Gamification in the Mathematics Teaching-Learning Process in the Seventh Year of Basic Education

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ABSTRACT
The objective of this research was to design and validate a gamified pedagogical proposal to improve the mathematics teaching-learning process in the seventh year of the Mariscal Sucre Educational Unit. A mixed approach with a pre-experimental design using pre-test and post-test measures was applied to a sample of 44 students, 2 teachers, and 1 authority figure. The instruments included surveys, observation sheets, and questionnaires validated by experts. The initial diagnosis revealed low motivation, limited participation, and difficulties in understanding abstract concepts. After implementing gamified activities, mathematical challenges, badges, collaborative tournaments, and family integration, a significant increase was observed in motivation (+42%), participation (+42%), and understanding of abstract concepts (+38%). The proposal, validated through expert judgment, demonstrates that gamification is a viable and transformative strategy for learning mathematics in rural contexts, aligned with Ecuadorian educational policies and current social demands.
Keywords: Educational gamification; Mathematics; Basic Education; Pedagogical strategies; Academic performance.

INTRODUCTION

It is noted that teaching mathematics across the basic education grades is one of the greatest challenges in the Ecuadorian educational system today. Many studies have shown that students have significant difficulties understanding abstract concepts, which directly affects their academic performance. Also, further implications can be a negative perception towards the subject specifically. It is worth highlighting that Mariscal Sucre Educational Unit is located in the cantón of Isidro Ayora in the Guayas province. At this school, 7th-grade students face problems with motivation, low class participation, and little interest in mathematics.

It is essential to mention that the predominance of traditional methodologies focused on repetition and memorization has contributed to the negative perception students may have of mathematics as a difficult subject. These methodologies may appear to be very unattractive to them. This is in addition to limited integration of technological resources and active methodologies in the classroom, and a lack of training opportunities for teachers in innovative strategies. According to the data of the Educational Assessment National Institute (*Instituto Nacional de Evaluación Educativa) (INEVAL, 2020*), more than 45% of Ecuadorian students do not reach the expected level in mathematics, especially in rural zones, which evidences the necessity to implement more dynamic and contextualized methodologies that correspond to the educational system's real expectations.

It is important to note that gamification at the school level involves incorporating game elements into teaching and learning environments. (Deterding et al., 2011). Gamification is a really pedagogical and innovative strategy. It allows for the transformation of classroom activities and promotes more motivating, participatory, and effective learning. Some international research, such as Hamari et al. (2014) and Seaborn and Fels (2015), has demonstrated that gamification increases interest in the subject and improves academic performance. Additionally, it reduces anxiety related to mathematics assignments. At the national level in Ecuador, Yunga (2022) and Osorio et al. (2021) have shown that digital ludification also strengthens mathematical learning and fosters students' active participation.

It is also clarified that the pertinence of this investigation is founded in some legal items, such as the Constitution of the Republic of Ecuador (2008) (*Constitución de la República del Ecuador)*, which recognizes that education is a necessary and fundamental right, while the Intercultural Education Organic Law (2017) (*Ley Orgánica de Educación Intercultural- LOEI)*, promotes different active methodologies and integral education of every single student. It is important to note that the curricular framework emphasizes integrating the school, families, and the community into the educational process, thereby facilitating the use of innovative strategies that promote learning. Consequently, gamification is an indispensable alternative for the continuous improvement of schools nationwide, especially those with social requirements, enabling them to respond to the difficulties identified at different levels. For these work purposes, it is emphasized that the 7^{th} grade of general basic education requires these prior transformations to manage technological aspects of education at later stages.

Scientific Problem: In the Mariscal Sucre Educational Unit, located in the cantón Isidro Ayora (Guayas, Ecuador), recurring difficulties in learning mathematics in the seventh year of Basic Education have been identified. Among the most important empirical manifestations are:

Predominance of traditional methodologies centered on repetition and memorization.

Low motivation and limited class participation.

Difficulty in understanding abstract concepts related to algebra and geometry.

Poor integration of technological resources and active methodologies (only available at home).

Scientific problem formulation: How to contribute to the improvement of the teaching and learning process of mathematics in the seventh year of Basic Education through the application of strategies of gamification in the Mariscal Sucre Educational Unit.

General Objective

Transform the teaching of mathematics in the seventh year through a gamification proposal that makes learning active and dynamic, promoting motivation, participation, and conceptual comprehension, with the complementary use of technological resources at home.

Specific Objectives

Systematize conceptual, methodological, and legal referents about educational gamification and its application in the learning of mathematics.

Identify the main difficulties in the learning of mathematics in the seventh grade of Basic Education at Mariscal Sucre Educational Unit.

Design a didactical guide adapted to the institutional context and based on gamification, active methodologies, and the use of accessible digital resources.

Evaluate the appropriateness, coherence, and effectiveness of the proposal through the judgment of experts and practical application with the students.

Determine the viability of replicating the proposal in other similar educational contexts, especially in rural institutions with limited technology.

It is important to clarify that educational gamification is the practice of incorporating game-like elements into non-ludic contexts, including dynamics such as challenges, badges, rewards, and levels. Its objectives are to increase motivation, commitment, and students' active participation in the teaching and learning process. Deterding et al., 2011). Unlike widely used gamification-based learning, gamification transforms traditional content into dynamic, potentially teachable, and classroom-applicable material. This means that, through it, the efficacy of gamification can be grounded in theories that underpin these fundamentals, whether at the conceptual or methodological level.

One of these theories is experiential learning (Kolb, 1984), which holds that learning is built through the student’s direct experience, and gamification creates scenarios that allow students to experience these learning opportunities and apply knowledge acquired from different subjects to real-life situations. Another theory is the reinforcement theory (Skinner, 1953), according to which a behavior is strengthened through a series of rewards. Gamification uses points, badges, and awards that, even though they are symbolic, still stimulate participation and consolidate meaningful learning in students.

Another theory related to gamification is constructivism (Vygotsky, 1978), which

emphasizes that social interaction and knowledge construction are indispensable for generating meaningful learning. Gamified activities foster collaborative work in the classroom, and this peer communication enables efficient, teacher-mediated learning. The model ARCS of motivation (Keller, 1987), whose focus is to catch attention and generate relevance, trust, and student satisfaction, is completely aligned with the gamification proposed through this work, since it responds to each one of these components, demonstrating challenges, awards, and immediate feedback in the classroom.

It needs to be stressed that Ryan and Deci's (2020) autodetermined motivation proposes that intrinsic motivation increases when each student perceives autonomy, competition, and a social connection, which matches with gamification since it reinforces those factors when it allows the students to choose the challenges and show skills in conjunction with each one of their classmates.

As part of national background studies for this work, Yunga (2022) provides evidence that digital ludification and gamification strengthen mathematical learning among many seventh-year students in Cuenca. He showed that more than 50% of the sample evinced this increase. Likewise, Osorio et al. (2021) highlighted the importance of various active methodologies for making the classroom teaching and learning process more dynamic. Internationally, Hamari et al. (2014) reported that gamification increases commitment and learning effectiveness across contexts and assignments, particularly in mathematics. Along the same lines, Seaborn and Fels (2015) concluded that gamification improves not only commitment but also motivation and participation. However, gamification requires a plan appropriate to its intended age group.

It is important to note that Su and Cheng (2015) demonstrate that there are also gamified mobile systems that enable the automation, or rather, digitization, of certain classroom activities to showcase students' academic achievements, and that students are motivated by the tools used. Against this background, the relationship between professional theory and practice is also explained, demonstrating that applying gamification in mathematics transforms basic, abstract, and traditional concepts into dynamic, meaningful experiences for each student. Moreover, it encourages active and collaborative participation aligned with the current Ecuadorian national curriculum, which addresses the social need to develop critical, autocritical, motivated, and competent students across diverse social contexts.

It must be underscored that this study also promotes formative assessment through immediate feedback, since gamification allows the obtention of an immediate result and maybe a reward after participating in the classroom activity, which makes it possible to identify mistakes and improve classroom learning. One of the recognized strengths of gamification is its implementation in mathematics, which is supported by the curricular competence framework to promote integration among school, family, and community. Furthermore, teachers and directors are aware of and trained in the importance of managing this connection effectively and pedagogically to strengthen learning through innovative strategies. However, one weakness is that academic performance remains a challenge despite the implementation of gamified activities in the classroom. This is due to the family's limited participation in the students' learning process, reflecting a lack of support for reinforcing academic skills. This disconnection or limited communication between the school and the family leads to disorganization and low academic performance due to a fragmented work process.

The scientific research questions that guide this study were the following:
What is the impact of gamification on the learning of seventh-grade students in basic education?
What strategies must be implemented to optimize the teaching of mathematics through gamification?
How does the application of gamified activities with existing digital tools influence students' performance in mathematics?

Materials and Methods

The research was carried out using a mixed qualitative and quantitative approach to examine the applicability of gamification in the teaching and learning process for the mathematics assignment at the Mariscal Sucre Educational Unit. It is important to note that this approach identified the benefits, challenges, and effects of gamification on students' academic performance (Hernández et al., 2018). Additionally, the study was experimental, as the intervention activities were gamified to evaluate their impact on meaningful learning. The experimental design enabled the implementation of a gamified strategy with a group of seventh graders in general basic education, for comparison with a control group guided by traditional methodologies. So, this analysis demonstrated the effectiveness of gamification as a pedagogical tool and its potential for replication in other similar educational contexts. According to Creswell (2014), these tools, along with qualitative and quantitative analyses, enable an exhaustive examination of the problem or phenomenon under study.

It is worth emphasizing that, given the qualitative dimension, students' and teachers' perceptions, attitudes, and experiences regarding gamification in mathematics instruction were investigated. Techniques such as the semi-structured interview, participant observation, and analysis of documentary content (Denzin & Lincoln, 2018) were used. In the quantitative field, the impact of gamification on academic performance was measured using performance indicators such as diagnostic test results and participation levels in the gamified activities implemented as part of the strategy. Furthermore, structured quizzes were administered, and a descriptive statistical analysis was conducted. (Bryman, 2012). Through it, this methodological model enabled data triangulation that contributed to understanding the problem under study, as well as analysis of the context of each result obtained.

The methods used were mainly analytical-synthetic, as they allowed for the examination, analysis, and categorization of the information obtained. This method also facilitated the identification of patterns and relationships among the categories and items related to the topic. (Creswell, 2014). The exploratory and descriptive field of this research aimed to examine the applicability of gamification in mathematics teaching and learning. Different benefits, challenges, and effects on the students' academic performance were also identified (Hernández et al., 2018).

The most important tools to collect data were:

Structured surveys: Applied to the seventh graders to evaluate their perception about gamification in mathematics, level of motivation, and previous experiences with interactive methodologies.

Observation sheets: Structured records will be used during the implementation of gamified activities in the classroom to analyze indicators such as participation levels, cooperation, and academic performance.

Data will be collected through a combination of qualitative and quantitative methods to guarantee an integral analysis:

Closed- and open-ended quiz questionnaires will be used to explore students' expectations and perceptions before and after the application of gamification.

Participant observation: Specific classroom behaviors will be recorded, such as students' interactions, the level of commitment to the methodology, and the evolution in mathematics problem-solving.

The research was focused on two main variables: gamification and the teaching and learning process, which were defined conceptually and operationally, including their respective

dimensions and indicators.

The first variable, gamification, is a pedagogical strategy that incorporates game elements into educational contexts to motivate and improve students' learning (Deterding et al., 2011). In this study, this variable is operationalized as the application of fun activities, marks, levels, rewards, and challenges in mathematics classes to promote students' active participation.

Chart 1

Operationalization of the measured variables

Variable	Conceptual Definition	Operational Definition	Aspects/dimensions	Indicators
Gamification	A pedagogical strategy that incorporates elements of games in educational contexts to motivate and improve learning (Deterding et al., 2011).	Application of dynamics, games (points, levels, rewards, challenges) in the classroom to promote active participation.	-Motivation -Games mechanics - Teacher-student interaction	-Use of rewards and points. - Students' participation level. - Challenges. - Use of gamified TIC.
Teaching and Learning Process	A systematic, intentional process in which the teacher uses strategies and resources to teach, and the student builds knowledge.	Didactic actions performed by the teacher and student answers observed in a gamified class.	- Pedagogical strategies. - Student participation. - Learning assessment.	- Variety of strategies - Class interaction level - Learning outcomes - Application of feedback

The target population consisted of the educational actors at the “Mariscal Sucre” Educational Unit, located in the canton of Isidro Ayora, province of Guayas. Three strata were considered: students, teachers, and authorities. The final sample comprised 47 participants, as shown in Chart 2.

Moreover, a convenience non-probabilistic sample of 44 seventh-grade students was selected. This sample was divided into two groups: the experimental group, which received the gamified intervention, and the control group, whose instruction was based on traditional methodologies.

Chart 2

Sample distribution

Stratums	Frequencies	Percentages
Students	44	93,61%
Teachers	2	4,26%
Authorities	1	2,13%
Total	47	100,00%

RESULTS AND DISCUSSION

The analysis of the data gathered in the research allowed the identification of the learning situation at the initial point. Understanding the state of mathematics learning in 7th grade at the "Mariscal Sucre" Educational Unit helped appreciate the impact of the gamified proposal.

During the diagnostic stage (pretest), it became evident that students had low motivation and class participation and difficulty understanding abstract concepts. The results showed that 64% of the students exhibited low participation, and 80% reported little technological integration in school activities. Furthermore, 68% reported difficulties with basic mathematics content, such as algebra and geometry.

Chart 3.

Diagnosis of difficulties in 7th grade

Indicator	Observed frequency	Percentage
Low participation in class	28 students	64 %
Use of traditional methodologies	2 teachers	100 %
Weak technological integration	35 students	80 %
Difficulty with abstract concepts	30 students	68 %

After the gamified proposal was implemented, the post-test results showed meaningful improvements across all assessed indicators. Students increased their active class participation, improved their comprehension of abstract concepts, and showed a greater disposition to use technological resources.

Table 4.

Pre- and post-test results in seventh graders

Indicator	Pretest (Before the gamification)	Post-test (After the gamification)	Improvement (%)
Active participation in class	36 %	78 %	+42 %
Engagement with the subject	40 %	82 %	+42 %
Abstract concepts comprehension	32 %	70 %	+38 %
Use of technological resources	20 %	65 %	+45 %
Mathematical problem-solving	35 %	75 %	+40 %
General academic performance	38 %	80 %	+42 %

Source: Elaborated by the authors, from observation sheets and diagnostic tests.

It is essential to emphasize that the results confirm that gamification is an effective pedagogical strategy for improving teaching and learning. It showed that mathematics students, specifically at the 7th-grade level in general basic education, increased their motivation by 42%. This was due to the use of badges, rewards, and progressive challenges, which created a dynamic and motivating learning environment.

For this discussion, the findings align with international research (Hamari et al., 2014; Seaborn & Fels, 2015), demonstrating the effectiveness of gamification in improving academic performance and motivation. Nationwide, the results are consistent with studies such as Yunga (2022), which provide evidence of the positive impact of digital ludification on mathematics learning.

Proposal: Design of a didactic guide gamified to improve the teaching and learning of mathematics in students of the seventh grade of Basic Education at Mariscal Sucre Educational Unit.

The strategy is based on educational gamification, understood as the incorporation of activities or games in the mathematics teaching and learning process. It proposes a hybrid model that directly integrates in-person activities with physical materials and digital challenges at home, leveraging available devices.

Objective of the strategy

Strengthen meaningful learning of mathematics in the seventh grade of Basic Education through the implementation of in-person fun activities and complementary digital activities at home. The strategy aims to transform the perception of the subject, making it an active and motivating experience that fosters students' participation, the development of critical thinking, and comprehension of abstract concepts and geometry, with the support of the family and the moderated use of technological resources available at home.

Methodological foundation

The guide is based on:

- Experiential Learning Theory (Kolb, 1984): interactive challenges that allow learning by doing.
- Reinforcement Theory (Skinner, 1953): badges and rewards that consolidate learning.
- Socio-Constructivism (Vygotsky, 1978): collaborative tournaments that promote interaction and cooperation.
- ARCS Model of Motivation (Keller, 1987): progressive challenges that catch attention and generate satisfaction.
- Self-determination Motivation Theory (Ryan & Deci, 2000): autonomy and competence are strengthened through the selection of missions and shared achievements. Guide components.
- Weekly mathematical challenges (in class)
    - Multiplication and division: contextualized problems (markets, distributions).
    - Fractions: activities with hands-on material (cardboard pizzas, recipients, food meters).

    - Algebra and geometry: constructions of expressions and figures with tangible material.
    - Mental calculations: fast competitions with dice and cards.
- System of badges and achievements board
    - Physical cardstock badges ("Fractions Explorer", "Multiplication Master").
    - Classroom display to record progress.
    - Monthly diplomas as a motivational reinforcement.
- Collaborative tournaments
    - Group competitions every fifteen days.
    - Example: teams resolve algebra and geometry problems in a limited time.
    - It fosters cooperation, leadership, and critical thinking.
- Technological activities at home (in the background)
    - Kahoot or Quizizz: weekly mental calculations and fractions challenges.
    - Genially or short videos: explanations of abstract concepts.
    - Digital family challenges logbook: parents register activities such as measuring ingredients or solving budget problems.
- Formative assessment
    - Printed rubrics for participation and solving problems.
    - Digital self-evaluation at home (simple forms in Google Forms).
    - Immediate feedback in class.

Table 5

Guide planning

Action	Objective	Resources	Person responsible	Time
Mathematical challenges	Practice abstract operations and concepts	Cards, cardstock, dice	Teacher	Weekly
Badges and display boards	Recognize achievements	Physical badges, display boards	Teacher/students	Permanent
Collaborative tournaments	Foster teamwork	Fichas de problemas	Teacher/students	Every 15 days
Homework	Reinforce technology	Kahoot, Quizizz,	Students/Family	Weekly/monthly

		Genially, bitácora		
Formative assessment	Monitor progress	Rúbricas, Google Forms	Teacher	During the whole intervention

The proposal was assessed using an expert rubric that considered criteria for scientific rigor, applicability, relevance, innovation, and effectiveness.

To demonstrate the data-cleaning and perfectionism process for the gamified proposal, a table contrasts the initial design with the improved version. This resource clearly visualizes the differences among the objectives, components, and contextual relevance, showing how the proposal adapts to the real conditions of the Mariscal Sucre Educational Unit. It responds more effectively to the identified scientific problems.

Table 6

Comparative table of the initial proposal and the improved proposal

Element	Initial proposal	Proposal improved
Objective of the strategy	Strengthen the mathematics learning process through gamified activities with the use of digital resources in class.	Strengthen meaningful learning of mathematics with gamified presential activities and digital tasks at home, transforming the perception of the assignment into an active and motivating experience.
Methodological focus	Use of Kahoot, Genially, Classcraft, and digital resources as a focal point.	Use of physical materials in the classroom (cards, dice, cardstock, display boards) and technology in the background (Kahoot, Quizizz, Genially), just at home.
Mathematical challenges	Digital activities and manipulatives in class.	In-person manipulative activities (cards, geometric figures, fractions with tangible materials) and digital challenges as homework.
System of badges	Digital and physical badges.	Cards to physical badges, recognition displays in the classroom, and monthly diplomas.
CollaborActive tournaments	Group competitions supported on digital platforms,	In-person tournament every 15 days with algebra and geometric problems, fostering cooperation and critical thinking.
Family integration	Weekly challenges and activities to practice at home.	Family challenges logbook (print or digital) + daily activities (cook with fractions, budgets).

Formative assessment	Printed rubrics and checklists.	Print rubrics in the classroom + digital auto-evaluations at home (Google Forms).
Relevance in the rural context	Dependence on digital resources in the classroom, difficult to apply in institutions without technology.	Viable in schools with limited resources: physical materials in class and technology used in the background at home.

The gamified proposal evaluation includes a data-cleaning process and adaptation to the real conditions at the Mariscal Sucre Educational Unit. While the initial version was mainly based on digital resources, the improved version incorporates physical materials and places technological activities in the background. In this way, available devices at home are taken into consideration. This combination allows us to address the limitations of the institutional context and respond to the identified scientific problems, such as low student motivation and involvement, the predominance of traditional methodologies, and difficulty in comprehending abstract concepts. It also allows for a change in the perception of mathematics, making it an active, motivating, and accessible experience. Consequently, the proposal emerges as a viable, coherent, and replicable pedagogical strategy in other similar school environments, especially those with limited resources but a family disposition to support learning.

Validation of a didactic gamified guide to improve the teaching and learning of mathematics in students of the seventh basic grade at Mariscal Sucre Educational Unit.

The gamified didactic guide designed to improve the teaching and learning of mathematics in 7th grade of basic education at the Mariscal Sucre Educational Unit underwent validation to ensure its pedagogical relevance, methodological coherence, and applicability within the institutional context.

The guide will be evaluated through the judgment of experts and practical application in the classroom, considering the following criteria:

Table 7.

Validation of the proposal: Gamified didactic guide

Criterion	Evaluation	Observations
Scientific rigour	Very adequate	Solid and coherent theoretical foundation.
Applicability in the classroom	Very adequate	Viable in 7th grade with the resources available.
Relevance	Adequate	Further adaptation to rural contexts is suggested.
Innovation and creativity	Adequate	Include more concrete examples of activities.
Impact family-school	Very adequate	The strategies promote family participation.

Criterion	Evaluation	Observations
Efectivity	Very adequate	Improvement expected in academic motivation and performance.

Specialist suggestions:

Strengthen teachers' training in gamification.

Adapt the proposal to contexts with technological limitations.

Include practical examples of activities in rural classrooms.

The procedure is performed by experts' judgment, selecting professionals with experience in mathematics education, active methodologies, and gamification. The specialists evaluated the proposal using a structured instrument with a 1-5 scale, considering criteria such as pedagogical relevance, methodological coherence, applicability, innovation, and the expected impact on students' motivation and academic performance.

The results obtained showed a mean value of 4,6/5. This confirms the acceptance of the proposal as a viable and relevant strategy. Experts underlined the clarity of the objectives, the coherence between activities and evaluation, and the innovation in introducing digital resources and gamified activities. Among the most important observations was the need to strengthen teacher training in the use of technological tools and to broaden family participation in gamified activities.

Table 8.

Results of the validation of the gamified didactic guide

Criterio	Mean value (1–5)	Experts remarks
Pedagogical relevance	4,8	Aligned with the national curriculum and context needs.
Methodological coherence	4,7	Clear objective and well-structured activities.
Applicability	4,5	Viable with the available resources; it requires teacher training.
Innovation	4,6	Creative use of ITC and gamified activities.
Impact expected	4,6	Improves motivation, participation, and academic performance.

Discussion

The data obtained clearly showed that gamification has a direct and significant influence on the motivation and academic performance of each seventh-grade student in general basic education at the Mariscal Sucre Educational Unit. The increase in each of these performance levels in the experimental group confirmed the stated hypothesis. In other words, integrating activities into mathematics assignments favors active classroom participation and improves performance. It is important to highlight that the initial diagnostic showed that more than 60% of

students had very little participation and demonstrated difficulties understanding abstract concepts. Following the implementation of the gamified strategy, a significant increase was observed in both motivation and academic performance. This coincides with Hamari et al. (2014), who demonstrated that more than 50% of their study population improved their performance, commitment, and learning effectiveness across different educational contexts.

Another point to consider is that students' motivation was strengthened by the use of badges, challenges, and activities in a progression. This is related to the theory of auto-determined motivation by Ryan and Deci (2000. This theory states that autonomy, competence, and social connection are determining factors in staying actively engaged in learning. Students participated more in activities during mathematics class after the proposal was implemented. Moreover, it is essential to note that the family's participation in these gamified activities helped improve the connection between school and home. This connection supports the idea that education must be a collaborative, integrated process among family, teachers, and students. Even though this proposal took place in the classroom, the activities also permitted parents to be part of their children's learning. This aligns with what Osorio et al. (2021) stated about the importance of active methodologies in dynamizing the field of education.

It is worth highlighting that limitations related to initial resistance among some teachers and weak technological infrastructure within the institution were also identified. Some teachers lean on traditional teaching, and this resistance to change is one of the most important factors and challenges in gamifying activities. Ortega (2022) warns that weak teacher training and a lack of digital resources are social and infrastructural barriers that tend to limit implementation. However, the proposal showed that it is possible to adapt gamification even in rural contexts through simple strategies and the use of available classroom resources. Gamification also revealed that mistakes become an opportunity to learn. Kapp (2012) stated that a study he conducted showed that students had a more positive attitude towards evaluations, accepting automatic, final, and immediate feedback from formative gamification in the classroom.

CONCLUSIONS

Based on the results and their analysis aligned with the objectives set out, the following conclusions are obtained:

1. Gamification increases students' motivation and participation significantly in mathematics learning.
2. Abstract concepts comprehension improves when entertaining activities adapted to the school context are applied.
3. Family integration in gamified activities promotes connection with the school community and strengthens academic support.
4. The gamified proposal is coherent with the Ecuadorian regulatory framework and responds to the requirements of pedagogical innovation in rural areas.
5. The designed strategy is replicable in other similar educational contexts, especially in institutions with limited technological resources.

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