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CÁTEDRA

Interactive applications as a strategy for socio-emotional development in primary school students

Aplicaciones interactivas como estrategia para el desarrollo socioemocional en estudiantes de educación primaria de escuelas

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Abstract

The objective of this study was to propose the integration of free interactive applications to strengthen the development of socio-emotional skills in primary school students in rural schools. Their use allows for the creation of dynamic, participatory, and contextualized learning experiences focused on emotion recognition, self-regulation, empathy, assertive communication, and peaceful conflict resolution. In rural contexts, where access to specialized educational resources and psychosocial support may be limited, these tools offer new possibilities to complement teachers' work and promote inclusive school environments. The research was conducted using a mixed-methods approach and a concurrent triangulation design. For data collection, observation sheets were used with 22



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students, surveys were administered to 2 teachers, and interviews were conducted with 3 experts. The results demonstrated the pedagogical and technical feasibility of implementing applications such as Smile and Learn, Respira, Juega, Actúa (Breathe, Play, Act), and Invasión Zombi (Zombie Invasion). These applications stand out primarily for their offline accessibility, cultural relevance, and capacity to promote social skills such as empathy, emotional self-regulation, and assertive communication. Furthermore, a favorable predisposition among teachers toward the use of technologies and digital applications was identified, although the need for institutional strengthening for their systematic adoption is evident. It is concluded that the proposal constitutes an innovative and contextualized alternative to contribute to reducing educational and socio-emotional gaps in rural environments

Keywords

Socio-emotional development, interactive applications, rural education, emotional self-regulation, educational technologies

Resumen

El objetivo de este estudio fue proponer la integración de aplicaciones interactivas gratuitas para fortalecer el desarrollo de habilidades socioemocionales en estudiantes de educación primaria de escuelas rurales. Su utilización permite generar experiencias de aprendizaje dinámicas, participativas y contextualizadas, orientadas al reconocimiento de las emociones, la autorregulación, la empatía, la comunicación asertiva y la resolución pacífica de conflictos. En los contextos rurales, donde pueden existir limitaciones de acceso a recursos educativos especializados y acompañamiento psicosocial, estas herramientas ofrecen nuevas posibilidades para complementar la labor docente y promover ambientes escolares inclusivos. La investigación se desarrolló mediante un enfoque mixto y un diseño de triangulación concurrente. Para la recolección de información se aplicaron fichas de observación a 22 estudiantes, encuestas a 2 docentes y entrevistas a 3 expertos, de manera que, los resultados evidenciaron la factibilidad pedagógica y técnica de implementar aplicaciones como Smile and Learn, Respira, Juega, Actúa e Invasión Zombi, las cuales se destacan en lo principal por su accesibilidad offline, pertinencia cultural y capacidad para promover habilidades sociales como la empatía, la autorregulación emocional y la comunicación asertiva, por otra parte, se identificó la predisposición favorable de parte de los docentes hacia el uso de tecnologías y aplicaciones digitales, aunque es evidente la necesidad de que exista fortalecimiento institucional para su adopción sistemática. Se concluye que la propuesta constituye una alternativa innovadora y contextualizada para contribuir a la reducción de brechas educativas y socioemocionales en entornos rurales.

Palabras clave

Desarrollo socioemocional, aplicaciones interactivas, educación rural, autorregulación emocional, tecnologías educativas.

1. Introduction

The socio-economic skills allow students to understand, regularly and express their emotions in the context. Aristulle and Paoloni indicate that emotions are subject to emotional influence and influence in which people perceive and respond to situations, personas and objects (Aristulle and Paoloni, 2019, p. 7). Therefore, it is vital that students



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learn to develop skills that facilitate an adequate emotional development that promotes personal well-being, social adaptation and significant learning.

From receiving UNESCO thanks to a study carried out in the year 2019 with the aim of promoting the teaching of socio-economic skills in educational systems, the module is based on consideration of very socio-economic skills: empathy, awareness of diversity and self-regulation school. In relation to empathy, the results obtained from the various participating countries show that the students report their conduct, emotions or feelings that are based on empathy on repeated occasions with moderate frequencies of 55% and only 15% declares a low frequency of this type of behavior, if Cuba is a country that has a higher average than other participating countries in this category. On the other hand, UNESCO indicated that 85% of students from the participating countries declared a favorable activity, although only 6% reported feeling much dissatisfaction among their distinct people, whether in Costa Rica or Cuba who found their most positive points in this area. Finally, in terms of automatic school regulation, the 74% of responses indicate that students are aware of the fact that they are capable of ejecting automatic actions in the school environment and only 5% report that this type of conduction occurs with a low frequency. non-existent, new Cuba has seen a major point that the rest of the participating countries, Brazil reveals a lower point, but it has a positive level (UNESCO, 2024, p. 22-27).

In the current situation, the socio-economic development has been consolidated as an essential component in basic education, especially in the rural sectors of Ecuador, where the social, economic and technological conditions present limited variations and strengthen the socio-economic skills that can mark a positive difference. in the general well-being and academic despair of children. La presente investigación trata sobre la problemática relacionada con la utilización de recursos tecnológicos interactivos orientados al desarrollo socioemocional en estudiantes de educación primaria de escuelas rurales. The root of the problem is the limited availability of innovative teaching methods adapted to the economic needs of students, which restricts their educational potential and negatively affects their overall well-being.

One of the main issues identified is the limited access to technology in rural areas, which has a direct impact on the viability of digital strategies applied in the classroom. According to data from the National Institute of Statistics and Censuses (INEC), digital analysis in the rural sector reaches 14.1% in people between 15 and 49 years old, including those who do not have an active cell phone, do not use a computer or have access to the internet in it last year (INEC, 2024, p. 20).

This situation is based on various factors, among them the resistance or the scarce interests of some educational documents related to the change processes, the lack of capacity in the pedagogical use of interactive applications and the limitation of the existence of local studies in this topic. In conjunction, these conditions make it difficult to effectively implement technological strategies oriented toward the growth of socio-economic development in childhood. Emotional education constitutes an important pillar in the development of children, particularly in early childhood. Ignoring this aspect can generate negative consequences in your self-esteem, academic coexistence and learning ability. In this context, Garofalo and Villao identify multiple applications in the rural educational system, stories such as the lack of understanding of the educational use of technology, the lack of access to teaching courses, the precariousness of basic services, and the adverse geographic conditions that make assistance to classes difficult, and the limited orientation of education towards technical productive development (Garofalo and Villao 2018, p. 156). In this



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situation, we recognize the urgent need to integrate digital networks with interactive applications, those which are demonstrated to be effective in fostering skills such as empathy, emotional regulation and communication, through educational and accessible activities in the context. pedagogical.

The idea of this research consists of proposing a didactic guide: discovering socio-economic skills through collaborative games without connectivity. The proposal is supported by a framework of research with mixed methodology, which combines quantitative and qualitative instruments with a predominance of qualifications, allowing for a more profound understanding of the phenomenon studied.

The suggestions that this is your study: can free interactive applications be offered to help you learn socio-economic skills in general basic education at a rural school? Do free and accessible technological options currently exist to serve this purpose in rural educational contexts? Do you have the digital skills level of this institution? Are there educational and teaching benefits offered to improve socio-economic skills in basic general education students? As it answers to these questions, this plant studio offers free interactive APPS for the development of socio-economic skills in primary education students of rural schools, so it is also hoped that it can be replicated or adapted to other similar contexts, providing a contextualized solution to the existing economic and technological gap.

This proposal responds to a concrete educational need and offers a relevant pedagogical alternative to reduce inequalities in access to emotional and digital resources in rural areas. To integrate technological tools into the classroom in an intentional and context-sensitive manner, it contributes to a more inclusive, equitable and humanized education of the first and second students.

This article is organized into five epigraphs. In the first section we describe the introduction that addresses the antecedents, the justification of the study and the questions of the investigation; In section 2 we will discuss the revision of the literature that theoretically funds the study, mainly in the socio-economic development, the pedagogical use of information technology and communication and interactive educational applications. In section 3 we describe the methodological design, explaining the mixing process, the type and the investigation design, the population and the data, the data collection instruments and the analysis procedure. In section 4 we present and discuss the quantitative and qualitative results, and incorporate the didactic proposal based on interactive applications to promote socio-economic skills in rural contexts. In the last section 5 we explain the conclusions derived from the main conclusions obtained from the study.

2. Literature Review

2.1 Definition of socio-emotional development

Diehl and Gómez state that socio-emotional development refers to the set of cognitive and emotional skills that a person can acquire and strengthen to act in ways that promote both their own well-being and that of others (Diehl & Gómez, 2020, p. 6). These skills allow individuals to achieve positive outcomes in their health, interpersonal relationships, and academic and professional goals, as well as facilitating positive participation in society.

2.1.1 Importance of socio-emotional skills

The Ministry of Education indicates that social-emotional education is a comprehensive process through which children and adolescents acquire and apply knowledge, values, attitudes, and skills essential for understanding themselves and others, making responsible



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decisions, and facing challenges ethically (Ministry of Education of Ecuador, 2020, p. 3). Its purpose is to develop tools that promote personal and social well-being, in accordance with the recommendations of organizations such as the WHO, PAHO, and UNICEF, which highlight the importance of fostering life skills as a protective factor for emotional and mental health. Within the framework of Ecuador's National Education System, five fundamental skills for students' social-emotional development have been identified: empathy, understood as the ability to put oneself in another person's shoes, understand their emotions, and accept differences; self-awareness, which allows one to recognize emotions, thoughts, strengths, and areas for improvement; emotional management, related to the ability to identify, express, and manage feelings such as anger, sadness, or frustration, avoiding impulsive responses; Conflict resolution, which promotes a peaceful, dialogical, and constructive approach to disagreements; and decision-making, which enables informed and responsible choices among various alternatives, considering their consequences, the context, and one's own and collective well-being (MINEDUC, 2020, p. 4).

2.2 Principles of the pedagogical use of ICT

Based on the following principles, the importance of a reflective and contextualized integration of ICT in education can be highlighted, considering not only its presence in the classroom, but also its function and the way in which it is used to improve teaching and learning processes.

a. Transformation of organizational structures

The implementation of ICTs in Ecuadorian public schools has modified the organizational structures of educational centers, although it has not substantially altered educational practices in the classroom (Gallego et al., 2010, p. 5).

b. Fostering student motivation

The use of ICTs has been shown to foster high student motivation to learn, suggesting a positive impact on the teaching-learning process (Gallego et al., 2010, p. 8).

c. Digital Competencies and Teacher Training

The effective incorporation of ICTs in education requires that teachers be adequately trained and equipped to integrate these technologies into their pedagogical practices (Gallego et al., 2010, p. 13). Therefore, teachers' digital competencies consist of the effective use of technological tools for pedagogical purposes, beyond their instrumental function (Guevara, 2024, p. 104).

d. Curricular Integration of ICTs

For ICTs to have an impact on education, it is essential that they be integrated into the curriculum and not used in isolation or as a supplement (Gallego et al., 2010, p. 17).

e. Continuous Evaluation and Adaptation

It is important to continuously evaluate the use of ICTs in the educational environment and adapt them according to the specific needs and contexts of each institution and educational community (Gallego et al., 2010, p. 15).

2.3 What are interactive educational applications?

"Interactive applications designed for educational purposes allow students to interact dynamically with diverse multimedia resources such as text, graphics, audio, video, and links" (Salazar et al., 2025, p. 868). These types of applications do not simply present information passively, but rather invite the user to actively participate in their learning process.



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Based on an analysis of López-Peñalver's work (2023), several types of applications specifically aimed at emotional development are identified:

a. Mindfulness Applications

According to López-Peñalver (2023), these consist of breathing exercises, guided meditations, and relaxation activities (p. 9). Students learn to manage stress and anxiety, improving their emotional well-being and concentration in the school environment, as exemplified by the app "Breathe, Play, Act."

b. Interactive Role-Playing Games

Role-playing games allow students to assume different characters and situations, facilitating the understanding and expression of their own and others' emotions (López-Peñalver, 2023, p. 20). A recommended application that incorporates this methodology is called "Mathematics: Zombie Invasion."

c. Digital simulations

López-Peñalver (2023) defines them as simulation applications that offer virtual environments where students can experience various social and emotional situations in a safe context (López-Peñalver, 2023, p.16), such as the "Smile and Learn" application.

Implementing these applications in the primary education curriculum would contribute to students' holistic development by combining academic learning with the strengthening of emotional and social skills. Furthermore, the strategic use of ICT in the classroom fosters a more interactive and participatory learning environment, preparing students to face the challenges of an increasingly digital and complex world.

2.3 1 Characteristics of an effective educational app

The use of mobile technologies has become increasingly important as a support tool in teaching and learning processes, and the incorporation of mobile applications opens up new possibilities for personalizing teaching, motivating students, and facilitating access to knowledge. However, for these technological tools to be truly effective, they must meet certain pedagogical, technical, and contextual quality criteria, such as:

a. Meaningful Pedagogical Integration

Vera and Cárdenas indicate that these tools should be aligned with curricular objectives and facilitate teacher mediation, not replace it (Vera & Cárdenas, 2021, p. 112). Their use should respond to the real needs of the teaching-learning process, promoting active and student-centered methodologies.

b. Accessibility and Adaptability

Vera and Cárdenas state that it is essential for them to be accessible to diverse educational contexts (Vera & Cárdenas, 2021, p. 113), considering factors such as connectivity, device availability, and users' digital skills.

c. Ease of Use and Intuitive Design

Vera and Cárdenas affirm that a user-friendly interface and intuitive design (Vera & Cárdenas, 2021, p. 115) allow both teachers and students to use the application without technical difficulties, enabling them to focus on the educational content.

d. Fostering Autonomy and Motivation

Vera and Cárdenas state that successful applications promote student autonomy, offering opportunities for self-directed learning and self-assessment (Vera & Cárdenas, 2021, p. 116). They also incorporate elements that increase motivation, such as immediate feedback and rewards for achievements.

e. Teacher Training and Technical Support



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Vera and Cárdenas mention that the effective implementation of educational applications requires training programs for teachers (Vera & Cárdenas, 2021, p. 118), enabling them to critically and reflectively integrate these tools into their teaching practice.

f. Evaluation and Continuous Improvement

Vera and Cárdenas indicate that it is necessary to establish evaluation mechanisms to measure the application's impact on learning and gather user feedback (Vera & Cárdenas, 2021, p. 121). This allows for adjustments and continuous improvements.

2.4 Pedagogical Foundations

a. Daniel Goleman's Theory of Emotional Intelligence

Emotional intelligence is "the set of skills that allow one to recognize, express, and manage emotions appropriately, both personally and socially" (Caputi, 2024, p. 48). Emotions such as self-motivation, perseverance, empathy, and mental agility can be strengthened with the help of interactive apps that contribute to students developing a resilient and socially adaptive character.

b. Ausubel's Theory of Meaningful Learning

Meaningful learning occurs when new information is linked in a non-arbitrary and substantive way to the student's prior cognitive structure through advance organizers that prepare the conceptual groundwork (Pinzón, 2024, p. 8860). Interactive apps promote and facilitate deep understanding, lasting retention, and the development of critical thinking by allowing students to actively reason, analyze, and evaluate the content.

c. Vygotsky and Piaget's Constructivism and Technology-Mediated Learning

According to Rodríguez, Jean Piaget conceives of constructivism as a process of progressive cognitive development, where the individual assimilates new knowledge through pre-existing mental schemas. He also posits that learning occurs through exploration of the environment, and that the processes of assimilation and accommodation allow for the attainment of complex states of thought. On the other hand, Lev Vygotsky considers learning to be a social process mediated by language and interactions with others (Rodríguez, 1999), particularly with those who possess greater knowledge. Therefore, in both processes, interactive apps allow students to explore, experiment, and collaborate on activities that promote socio-emotional development through technology as a mediator of learning.

3. Methodology

This work is based on the pragmatic paradigm, understood as the capacity of an idea or proposal to generate practical, useful, and beneficial results in addressing a specific problem (Arias, 2023, p. 15). In accordance with this paradigm, a mixed-methods approach is adopted, defined as the set of systematic processes for collecting, analyzing, and integrating quantitative and qualitative data within a single study, with the purpose of providing a broader and deeper response to the research question (Hernández-Sampieri et al., 2014, p. 532). The choice of this paradigm and approach directly responds to the overall objective of proposing the implementation of interactive applications aimed at strengthening the socio-emotional development of students in rural areas.

3.1 Approach

The present research employs a mixed-methods approach, with a predominance of qualitative elements, allowing for a deep and contextualized understanding of the



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contribution of interactive applications to the socio-emotional development of primary school students in rural environments. From the qualitative perspective, this approach is recognized as enabling the formulation and refinement of questions and hypotheses before, during, and after data collection and analysis (Hernández-Sampieri et al., 2014, p. 7). In this sense, semi-structured interviews were used to explore the perceptions, experiences, and meanings constructed by experts regarding the importance of socio-emotional development in rural areas; the influence of applications on learning breathing and self-regulation techniques; their feasibility of implementation in contexts with technological limitations; the methodological challenges associated with the use of interactive games; their impact on the understanding and management of emotions, as well as on motivation toward school subjects; and the didactic elements that promote socio-emotional learning. In addition, the quantitative approach, which allows for data collection to test hypotheses based on numerical measurement and statistical analysis (Hernández-Sampieri et al., 2014, p. 4), is implemented through Likert-type surveys for teachers and Likert-type observation checklists for students, in order to identify observable changes in socio-emotional competencies. This methodological articulation allows for the validation of qualitative findings with empirical evidence, thus providing a comprehensive, rigorous perspective adapted to the rural context in which the study is conducted.

3.2 Type of research

This study falls under the category of applied and participatory research, as it seeks to achieve relevant knowledge and address a general problem (McMillan & Schumacher, 2005, p. 24) through a specific educational intervention based on the implementation of interactive applications that promote the socio-emotional development of elementary school students in a specific rural context. It is also classified as exploratory and descriptive research, given that its purpose is to examine a research topic or problem that has received little attention (Hernández-Sampieri et al., 2014, p. 91) and to characterize the experiences and perceptions of teachers and students regarding the pedagogical use of these technological tools, as well as to identify observable changes in skills such as empathy, emotional self-regulation, and communication.

3.3 Research Design

The research was conducted using a Concurrent Triangulation Design (DITRIAC), characteristic of a mixed-methods approach, which allows for the simultaneous collection and analysis of qualitative and quantitative data. Although the data obtained simultaneously are analyzed separately (Hernández-Sampieri et al., 2014, p. 557), the results are subsequently integrated in the interpretive phase to establish convergences, complementarities, or discrepancies. The triangulation process included comparing the teachers' quantitative perceptions, obtained through surveys, with classroom observations of students; validating the findings with expert opinions; and cross-referencing the data with the theoretical framework, thus strengthening the internal coherence and interpretive rigor of the research:

- **Phase 1: Quantitative Instrument**

Likert-type surveys will be used with teachers, and Likert-type observation checklists will be used with students to evaluate teachers' digital competence levels and students' progress in socio-emotional skills.

- **Phase 2: Qualitative Instrument**

Structured interviews will be conducted with experts in educational psychology and technologies applied to education. The purpose is to deepen our understanding of



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the pedagogical use of interactive applications and their contribution to children's socio-emotional development.

• Phase 3: Integration of Results

In this stage, the qualitative and quantitative results will be triangulated and integrated. The findings will be compared and interpreted together, using a side-by-side approach (Hernández-Sampieri et al., 2014, p. 557). The quantitative results are presented first, followed by the qualitative categories and relevant quotes from experts, to determine convergences, divergences, or complementary contributions.

3.4 Sample population

The sample population is defined as a subgroup of the universe or population from which data are collected and which must be representative of it (Hernández-Sampieri et al., 2014, p. 173). In this study, it consists of students in Basic General Education at a public school located in a rural area. This sample includes both the students and the teachers who actively participate in the teaching-learning process within the classroom, constituting the focus group on which the data collection techniques and instruments were applied.

Level	EGB
Parallel	A
Conference	Morning
Students	22
Teachers	2
Experts	3
Grand Total	27

Table 1. (Granda, 2025).

The selected sample consists of the 3 experts, a total of 22 students and 2 teachers from a small rural school characterized by a low socioeconomic level. All attend the morning session, so the small population is accessible and manageable; therefore, we will work with all participants.

3.5 Correlation of Instruments

The integration of both approaches, qualitative and quantitative, will be achieved through methodological triangulation. The findings from the numerical data of the personal surveys and observation sheets will be compared with the numerical results obtained through the surveys. This correlation will allow:

- Validate the internal consistency of the data by comparing participants' subjective perceptions with quantifiable indicators.
- Identify and explain in detail how interactive applications would contribute to specific aspects of socio-emotional development.
- Delve deeper into the analysis of the benefits and challenges associated with integrating technologies, which will facilitate the development of improvement strategies adapted to the rural educational context.

Therefore, to determine the reliability of the results, Cronbach's Alpha was applied. This tool measures the internal consistency or reliability of the test-type data collection instrument, producing values between zero and one (Hernández-Sampieri et al., 2014, p. 295). The validation of the surveys administered to teachers yielded a very positive Cronbach's Alpha reliability coefficient of 0.973, while the observation checklists



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administered to students showed a Cronbach's Alpha reliability coefficient of 0.953, indicating completely reliable responses.

On the other hand, the process that allowed for the validation of the proposal, where the interviewed experts indicated that interactive applications do indeed contribute to socio-emotional development provided they are implemented with teacher mediation, adaptations, teacher training, and institutional support, was carried out using MAXQDA software. This is a definitive qualitative data analysis software that allows for the organization, analysis, and interpretation of a variety of data, and its functions include coding, categorization, data visualization, text search, and quantitative content analysis (VERBI Software, 2025). The experts agreed that the collaborative games approach fosters student motivation and the acquisition of soft skills.

3.5.1 Operationalization of the study variables/categories

The operationalization of the study variables on interactive applications and socio-emotional development is established below, in order to collect, analyze, and interpret data. This operationalization is directly aligned with the study objectives and the selected instruments.

Independent Variable	Study Category	Dimensions	Observable Indicators	Technique and Instrument	Unit of Analysis
Interactive Apps.	Pedagogical integration of the app.	Use in activities - Curriculum relevance.	Frequency of app use in the classroom - Relationship to educational objectives.	Likert scale survey / Structured interview.	Teachers/Experts.
	Accessibility and adaptability.	Offline use - Context adaptation.	Ease of access to the app - Suitability to the rural environment and children's abilities.	Likert scale survey.	Teachers.
	Usability and design.	User-friendly interface - Navigation.	Opinion on ease of use and interaction.	Likert scale survey.	Teachers/Students.
	Acceptance and continued use.	Overall assessment - Willingness to continue.	Intention to continue using the app - Perceived usefulness.	Likert scale survey.	Teachers/Students.

Table 2. (Granda, 2025). Study variables/categories, independent variable.



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Independent Variable	Study Category	Dimensions	Observable Indicators	Technique and Instrument	Unit of Analysis
Socio-emotional Development.	Empathy.	Comprensión emocional- Cooperación.	Interés por las emociones ajenas- Colaboración en actividades con otros.	Encuesta likert.	Docentes / Estudiantes.
	Emotional self-regulation.	Impulse control - Emotional recognition.	Use of emotional control strategies - Verbal identification of emotions.	Likert survey.	Teachers / Students.
	Assertive communication.	Expression of ideas - Social interaction.		Likert survey.	Teachers.
	Application in daily life.	Transfer of learning.	Clarity in communicating emotions - Participation in group activities.	Likert survey.	Teachers.

Table 3. (Granda, 2025). Study variables/categories, dependent variable.

4. Discussion and Results

The percentages obtained in the quantitative analysis were calculated using SPSS v.25 statistical software. Likert-type observation sheets were applied to 22 students, allowing the collection of data on their performance in different socio-emotional skills. Likert-type surveys were also administered to 2 teachers to obtain a complementary perspective from pedagogical practice. The results obtained from these quantitative instruments revealed clear trends in the development of the evaluated competencies, facilitating the identification of strengths and areas for improvement within the process of implementing the activities aimed at the students.

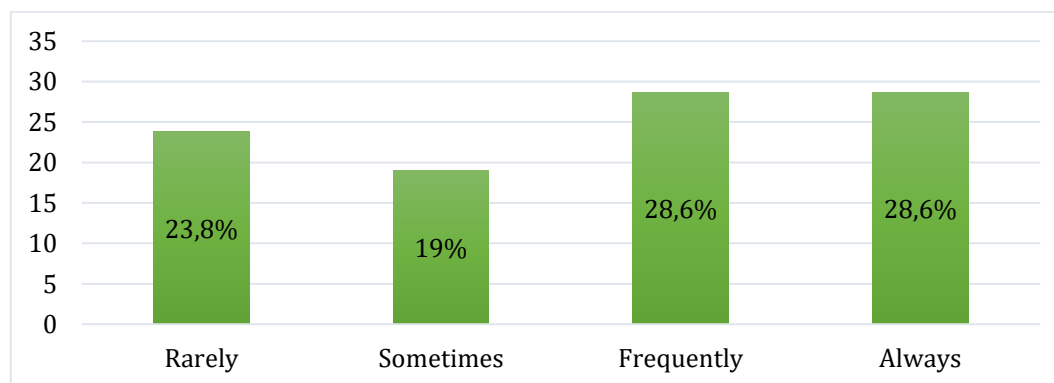


Figure 1. Responses regarding students' awareness of their abilities and limitations.

57.2% of the students showed a high level of self-awareness, with 28.6% indicating this "frequently" and 28.6% "always." Betina and Contini indicate that social skills influence areas such as school and family life, since children who show difficulties in relating to others tend to experience long-term problems such as school dropout, violent behavior, and psychopathological disturbances as adults (Betina & Contini, 2011, p. 161). Therefore, this skill, fundamental for self-regulation and self-esteem, is fostered by reflective activities that



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promote the recognition of emotions, achievements, and areas for improvement. The app played a significant role in this by allowing children to self-evaluate in playful environments.

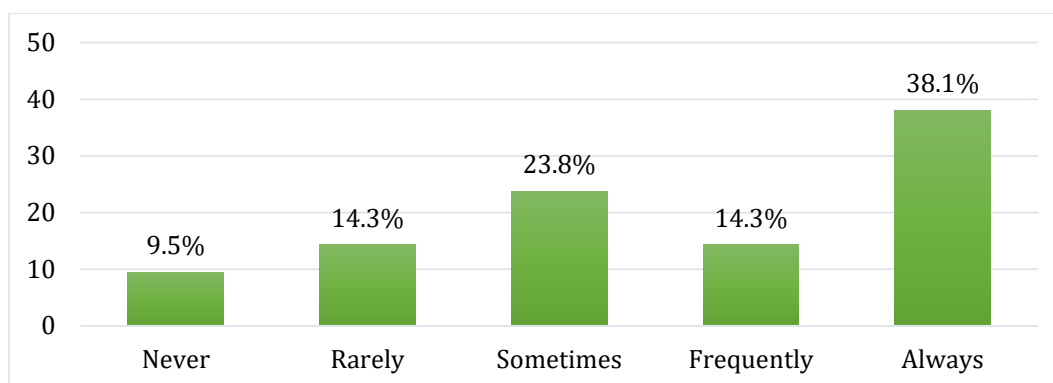


Figure 2. Responses regarding the appropriate management of student frustration.

Although 38.1% indicated that they “always” succeed, a significant group falls into medium or low levels, with 23.8% reporting “sometimes” and 14.3% “rarely.” This suggests that, while progress has been made, difficulties in emotional control when faced with frustration persist. It should be noted that low frustration tolerance is linked to emotional situations such as negative events involving aggression, desolation, maladjustment, apathy, and anxiety, triggering an emotional imbalance in the student (Degante & Caselin, 2022, p. 342). Therefore, this skill needs to be reinforced through breathing exercises, mindfulness, and problem-solving activities, which are integrated into the dynamics of the application used.

On the other hand, the results of the surveys administered to teachers indicate a favorable disposition toward the use of technology for socio-emotional purposes, despite the structural limitations of the rural environment.

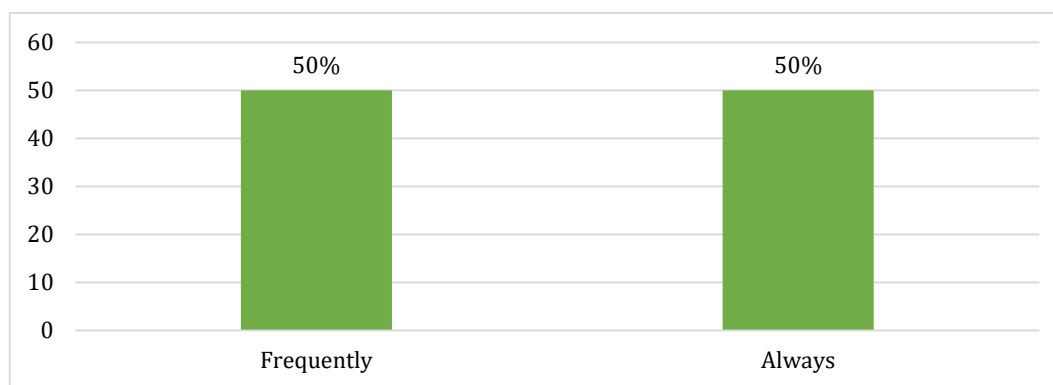


Figure 3. Teacher surveys. I use digital tools to work on socio-emotional aspects such as empathy, self-regulation, and conflict resolution.

One hundred percent of the participants reported using digital tools to work on aspects such as empathy, self-regulation, and conflict resolution, at levels of “frequently” and “always,” agreeing that technology has the potential to strengthen emotional development in rural contexts. As Borja and Carcausto state, “Digital tools in education can be defined as the set of applications and platforms that can help both teachers and students in their academic work” (as cited by Echeverría and Molina, 2022, p. 3), the teachers indicated that they do indeed use these tools, with one frequently and the other always. This is a very positive



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result, as it demonstrates a clear appropriation of the emotional approach through digital resources. This favorable attitude constitutes an essential pillar for implementing innovative, technology-based strategies in the classroom.

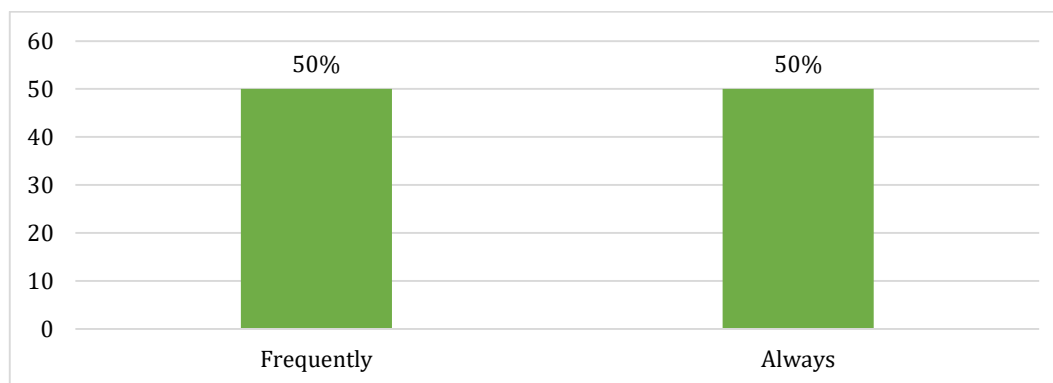


Figure 4. Teacher surveys. I have received training in the use of technologies to work on socio-emotional skills.

Both teachers indicated that they had received training 50% “frequently” and 50% “always.” This training is key to the sustainability of initiatives such as the incorporation of interactive apps with an emotional focus. Authors like Espinoza and Rodríguez (2017) suggest that “new technologies available to children offer new possibilities for accessing information and communication, and also new paradigms for relating to the social context, through the modification and generation of socio-affective skills” (p. 6).

Now, from the qualitative analysis, carried out using the MAXQDA software, which allowed the identification of emotional categories such as emotional self-regulation, empathy, and collaborative work, based on interviews with the experts, the main findings are presented below. Activities such as “Breathe, Play, Act” strengthened emotional self-awareness, “Smile and Learn” facilitated the identification of one’s own emotions and those of others through interactive stories, and the role-playing game “Zombie Invasion” promoted team decision-making, shared leadership, and cooperation among peers.

Experts emphasized that the use of educational technologies for socio-emotional purposes is not only relevant but also viable, provided there is teacher guidance and pedagogical contextualization. The use of MAXQDA allowed for the organization and validation of these perceptions, supporting the effectiveness of the proposal as an innovative and accessible alternative for emotional education in rural settings.

Expert Response 1	Expert Response 2	Expert Response 3	Analysis and Interpretation
Breathing and relaxation are processes that help us with emotional self-regulation, allowing us to better manage and control our emotions, as well as adapt better to different situations,	Digital breathing and relaxation techniques help students calm down, identify their emotions, and respond better to stress. Being interactive and accessible, they promote emotional	I’ve seen that there are apps for self-regulation, for both children and adults, and that would make it much easier for us to reduce stress and anxiety.	According to López-Peñalver (2023), digital breathing and relaxation techniques help manage stress and control emotions, facilitating healthy habits. Experts agree that these techniques promote



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so their influence on our nervous system and the physiological responses in our body are very positive.	self-regulation in a practical and consistent way.	emotional self-regulation by reducing stress and anxiety, highlighting their practicality and accessibility, which allow for consistent and engaging implementation for students. Furthermore, they not only improve immediate emotional responses but also develop healthy habits for long-term stress management.
CODING (TR)		
TR-1: Emotional self-regulation. TR-2: Adaptation. TR-3: Influence on the nervous system. TR-4: Physiological responses.	TR-1: Relaxation Techniques TR-2: Identifying Emotions TR-3: Responding to Stress TR-4: Ongoing Encouragement.	TR-1: Reduce stress and anxiety.

Table 4. Expert Interviews. How can the use of digitized breathing and relaxation techniques influence the student's emotional self-regulation??

Expert Response 1	Expert Response 2	Expert Response 3	Analysis and Interpretation
Any reward obtained through pleasurable motivation generates interest, which can be favorably applied to subjects like mathematics.	Yes, because it transforms learning into a fun and practical experience, sparking interest and commitment in students.	Yes, in fact, it's always important to make the class interactive and fun; this greatly helps student learning.	Gallego et al. (2010) point out that educational games motivate students by making classes dynamic and engaging, improving their performance and commitment.
CODING (MA)			Experts agree that these activities increase motivation and interest, even in subjects perceived as difficult, fostering engagement and academic achievement
MA-1: Reward obtained. MA-2: Pleasurable motivation. MA-3: Favorable application.	MA-1: Playful experience. MA-2: Practice. MA-3: Interest and commitment.	MA-1: Interactive Class MA-2: Learning Support	

Table 5. Interviews with experts. Do you believe that this type of game can improve student motivation towards areas such as mathematics or other subjects?



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Expert Response 1	Expert Response 2	Expert Response 3	Analysis and Interpretation
Consider criteria that ensure adaptability and effectiveness. Aspects such as accessibility, culturally relevant content, usability, security, and integration with the local educational community should be evaluated.	Offline accessibility, simplicity, cultural relevance, ease of use for teachers, and local technical support.	Having an attractive interface and, above all, having tools that are useful and at the same time optimized and easily accessible, meaning that the app is not too difficult to use.	According to Vera and Cárdenas (2021), apps must be accessible, relevant, and easy to use to be effective in rural contexts. The experts emphasize the importance of offline accessibility, simplicity, and cultural relevance, since in rural areas the selection of tools must respond to local and technical conditions to guarantee their effectiveness and sustainability.
CODING (CSA)			
CSA-1: Adaptability and effectiveness.	CSA-1: Accessibility.	CSA-1: Attractive interface.	
CSA-2: Cultural content.	CSA-2: Simplicity.	CSA-2: Useful tools.	
CSA-3: Accessibility, usability, security, and integration.	CSA-3: Cultural Relevance.	CSA-3: Optimization.	
	CSA-4: Technical Support.	CSA-4: Easy access.	

Table 6. Expert interviews. What criteria would you recommend considering when selecting an educational app with an emotional focus for rural contexts?

The responses provided by the experts strengthen the relevance of the pedagogical proposal formulated in this research, whose content consists of a didactic guide: Development of Socio-emotional Skills through Collaborative Games without Connectivity, aimed at primary education students in rural schools.



Figure 5. (Smile and Learn, 2025)

This guide proposes the intentional integration of interactive applications such as Smile and Learn, Breathe, Play, Act, and Zombie Invasion. These applications were selected due to their offline accessibility and cultural relevance, as well as their ability to promote empathy, emotional self-regulation, and communication through playful and collaborative activities.



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The proposal, based on the Technological Pedagogical Content Knowledge (TPACK) model, which focuses on “articulating technological, pedagogical, and curriculum content knowledge to achieve the integration of ICT in teaching practice” (Salas-Rueda, 2019, p. 4), allowed us to understand that the applications were analyzed not only for their technological potential but also for their alignment with socio-emotional learning objectives and their suitability for the specific content of primary school students in rural areas.

Finally, the process carried out using the MAXQDA software allowed for the validation of the proposal, where the experts interviewed indicated that interactive applications do indeed contribute to socio-emotional development, provided they are implemented with teacher mediation, adaptations, teacher training, and institutional support. They also agreed that the collaborative games approach fosters student motivation and the acquisition of soft skills.

5. Conclusions

First, the selection of the applications is justified by their technical and pedagogical characteristics, such as user-friendly design, cultural relevance, and ease of use. These factors facilitate student participation and strengthen emotional understanding and expression, which aligns with the theoretical framework and Goleman's emphasis on developing emotional competencies, especially for students with less exposure to innovative resources. Second, despite the identified technological limitations, such as unstable connectivity and a scarcity of devices, these do not preclude the proposal; rather, they condition its reach and impact. The offline accessibility of the selected applications becomes a key element in overcoming these barriers, as it allows their use without internet access, thus mitigating the effects of the digital divide that characterizes rural areas.

Third, it is concluded that the integration of interactive applications such as “Smile and Learn,” “Breathe, Play, Act,” and “Zombie Invasion” constitutes a highly relevant pedagogical approach for strengthening socio-emotional skills such as empathy, emotional self-regulation, and assertive communication in elementary school students. This is supported by the TPACK model, as the apps not only possess adequate technological potential but also align with pedagogical objectives and curricular content that promote socio-emotional learning in the rural context.

Fourth, the findings show that the effectiveness of these tools depends directly on teacher mediation, appropriate pedagogical contextualization, and ongoing professional development. Teachers expressed a positive predisposition toward the use of technology but recognize the need for greater institutional support. Therefore, it is recommended that implementation include training workshops focused on the practical use of applications, emotional mediation strategies based on Goleman's framework, and guided activities to inform lesson planning. Fifth, the methodology based on data triangulation confirmed the coherence and robustness of the results, integrating teacher perceptions, student observations, and expert validation. This convergence demonstrates that the proposal is viable, contextualized, and innovative for reducing educational and emotional gaps in the rural school studied, constituting a formative strategy that promotes meaningful, equitable learning adapted to the needs of the educational community.



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Declaration of authorship-CRediT

MARÍA GRANDA-MORENO: State of the art, related concepts, data analysis, validation, conclusions, final review.

DIANA CEVALLOS-BENAVIDES: State of the art, related concepts, methodology, validation, data analysis, writing.

Statement on the use of artificial intelligence

The authors declare that they used the ChatGPT tool – GPT-4 model (OpenAI), June 2025 version, exclusively to support language improvement. None of the scientific content, results, analyses, or interpretations were generated by artificial intelligence. All material was written, reviewed, and validated by the author, who is responsible for its accuracy and rigor.



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