterns in the relationship between phonological awareness and technological mediation in reading habits.

The study guaranteed respect for the ethical principles of research in education. Participation was voluntary, with authorization from the directors and teachers of the institutions, as well as informed consent from the parents in the case of the students. The confidentiality of the information collected and its exclusive use for academic and research purposes were ensured.

Results

The analysis of results focuses on the validation of the instrument designed for the integration of technological applications by teachers to develop students' phonological awareness. To this end, an exploratory factor analysis (EFA) was initially applied in each of the dimensions included in the questionnaire: linguistic skills, metalinguistic skills, technological, technological mediation, socio-emotional and reading habits. The use of the KMO test (Kaiser-Meyer-Olkin) and the Bartlett sphericity test allowed to establish the structural validity of the instrument and the correlation between items within each dimension. Then the factors were identified more clearly and the confirmatory factor analysis procedure is applied with the rotation method used is VARIMAX that seeks to redistribute the variance along all the components in the load matrix.

Board 1

Initial exploratory analysis of factors A1 - A4 variable development of phonological awareness.

Factor A1	**Component/indicator**	**Item**
Listening - Listening	A 1. Ability to actively interpret sound	1,2
	A 1.2 Ability to relate what is heard to objects that are known.	3,4
Factor A2	**Component/indicator**	**Item**
Oral Expression - Speech	A 2.1 Ability to communicate with speech	5,6
Factor A3	**Component/indicator**	**Item**
Metaphonology	A 3.1 Ability to identify the phonological components of linguistic units.	7,8
	A 3.2 Ability to deliberately manipulate linguistic units	9, 10
Factor A4	**Component/indicator**	**Item**
Meta Semantics	A 4.1 Ability to recognize the linguistic system as a conventional and arbitrary code 2	11,1
	A 4.2 Ability to recognize the linguistic system as a conventional and arbitrary code 4	13,1

Note: The table contains the grouped factors of the variable Development of phonological awareness. Source: Own elaboration (2025)

Initial exploratory analysis factors B1 – B10 Variable Graphogame mediation Based on reading habits

Board 2

Initial exploratory analysis, factors B1 -B10, variable graphogame mediation and based on reading habits.

Factor B1	**Component/indicator**	**Item**
Technology Skills	B 1.1 Basic Digital Skills	15, 16
	B 1.2 Ability to use technological tools	17, 18
Factor B2	**Component/indicator**	**Item**
Interactivity	B 2.1 Instantaneity of communication.	19, 20
Factor B3	**Component/indicator**	**Item**
Role of the Teacher	B 3.1 Technology transformation	21,22
	B 3.2 Learning Strategy Designer	23,24
Factor B4	**Component/indicator**	**Item**
Technology Adaptability	B 4.1 Adaptability to change	25,26
	B 4.2 Flexibility in the use of technologies	27,28
Factor B5	**Component/indicator**	**Item**
Technology Integration	B 5.1 Integration of ICT into the curriculum.	29,30
	B 5.2 Appropriation of technology	31,32
Factor B6	**Component/indicator**	**Item**
Technology and Society	B 6.1 Innovation	33,34
Factor B7	**Component/indicator**	**Item**
Awareness	B 7.1 Ability to understand what is being felt.	35,36
	B 7.2 Ability to know why the emotion is being experienced.	37,38
Factor B8	**Component/indicator**	**Item**
Building Relationships	B 8.1 Ability to have well-conducted relationships with other people.	39,40
	B 8.2 Social skills are essential when consolidating friendships.	41,42
Factor B9	**Component/indicator**	**Item**
Reading habits	B 9.1 Ability to show reading interest	43,44
	B 9.2 Ability to show my reading taste.	45,46
Factor B10	**Component/indicator**	**Item**
Reading Interaction	B 10.1 Faculty to establish a teacher-student-reading relationship.	47,48

B 11.2 Indicator: Enjoy the creation of rewarding environments.	49,50

Note: The table contains the grouped factors of the variable Grapho game mediation based on reading habits Source: Own elaboration (2025)

Table 4

KMO and Bartlett Test Variable 1 Teacher Questionnaire

Prueba de KMO y Bartlett Var 1 - Docentes

Medida Kaiser-Meyer-Olkin de adecuación de muestreo		,776
Prueba de esfericidad de Bartlett	Aprox. Chi-cuadrado	342,980
	gl	91
	Sig.	,000

Source: Own elaboration (2025)

Table 5

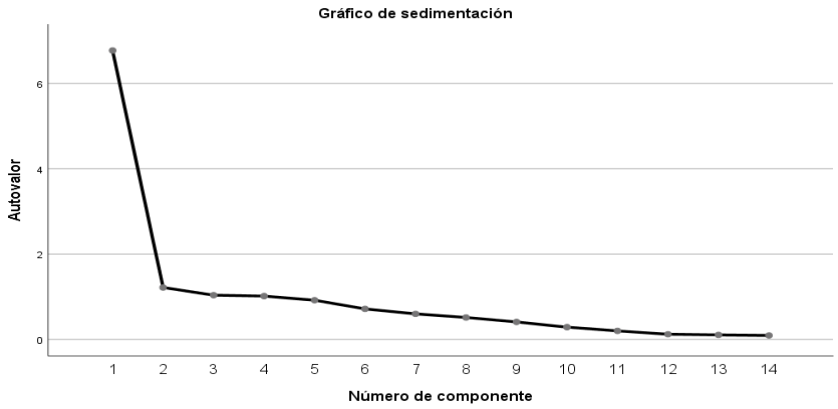
KMO and Bartlett Test Variable 2 Teacher Questionnaire

Prueba de KMO y Bartlett Var 2 Docentes Dimensión tecnologia

Medida Kaiser-Meyer-Olkin de adecuación de muestreo		,738
Prueba de esfericidad de Bartlett	Aprox. Chi-cuadrado	468,675
	gl	153
	Sig.	,000

Source: Own elaboration (2025)

Figure 1: ***Sedimentation graph Variable 1 Teachers Questionnaire***



Source: Own elaboration (2025) . In original Spanish language

Table 6: Variable 1 teacher rotated component matrix

Matriz de componente rotado Var 1 - Docentes[a]

	Componente			
	1	2	3	4
Item12 Meta Semantica	,864			
Item5 Expresión Oral- Habla	,785	,343	,311	
Item10 Meta Fonológia	,669		,426	
Item8 Meta Fonológia		,854		,308
Item14 Meta Semantica		,674		
Item7 Meta Fonológia		,470	,447	,427
Item9 Meta Fonológia		,468		
Item13 Meta Semantica			,859	
Item11 Meta Semantica	,300	,533	,706	
Item1 Comprension Auditiva- Escucha	,366		,577	
Item3 Comprension Auditiva- Escucha				,854
Item2 Comprension Auditiva- Escucha		,513		,645
Item6 Expresión Oral- Habla	,380	,356		,601
Item4 Comprension Auditiva- Escucha	,395		,324	,523

Método de extracción: análisis de componentes principales.
Método de rotación: Varimax con normalización Kaiser.

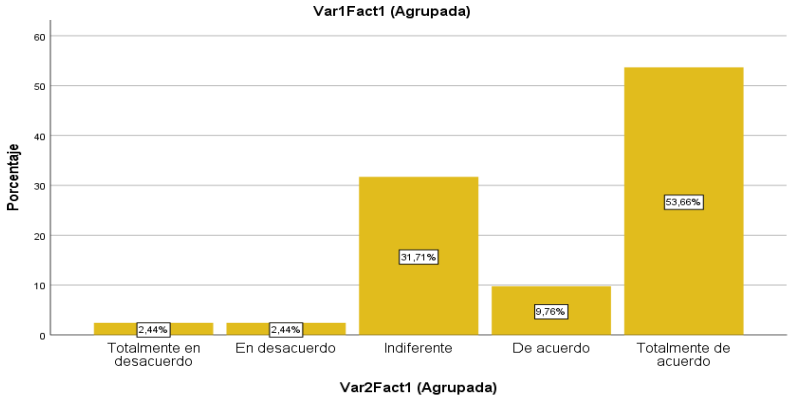
a. La rotación ha convergido en 11 iteraciones.

Source: Own elaboration (2025). In original Spanish language

As can be seen in Table 6, the first factor is composed of three (3) items (questions 5, 10 and 12) while the second factor is composed of four (4) items (questions 7, 8, 9 and 14), the third factor is composed of three items (3) (questions 1, 13 and 11) and the fourth factor is composed of four (4) items (questions 2, 3, 4 and 6). Given the characteristics of the questions, the factors were called: **Factor 1**. Meta Semantics; Factor 2. **Metaphonological;** Factor 3. **Listening Comprehension - Listening** and Factor 4**. Oral-speaking expression.**

In this way, the original fourteen (14) items were converted to four (4) factors that represent the variable Development of Phonological Awareness and that explain **71%** of the common variance.

Figure 2: Variable 1 Factor 1 Teacher Questionnaire

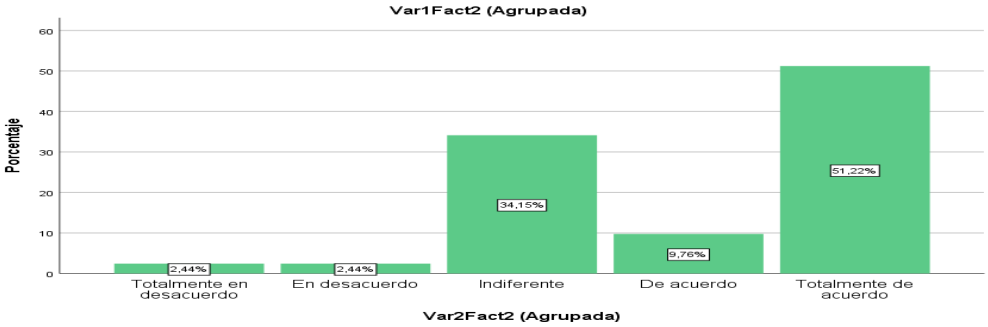


Source: Own elaboration (2025). In original Spanish language

When appreciating Figure 2 and in response to the assessment described above, it was evident that 54% of the teachers valued this factor as they were in total agreement, while 32% considered it indifferent. These results coincided with those presented by Zamora (2022), who determined the effect of the phonological awareness workshop on reading and writing in students of an Educational Unit in Naranjito, which significantly improved the reading and writing process. Allowing the localization of phonological awareness that has a considerable relationship with the development of reading and writing, all this hand in hand with a process of evaluation and monitoring, with which it is possible to determine the best specific ones, after applying the test specific improvements were observed mainly in the process of syllabic dimension.

The factor called Metaphonological is now shown, which explains 18.40% of the common variance.

Figure 3: ***Variable 1 Factor 2 Grouped Teachers***



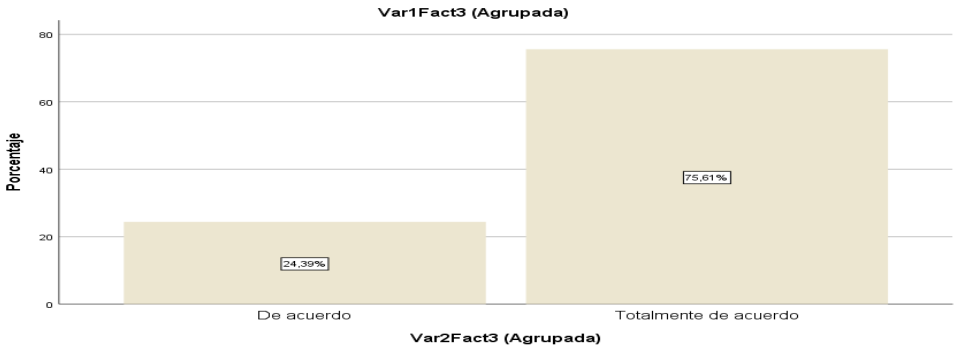
Source: Own elaboration (2025). In original Spanish language

This refers to the ability to identify letters and their adequate representation in sounds, the following results were obtained, while the children's knowledge of the sounds of their own language is highlighted. On appreciating Figure 3 and in view of the assessment described above, it is possible to show that a percentage corresponding to 51% of the teachers value this factor as Totally Agree, although 34% are Indifferent.

These values are consistent with the work of Quispe (2022) from Peru, who verified the effect of the development of metalinguistic awareness on the improvement of reading comprehension in Spanish, as a second language, in primary school students of a bilingual intercultural education institution, concluding that the groups show no difference in terms of text comprehension and the development of metalinguistic awareness in the selected learners and that the development of metalinguistic awareness has a significant effect on improving literal, inferential and critical comprehension of texts in Spanish as a second language.

As for the factor, called **Listening Comprehension - listening** that explains 17.45% of the common variance, it is said that it implies the possibility of understanding and interpreting what is heard, beyond a simple receptive ability of decoding or discriminating sounds where syllables, words, phrases or sentences are inserted.

Figure 4: ***Variable 1 Factor 3 Teacher Questionnaire***



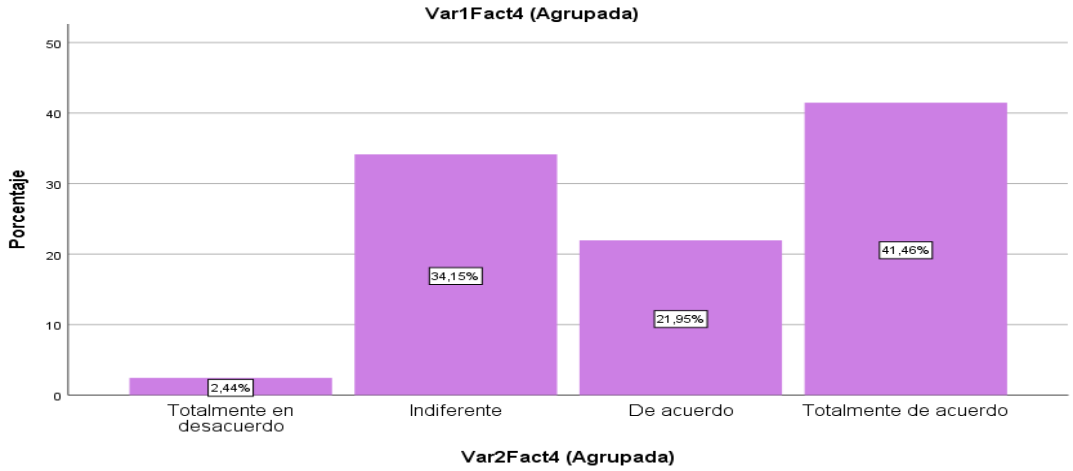
Source: Own elaboration (2025). In original Spanish language

When appreciating Figure 4 and in view of the assessment described above, it is possible to show that a percentage corresponding to 76% of the teachers value this factor as Totally Agree, together with 24% who expressed agreement.

These values are in line with the study by Parra (2022) carried out in Ecuador to provide an overview of the importance of the development of phonological awareness at an early age, where important information is covered on the role played by the development of phonological awareness at an early age and the satisfactory result it has when starting the reading process in children. therefore, it is recommended that future studies be carried out with a view to obtaining contextualized data that allow educational decisions to be made to promote optimal learning of this metalinguistic skill.

Finally, the factor called **Oral-speech expression,** which explains 16.94% of the common variance, refers to the ability to communicate using speech to transmit ideas, thoughts and needs from the mastery of grammar, lexicon and pronunciation of a language, with sociocultural and pragmatic knowledge, had the following result:

Figure 5: ***Variable 1 factor 4 teacher questionnaire***



Source: Own elaboration (2025). In original Spanish language

When appreciating Figure 5 and in view of the assessment described above, it is possible to show that a percentage corresponding to 41% of the teachers value this factor as Totally Agree, while 34% weigh this factor as Indifferent. These values are in line with those presented by Dilek (2024) on improving students' reading comprehension to help them

develop a positive attitude towards reading, as well as contributing to their reading habits using the reading circle technique.

The first factor, called **Semantic Goal**, explains 18.90% of the common variance, reflects a form of reading that leads to recontextualizing what is read in context with what the author experienced in order to better capture what the reading wants to express, from a cognitive analysis.

Table 5: Rotated Component Matrix Variable 2 Teacher Questionnaire

Matriz de componente rotado Var 2 - Docentes Dimensión tecnológica[a]

	Componente			
	1	2	3	4
Item15 Habilidades Tecnológicas	,799		-,309	
Item23 Rol del Docente	,769	,303		
Item17 Habilidades Tecnológicas	,764		,329	
Item34 Tecnología y Sociedad	,610			,593
Item18 Habilidades Tecnológicas	,598		,544	
Item22 Rol del Docente	,520			,447
Item29 Integración de la Tecnología	,465	,421		,355
Item31 Integración de la Tecnología		,859		
Item32 Integración de la Tecnología		,820		
Item30 Integración de la Tecnología	,415	,729		
Item33 Tecnología y Sociedad		,586	,300	,307
Item20 Interactividad			,851	
Item19 Interactividad			,754	
Item16 Habilidades Tecnológicas	,383	,429	,594	
Item24 Rol del Docente		,359	,593	,357
Item26 Adaptabilidad de la Tecnología		,362		,790
Item28 Adaptabilidad de la Tecnología				,758
Item27 Adaptabilidad de la Tecnología	,510			,516

Método de extracción: análisis de componentes principales.
Método de rotación: Varimax con normalización Kaiser.

a. La rotación ha convergido en 5 iteraciones.

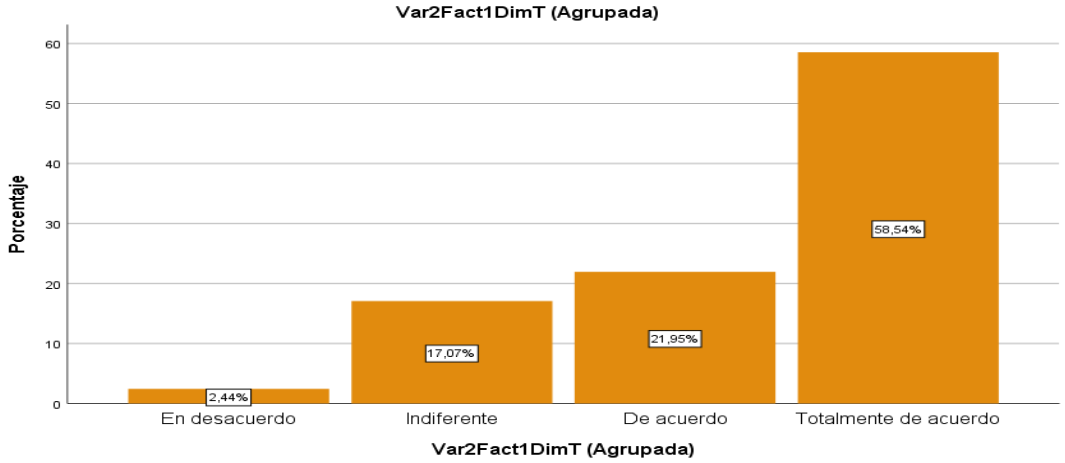
Source: Own elaboration (2025). In original Spanish language

As can be seen in Table 5, the first factor is composed of seven (7) items (questions 15, 23, 17, 34, 18, 22 and 29), factor two is made up of four (4) items (questions 31, 32, 30 and 33), factor three is made up of four (4) items (questions 16, 19, 20 and 24) and the fourth factor is made up of three (3) items (questions 26, 27 and 28). Given the characteristics of the questions, the factors were called: Factor 1**. Technological skills,** factor 2. **Technology Integration,** Factor 3 **Interactivity** and Factor 4. **Technological adaptability.**

In this way, the original twenty (20) variables have been reduced to four (4) factors that represent the perception that teachers have about the variable Graphogame Mediation Based on reading habits that explain 70% of the common variance.

The first factor 1, called **Technological Skills**, explains 18.13% of the common variance.

Figure 6: ***Variable 2 factor 1 teacher questionnaire***



Source: Own elaboration (2025). In original Spanish language

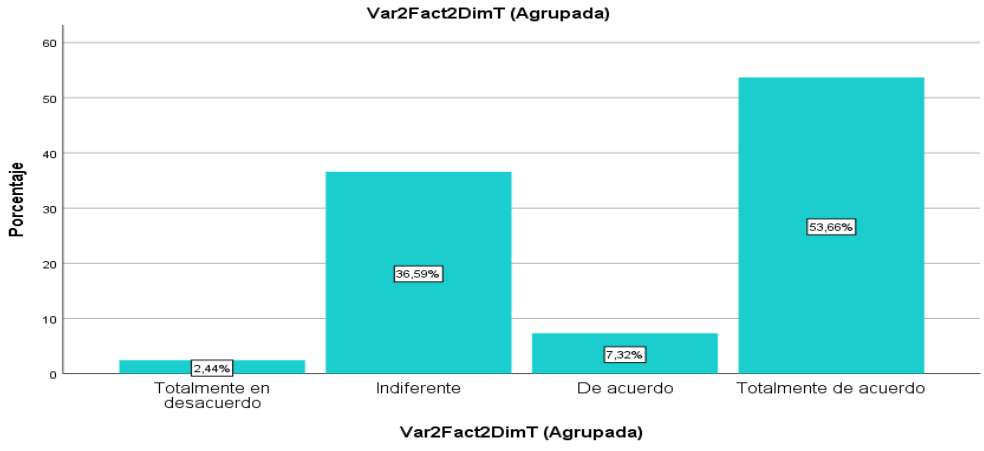
This factor refers to skills and knowledge associated with the use and understanding of modern technologies such as digital platforms and tools or technical software.

When appreciating Figure 6 and in response to the assessment described above, it is possible to show that 59% of teachers expressed Totally Agree, and 22% Agree; these values agree with what was expressed by Rodríguez, Yépez, Apolo & Nasimba (2022) where it is highlighted that phonological awareness should be seen as the pillar of reading and writing and the ability to identify and use sounds in the choice of words that rhyme with each other, along with the counting of syllables and the recognition of the sounds by which these words are formed.

For factor 2 called **Technology Integration,** which explains 15.77% of the common variance and refers to the use and integration of technological resources in the improvement and support of processes, strategies and culture, the results are presented below.

Figure 7

Variable 2 factor 2 teacher questionnaire



Source: Own elaboration (2025). In original Spanish language

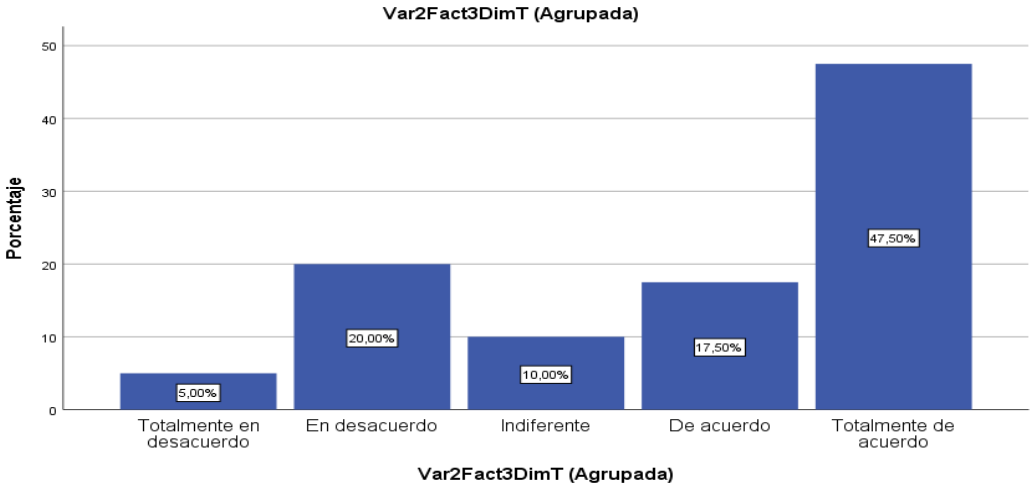
When appreciating Figure 7 and in view of the assessment described above, it is possible to show that a percentage corresponding to 54% of the teachers value this factor as Totally Agree, and 37% were Indifferent. These values are in line with the research of

Guacapasa (2022), who set out to promote reading habits through innovative methodologies (digital corner) and interactive such as current digital tools.

For example, audio stories, digital readings, interactive games were used, in order to enhance the cognitive area and reading comprehension, highlighting the importance of existing technological resources, and their application in a population or age group highly interested in technology and its tools, in addition to taking advantage of these elements to increase and strengthen the reading process; The study was carried out with a small sample, which does not give weight or validity to the instrument applied.

Factor 3 called Interactivity, which explains 12.72% of the common variance, refers to the ability of a digital content or device to respond to a person's actions, or it is the communication between people, computers, programs or digital content in a viable and integrated way.

Figure 8: *Variable 2 factor 3 teacher questionnaire*

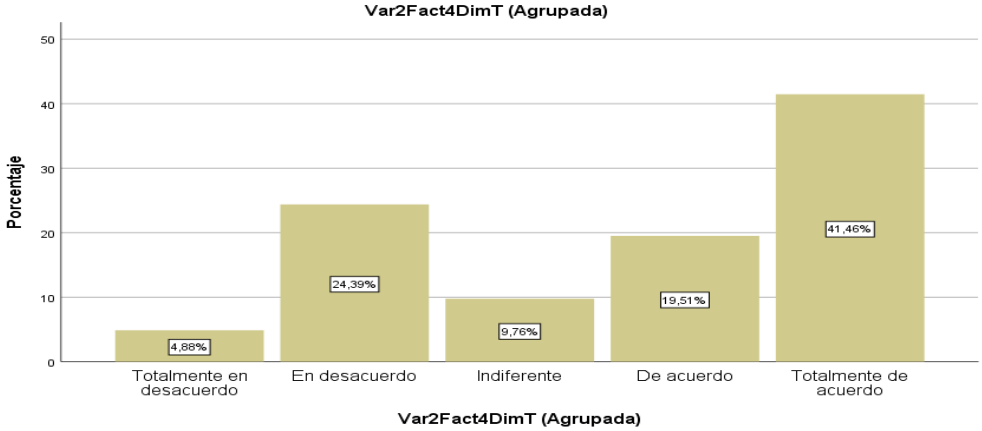


Source: Own elaboration (2025). In original Spanish language

When appreciating Figure 8 and in view of the assessment described above, it is possible to show that a percentage corresponding to 48% of the teachers expressed Totally Agree, while 20% responded to Disagree. These values coincide with the work from Spain carried out by Oliva, Ayuso, Coma, and Torres (2021) on the development of phonological awareness, or the metacognitive ability that makes thinking viable and manipulates the structure of language from an early age for the acquisition of literacy skills, based on multisensory stimulation, curiosity, and interest in learning. since Communication Technologies play a key role from a learning-oriented use that allows the promotion of interest and thinking of digital natives; The article highlights how a game with tangible technology designed for diagnostic, formative and summative intervention and evaluation leads to an experience that, in this case, lasted two weeks, in order to promote the development of phonological awareness.

As for factor 4 called Technological Adaptability, which explains 12.17% of the common variance, it refers to the ability of technology to respond to the modifications and trends that arise.

Figure 9: ***variable 2 factor 4 teacher questionnaire***



Source: Own elaboration (2025). In original Spanish language

When appreciating Figure 9 and in view of the assessment described above, it is possible to show that a percentage corresponding to 42% of the teachers Strongly Agree, while 24% weighted from the Disagree option. These values are in line with the work of Ibáñez (2024) who developed the study to investigate how the processes of mediation and interaction of learning are carried out in virtual scenarios, generating a broad explanation of what the theory of cognitive modifiability and mediated learning seeks where he highlights the importance of the model to follow in children and the fundamental support of parents in the teaching-learning process.

Among the main gaps is the absence or misuse of technological resources and/or digital tools for the process of teaching reading and reading comprehension, which is why it proposes mediation and appropriation of these current tools, thus promoting educational innovation.

Summary of findings

Factor analysis allowed reducing and reorganizing the items of the instruments applied, confirming the internal coherence of the proposed dimensions. In the variable development of phonological awareness, the fourteen initial items were grouped into four factors: metasemantic, metaphonological, listening-listening comprehension and oral-speech expression, which together explained 71% of the common variance. These factors show the consistency of the linguistic and metalinguistic components proposed in the questionnaire.

On the other hand, the technological mediation variable based on reading habits was structured in four factors: technological skills, integration of technology, interactivity and technological adaptability. These factors explained 70% of the common variance, which confirms the relevance of the questionnaire to characterize the teachers' perception regarding the use of Graphogame as a pedagogical support tool.

The statistical results, supported by a Cronbach's alpha of 0.978, allow us to conclude that the instruments designed achieved a high internal consistency, guaranteeing the reliability of the data collected. Taken together, the findings offer a solid empirical basis for the analysis of phonological awareness and the role of technological mediation in the educational process.

Discussion

The exploratory factor analysis allowed to reduce the initial items to a set of factors with high explanatory capacity of the variables under study. In the case of the development of phonological awareness, the fourteen items were organized into four factors that together explain 71% of the common variance, which shows the consistency of the instrument and the relevance of the dimensions identified. Next, each of the factors resulting from the application of the instrument will be explained.

Factor 1. Meta Semantics. This factor, which explains 18.90% of the common variance, reflects the students' ability to recontextualize what they read and link it to previous experiences, allowing a deeper understanding of the text. This result coincides with what Gillon (2004) proposes, who argues that phonological awareness is not limited to decoding, but involves cognitive processes of greater complexity, such as the construction of meaning. Likewise, Bravo (2002) highlights that semantic analysis in the early stages is a key predictor of reading success.

Factor 2. Metaphonological. The identification of this factor confirms the relevance of metalinguistic skills in learning to read. Jiménez and O'Shanahan (2008) point out that explicit reflection on the phonological structure of words allows the child to recognize and manipulate sounds, strengthening the grapheme-phoneme correspondence. These findings reinforce the need to integrate strategies that favor phonemic awareness from the earliest grades.

Factor 3. Listening-listening comprehension. This factor highlights the importance of active listening and listening comprehension as precursors to initial literacy. Snow (2002) emphasizes that previous oral skills, especially the ability to attend to and understand auditory messages, constitute the foundation on which reading learning is built. The results obtained corroborate that phonological awareness cannot be analyzed in isolation, but in interaction with listening comprehension competencies.

Factor 4. Oral-speaking expression. The inclusion of this dimension evidences the close relationship between oral production and reading development. According to Bravo (2002), verbal expression not only favors the acquisition of vocabulary, but also allows the consolidation of phonological representations necessary for reading and writing. In this sense, the findings of the study support the idea that the strengthening of oral expression contributes to the progress of phonological awareness in the first school levels.

Regarding technological mediation based on reading habits, the initial twenty items were grouped into four factors that explain 70% of the common variance, confirming the relevance of the instrument and its ability to represent the perceptions of teachers and students regarding the use of digital tools.

Factor 1. Technological skills. This factor, which explains 18.13% of the variance, reflects the mastery of basic skills in the use of digital resources. In accordance with Segers and Verhoeven (2005), the development of technological competencies is essential for educational applications to have an effective impact on the acquisition of reading and writing.

Factor 2. Technology integration. This finding shows that the pedagogical value of digital tools depends on their incorporation into teaching practices and the school curriculum. Naeem and Khan (2019) highlight that the simple availability of technological resources does not guarantee meaningful learning, but requires intentional mediation by the teacher. The

results of this study reinforce this position, showing that pedagogical integration is decisive to enhance reading habits.

Factor 3. Interactivity. The presence of this factor confirms that student participation is a central element in the use of educational technologies. According to Sevillano (2017), interactivity favors motivation, autonomy, and the construction of meaningful learning. In the case of applications such as Graphogame, this dimension translates into opportunities for playful practice that stimulate phonological awareness.

Factor 4. Technological adaptability. This factor reflects the ability of digital resources to adjust to the rhythms, styles and needs of students. As Segers and Verhoeven (2005) point out, the most effective educational technology is one that allows for the personalization of learning. In this sense, the technological adaptability identified in the results constitutes an added value that favors the consolidation of reading habits in heterogeneous contexts.

Overall, the findings show that technological mediation favors the development of phonological awareness, generating a positive impact on the acquisition of linguistic and metalinguistic skills. The coincidence between the factors identified and what has been proposed by the previous literature supports the validity of the proposed model and suggests the need to promote the pedagogical integration of digital resources as a strategy to strengthen initial literacy in school contexts.

Conclusion

From this analysis, it is concluded that the development of phonological awareness is a determining factor in the processes of initial literacy, and that its strengthening is enhanced through the integration of technological resources such as *Graphogame*. The dimensions identified in the factor analysis show that phonological awareness is not limited to the decoding of sounds, but involves processes of semantic comprehension, metalinguistic skills, listening comprehension and oral expression, all interrelated and fundamental for the acquisition of reading and writing.

The findings also show that technological mediation based on reading habits provides significant value to the educational process, to the extent that it facilitates the development of technological skills, promotes the pedagogical integration of digital resources, fosters student interactivity and enables adaptability to different learning rhythms and styles.

In this way, the results obtained support the need to overcome traditional teaching models focused on mechanical repetition, to move towards pedagogical proposals that incorporate the use of interactive digital tools, favoring significant learning and the integral development of students.

Based on the above ideas, it can be inferred:

1. The importance of the development of phonological awareness as an essential basis for the acquisition of reading and writing in the first years of schooling, highlighting that its strengthening constitutes a fundamental axis for the construction of later learning.
2. Teacher mediation acquires a central role, as it allows the transition from traditional methodologies to the use of innovative technological resources, such as *Graphogame*, which enrich teaching and facilitate access to more dynamic and meaningful learning experiences.

3. The balanced integration of technology in pedagogical practice, guided by the guidance of the teacher, favors not only the development of linguistic and metalinguistic skills, but also the formation of reading habits and socio-emotional competencies that enhance the educational trajectory of students.

4. The role of the teacher emerges as an essential mediator in this process, given that their ability to guide, integrate and contextualize digital tools is decisive for them to become true learning instruments and not isolated resources.

Finally, it is recommended to continue with research that delves into the impact of technological mediation on the development of phonological awareness at different educational levels, as well as in the evaluation of teacher training programs that promote the pedagogical use of digital tools in the teaching of reading and writing.

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