

MLS - EDUCATIONAL RESEARCH

<http://mlsjournals.com/Educational-Research-Journal>

ISSN: 2603-5820



How to cite this article:

Roja Soler, L. E. & amber, D. (2022). Impacto de la gamificación con TIC en la enseñanza de las Ciencias Sociales en estudiantes de cuarto grado de Primaria. *MLS-Educational Research*, 6(2), 232-252. 10.29314/mlser.v6i2.1238

THE IMPACT OF GAMIFICATION USING ICT ON FOURTH GRADERS' ACADEMIC PERFORMANCE IN SOCIAL STUDIES SUBJECT

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Abstract. The concept of gamification applied in the educational field has a positive impact in the students' motivation and behavior in learning. The purpose of this article is analyzing what was the impact of gamification using ICT on fourth graders' academic performance in Social Studies subject. In order to carry out this research, several pedagogical strategies and learning theories reviews were searched. The mixed-methods sequential explanatory design, that implies collecting and analyzing quantitative and then qualitative data, was chosen. This type of study has validity and reliability criteria. A group control was needed in order to compare pretest and posttest results. SPSS 11.0 software was used for the qualitative data analysis and Atlas.ti tool was implemented for the qualitative data analysis. The result demonstrated that there is a significant difference the means of the scores obtained in the pretest and the posttest. At the same time there is an improvement in the climate of the classroom, learners' participation in class was higher and they were more motivated. We highlight the teachers' proposal in regards to the use of gamification ICT tools for planning, motivating, learning and assessing along with the successful gamification experiences exchange in other knowledge fields. It is concluded that the use of gamified strategies represents a positive contribution to teaching dynamics, useful for improving academic results in social sciences.

Keywords: Gamification, motivation, ICT, learning, academic performances.

IMPACTO DE LA GAMIFICACIÓN CON TIC EN LA ENSEÑANZA DE LAS CIENCIAS SOCIALES EN ESTUDIANTES DE CUARTO GRADO DE PRIMARIA

Resumen. El concepto de gamificación aplicado en el ámbito educativo, incide positivamente en la motivación y compromiso de los estudiantes en los procesos de aprendizaje. El propósito de este artículo consiste en analizar cuál fue el impacto de la gamificación con TIC en el desempeño académico en el área de ciencias sociales por parte de los estudiantes de cuarto grado de primaria de la institución educativa técnica Antonio Nariño de Monquirá - Colombia. Metodológicamente se realizó un estudio de tipo mixto secuencial explicativo CUAN → CUAL → CUAN donde intervienen instrumentos cuantitativos y cualitativos, que cuentan con los respectivos criterios de validez y fiabilidad. La muestra quedó compuesta tanto por docentes, que participaron a través de la entrevista etnográfica y el cuestionario y facilitaron la observación del desarrollo de la propuesta de gamificación, como por estudiantes, que fueron organizados en dos grupos: experimental y control, para confrontar los resultados obtenidos en el pretest y postest. En el análisis de los datos cuantitativos se utilizó el *software* SPSS 11.0 y para el análisis de los datos cualitativos se implementó la herramienta *Atlas.ti*. Dentro de los resultados obtenidos se destaca que sí existió diferencia significativa entre las medias de los puntajes obtenidos en el pretest y el postest, tras la implementación de la propuesta gamificada, a la vez que se evidencia mejoramiento del clima en el aula, mayor motivación y participación de los estudiantes en clase. Resalta la propuesta de los docentes en relación al uso de herramientas TIC gamificadoras para planear, motivar, aprender y evaluar, junto al intercambio de experiencias exitosas de gamificación en otras áreas del conocimiento. Se concluye que el uso de estrategias gamificadas supone un aporte positivo a las dinámicas docentes, útil para la mejora de los resultados académicos en ciencias sociales.

Palabras clave: Gamificación, motivación, TIC, aprendizajes, desempeño académico.

Introduction

Gamification is a phenomenon of growing interest for practitioners and researchers. The definition of gamification refers to "the use of game elements and game design techniques in non-game contexts" (Werbach and Hunter, 2014, p. 28). The primary goal of gamification is intense engagement in the process of achieving habits and goals. Before entering education, gamification mechanics and dynamics were already impacting other sectors more related to marketing and economics, among which we can highlight the design of websites and human-computer interaction interfaces (HCI design, human computer interaction), the design of commercial products, marketing, and advertising. Although in these areas, gamification techniques, game mechanics, status, and rewards had already been implemented, it was not yet recognized as an engagement methodology for certain brands or products. However, in recent years, this type of theories and strategic operations of gamification of all types of environments and products, from *Facebook* to coffee shops like *Starbucks*, through some viral marketing campaigns, have taken the name of *gamification* (Scolari, 2013).

It is very common in the educational field to confuse, in practice, the concept of gamification with that of game-based learning (GBL) since it is considered, according to

Reyes (2016), that "each approach can give the necessary motivation and inspiration to the target population; in fact, they can be mixed, commonly this combination is known as *Serious Games*" (p. 9). For Gómez (2020), the main difference between these two concepts is that gamification incorporates the most effective elements of games in the teaching-learning process without committing to a specific game, while ABJ relies on a game to convey the content to the student. Also analyzed is what is written by Foncubierta and Rodríguez (2014) who define gamification as:

The technique that the teacher employs in the design of an activity, task, or learning process (whether analog or digital in nature) by introducing game elements (badges, time limit, scoring, levels, etc.) and/or their thinking (challenges, competition) in order to enrich the learning experience, direct and/or modify student behavior in the classroom. (p. 2).

Therefore, it is intended through gamification to capture the attention of students through the use of playful elements since, according to Ramírez (2014), it is established that gamification "aims to entertain, build loyalty, and improve the experience in the teaching and learning process" (p. 28).

In this sense, gamification is intended to increase the intrinsic motivation of students to learn, which is the one that fixes their interest in study or work, always showing self-improvement and personality in achieving their goals, aspirations, and objectives (Gómez, 2000). Following Teixes (2015), it can be stated that gamification is the application of game resources (design, dynamics, mechanics, and elements) in non-game contexts, in order to modify the behavior of individuals, acting on their motivation for the achievement of specific objectives. This statement is confirmed by Contreras and Eguía (2017) when they specify that "Gamification is the use of mechanics associated with the video game, to present the student with a series of learning challenges, which when the student has fulfilled them, will generate a short-term reward" (p. 23).

In addition to the above, it should be noted that, just as society is computerized and demands from its members the management and rational or critical use of these media, in the same way, education must incorporate computer media and adapt to these needs (Bustillo, 2012). All the more reason to take into account during the planning of classroom moments, the insertion of Information and Communication Technologies (ICTs) together with the gamifying structures of the contents.

With the contributions of gamification to education, following Borrás (2015), the aim is to activate motivation to learn, obtain constant feedback, acquire meaningful learning, improve memory retention by being more attractive while promoting commitment to learning, class loyalty, measurable results (levels, points and medals), and the development of autonomous learning.

The rigorous review of the relevant literature has allowed us to recognize that gamification has been successfully implemented in different contexts, with the main objective of improving achievement motivation among participants. Likewise, what is presented by Suárez and Custodio (2014) is taken up again, regarding the fact that education as a relevant aspect in the life of the human being has given rise, together with ICTs, to a

new teaching environment in which the student is able to become the protagonist of his own learning, where time and flexibility are considered relevant factors.

The study in reference, revolves around one of the most sensitive needs among fourth grade teachers and students of primary school of the educational institution (IE) técnica Antonio Nariño de Moniquirá - Colombia; because the constant evolution of technology, the internet, social networks, and its evident incursion in education, have contributed to the academic processes in the area of social sciences do not achieve the objectives set. This situation occurs because students lack motivation and interest in learning; they do not carry notebooks, they are easily distracted, and their attitude reflects lack of benefit from the activities proposed by teachers, and they prefer to be aware of their social networks through their mobile device. Little time is dedicated to the realization of meaningful educational experiences; likewise, during the evaluation processes, in many occasions such activity is focused on relating phenomena or concepts or in the realization of theoretical type activities; one of the most notable consequences of this wasted teaching - learning process can be evidenced in the academic records of the students, where it is observed that this area presents the highest degree of academic failure, with respect to its hourly intensity, with performance indicators: Low and basic in more than 48% in the 2019 and 2020 academic years, according to academic record database.

In order to analyze the impact of gamification with ICTs in the teaching-learning processes in the area of Social Sciences of the fourth grade students of the of primary school of the IE técnica Antonio Nariño de Moniquirá, a gamified didactic unit was designed and implemented in the classes in order to achieve the proposed objectives. Within these objectives, the main objective is to analyze how the use of gamification contributes to the improvement of academic performance and to the increase of motivation and participation of students in the social sciences classroom. Among the specific objectives, the following can be mentioned: The identification of the factors that affect the academic performance of students in the area of social sciences; the inquiry about the innovative methodologies implemented by teachers in the area of social sciences in favor of the improvement of students' academic performance; the identification of pedagogical strategies mediated by ICTs as well as the obstacles for their implementation. Finally, we verified the existence of didactic unit plans in the area of social sciences for the fourth grade of elementary school that included a gamification approach with ICTs.

Method

In the development of the gamification proposal with ICTs in the teaching of social sciences in the fourth grade of elementary school, an explanatory sequential mixed study was conducted, WHEN→ WHICH→WHICH. According to Creswell (2015), mixed methods research is one in which the researcher gathers quantitative and qualitative data, integrates them, and then makes interpretations based on combining the strengths of both. This type of convergence between these two methodologies is also present in studies that include methodological triangulation, as they are elaborated from the results found through various research methods and techniques that combine and complement each other in the different

partial analyses of the discourses. This approach facilitates the contrast of viewpoints present in the discourses on the problem addressed (Amber and Domingo, 2021). Figure 1 shows the mixed sequential explanatory sequential design, WHEN→ WHICH→WHICH, that guided this study.

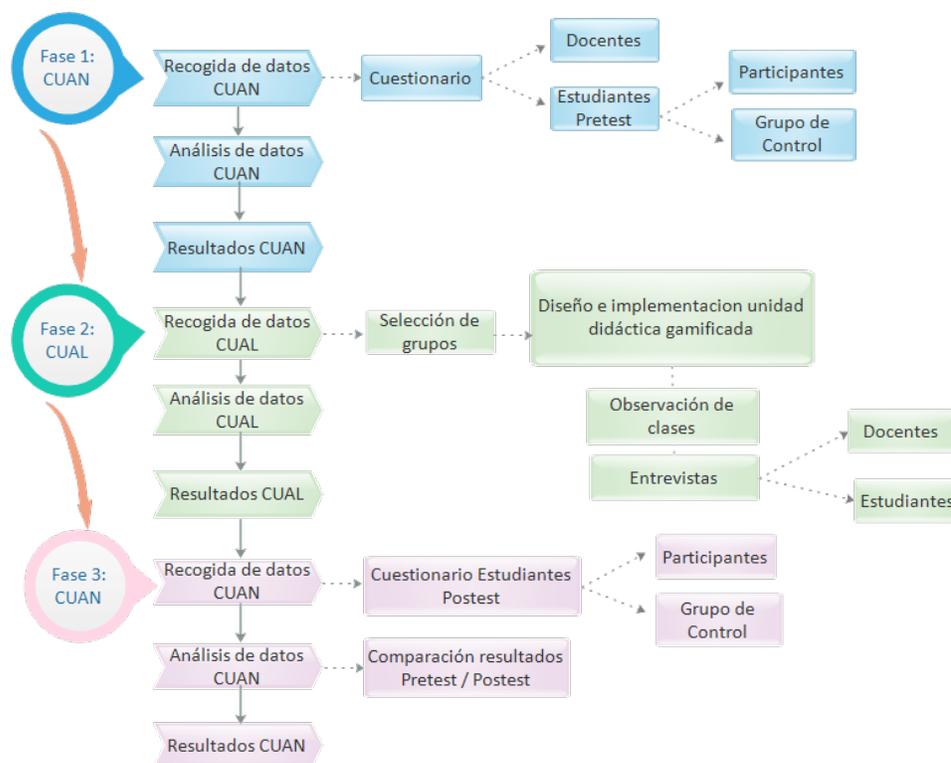


Figure 1. Diagram of the sequential methodology applied in the proposal.

Participants

The population of the present study consisted of 193 students in the fourth grade of the IE técnica Antonio Nariño de Monquirá - Boyacá. Eighty-nine students are female and seventy-nine are male. Their ages are between 8 and 14 years old, and their socioeconomic stratum is between 1 (low - low) and 3 (medium - low). In Colombia, strata 1, 2, and 3 correspond to the population with fewer resources, while stratum 6 (High) corresponds to the most socioeconomically privileged population.

The type of sample used is probabilistic: simple random sample (SRS). The sample frame of reference used in phases 1 and 3 of this proposal (application of the questionnaire: Pretest and Posttest), corresponds to the SIMAT database (Registration Record) for active students in the educational institution, which are distributed in six courses of the fourth grade of elementary school as follows: course 4-1 with 31 students, course 4-2 with 31 students, course 4-3 with 33 students, course 4-4 with 31 students, course 4-5 with 34 students, and course 4-6 with 34 students; total of 193 fourth grade students. The selection of the sample

corresponding to the 78 participating students was made randomly. The sample of teachers corresponds to 3 teachers, taking into account that they are the ones who directly guide the area of social sciences in the participating courses.

Instruments

In the quantitative phase, the questionnaires were applied taking as a basis what is stated by Osorio (2000), in relation to this type of instrument, whose purpose is to collect the opinion or characteristics of a group of people about a specific topic or theme with the intention of studying the fact proposed in the research or verifying formulated hypotheses. In the development and validation of these instruments, reference is made to the steps proposed by Supo (2013): Review previous literature, explore the concept, list the topics, formulate the items, select the judges, apply the pilot test, evaluate the consistency, reduce the items, reduce the dimensions, and identify a criterion.

The design of the questionnaire took into account its validity and reliability, according to Glasserman (2013). The questionnaire applied to teachers during the diagnostic stage indicated expectations about gamification, the importance of motivation in class, and the use and implementation of technological resources, such as devices and applications related to gamified and playful learning. Due to the confinement measures adopted by the national government due to the Covid-19 pandemic, this instrument was implemented through a form in *Google Forms*. As for the questionnaire applied to the students in the diagnostic phase, this is taken up again in Phase 3, when the progress in learning (academic performance) is compared after having implemented the gamified didactic unit. Figure 2 shows the quantitative data collection techniques.

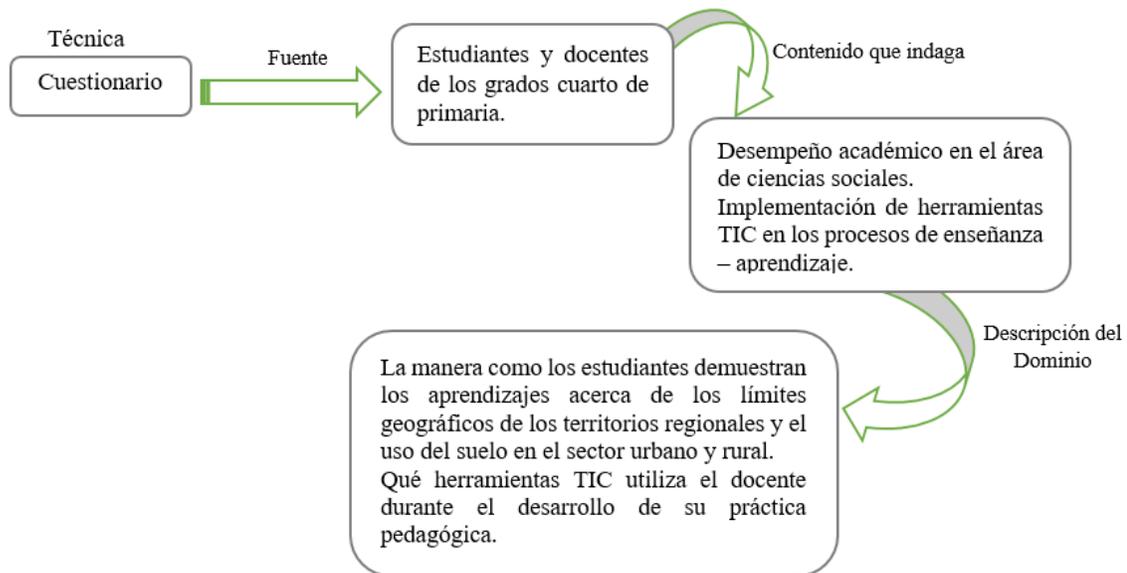


Figure 2. Quantitative data collection techniques.

In order to collect the qualitative data necessary for the development of this research, participant observation and ethnographic interview were used. Following Hernández, Fernández, and Baptista (2014), participant observation refers to the fact that the researcher is included in the group in order to keep (from the inside) a systematic, valid, reliable record of observable behaviors and situations. Along the same lines, classroom observation as an inquiry technique, according to Martínez (2009), is a practice for collecting information *in situ* and, in general, "is understood as an activity whose purpose is to collect evidence about the aspects involved in the teaching and learning process in the context in which it is exercised" (p. 65). Therefore, it can be carried out in different ways together with the application of an observation guideline. It is also necessary to emphasize that the annotations recorded through this instrument are undoubtedly marked by the new norms of social behavior due to the Covid-19 pandemic. In the schools, through the application of the alternation model (consisting of a combination of face-to-face and virtual learning with the permanent attendance of 50% of the students at the educational institution), the number of students per group has been reduced, and the use of ICTs in class has increased.

The interview designed for teachers and students revolves around the impression generated by the use of gamification tools and the implementation of the gamified didactic unit. The qualitative data collection techniques used in phase 2 of this study can be seen in Figure 3.

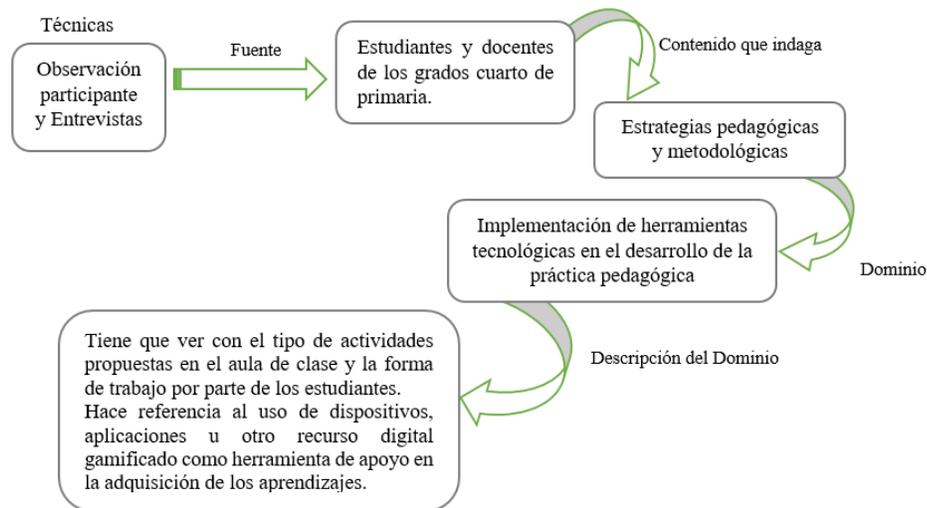


Figure 3. Qualitative data collection techniques.

Validity and reliability

According to Martínez (2006), the validity criteria that should be considered in a study are model or construct validity, internal validity, external validity, reliability, and triangulation. Figure 4 shows the validity criteria that were present in the research.

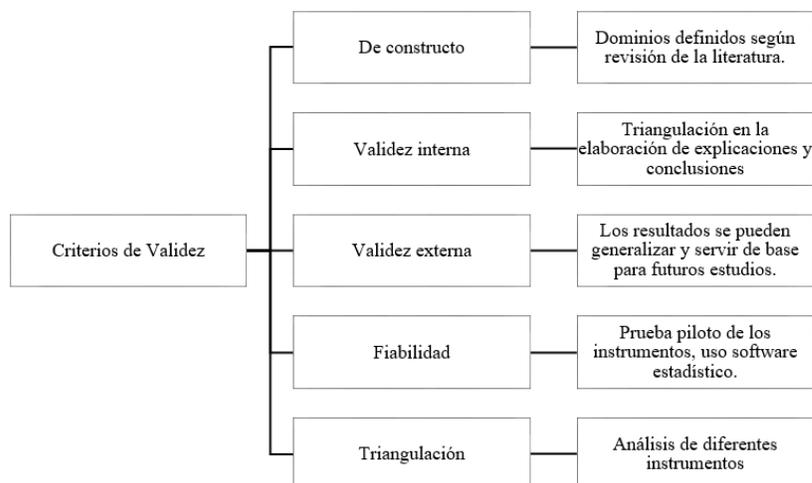


Figure 4. Criteria for instrument validity.

To ensure the internal consistency of the student questionnaire implemented in phases 1 and 3, Cronbach's Alpha was calculated in the SPSS application. The results are presented in Table 1.

Table 1
Final statistics of the total number of elements

Scale statistics				Reliability statistics	
Mean	variance	Dev. Deviation	N of elements	Cronbach's alpha	N of elements
34,75	68,250	8,261	14	0,847	14

Thus, we have a Cronbach's Alpha equal to 0.847 for N= 50 tests evaluated, which indicates that the internal consistency of the results obtained with this test is moderate. Taking into account what was proposed by Oviedo and Campo (2005), Cronbach's Alpha values between 0.70 and 0.90 indicate a good internal consistency.

In relation to the validation of the instrument developed to learn about the teachers' approaches to the concept of gamification, the SPSS application was used to confirm its reliability. Table 2 shows the results obtained:

Table 2
Reliability of teachers' instruments

Scale statistics				Reliability statistics	
Mean	variance	Dev. Deviation	N of elements	Cronbach's alpha	N of elements
74,25	26,917	5,188	13	0.745	13

In the case of the questionnaire applied to teachers in phase 1, Cronbach's Alpha is 0.745 for N= 3 (3 social science teachers) tests evaluated, which indicates that the internal consistency of the results obtained with this test is moderate. Taking into account what was proposed by Oviedo and Campo (2005), the values of Alpha Cronbach between 0.70 and 0.90 indicate a good internal consistency.

For the validation of the qualitative instruments, the evaluation by means of expert judgment was used. This method, according to Robles and Rojas (2015) is a validation strategy that "basically consists of asking a number of people to demand a judgment towards an object, an instrument, a teaching material, or their opinion regarding a specific aspect" (p. 2).

At this point it is emphasized that validity and reliability are the two quality criteria that a measurement instrument must meet after being submitted to the consultation and judgment of experts, so that researchers can use it in their studies. Validity, defined as "the degree to which a measuring instrument measures what it actually intends to measure or serves the purpose for which it was constructed" (Martín, 2004, p. 5). In particular, it can refer to content or construct.

Research development process

The first phase consisted of a quantitative study that consisted of the application of a questionnaire to the students and another questionnaire to the teachers. Once the

questionnaires were implemented, the respective analysis of the results obtained was carried out.

In the second phase, a qualitative study was carried out, which consisted of the design and implementation of a gamified didactic unit in the area of social sciences for fourth grade students. This gamified didactic unit consists of the following elements: Pdf documents, presentations, videos, maps, and interactive games that are hosted on the Classting platform, within a class created for the respective grade and in the indicated area. Students can access this class through a link generated by the same platform and that teachers share with the students enrolled in that class. Figure 5 shows the main screen.



Figure 5. Main screen of the gamified didactic unit.

The implementation of this gamified didactic unit was carried out in ten class sessions during an academic period in which school activities are developed with the following dynamics:

- The game progresses through a series of levels, which are related to the progress of learning about each of the provinces of Boyacá and the georeferencing of each of its natural resources.
- In order to reach each level, students will have to earn different badges (see Figure 6), which can be achieved by viewing and taking notes on videos and images, participating in activities or repeating positive behaviors.
- When reaching a new level, students will obtain one or more achievements, which will give them benefits in the classes or in the evaluation of the subject.



Figure 6. Game badges for the gamified didactic unit.

Simultaneously to the implementation of the gamified didactic unit, a class observation guideline format was used to determine the students' attitude towards the acquisition of new learning in the area of social sciences. Once the application of the gamified didactic unit was completed, interviews were conducted with teachers and students to learn their impressions about this new teaching methodology. Once the results of this second phase were obtained, as in the first phase, the respective analysis of results was carried out.

The third phase consisted of reflecting on the results obtained. The academic performance of the students before and after the implementation of the gamified didactic unit was compared, for which the same questionnaire applied in phase 1 was applied to the students. In this phase, conclusions were drawn to support the improvement of learning processes and teaching performance.

Data analysis procedure

Hernández et al. (2014) point out that for data analysis in the mixed approach it is suggested "(...) to include a section where the method, collection, and analysis of both quantitative and qualitative data are presented" (p. 549). Following the aforementioned authors and taking into account that this is a mixed design study, the results are presented under the triangulation scheme. Consistency was sought between the results obtained from both approaches and possible contradictions or paradoxes were identified.

The analysis of data from the mixed method requires the use of specific techniques according to their quantitative and qualitative origin. Following Creswell and Plano (2007), the analysis of the information is carried out independently. In relation to the analysis of quantitative data, the following activities were previously carried out: data coding, organization of a matrix, saving the file, debugging of errors. Once the above was done, the statistical package Statistical Package for the Social Sciences SPSS® or PASW Statistics SPSS 11.0 was used. In the case of the questionnaire, the database of the questionnaires applied to the two samples (teachers and students) was created. This software was also used

for the analysis of the results obtained in the post-test by the set of students designated as the control group.

As for the analysis of the qualitative data, i.e., the information collected in the participant observation and the interview, the following procedure was followed:

- Participant observation: The content of the transcripts was analyzed based on the categories of classroom factors previously established. Attention was paid to the emergence of elements that would make it possible to identify the presence or absence of the factors studied in classroom practices.
- Interview: The content of the interviews was analyzed based on the ideas and concepts that are part of the categories of analysis of the study.

For the analysis of the textual data collected through the interviews, the general process of qualitative data analysis described by Rodríguez and Gómez (2010) was followed, which is a flexible process that can be adapted to the different conditions of each specific research context. The scheme shown in Figure 7 was used as a reference.

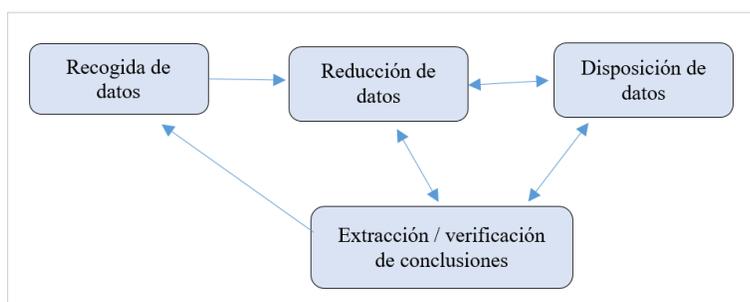


Figure 7. Tasks involved in data analysis.

Note: Villagrán (2020).

After collecting the data from the interviews, we proceeded to reduce them, taking into account that the length of the interviews and their qualitative nature, the amount of information obtained was high, so it was necessary to reduce it for its handling during the analysis. To this end, the most relevant data were selected and then simplified and summarized in a clear and precise manner. *Atlas.ti* was used as support *software* in this process, taking into account what was stated by San Martín (2014), who states that it is one of the most powerful programs for the analysis of qualitative data. This *software* contributes to the theoretical construction in educational research through the separation of units or categorization with the division of information into different thematic criteria. Once the information was reduced, we proceeded to what Rodríguez and Gómez (2010) call the arrangement and transformation of data.

The strategy used to obtain the conclusions was comparison since it makes it possible to clarify the relationships, discrepancies, and similarities that exist between the data that form part of the same thematic category. The conclusions obtained are verified through the strategies described by Flecha, García, Gómez, and Latorre (2009): critical judgment with other researchers, assurance of structural coherence, and checks with the participants.

Results

The following are the results obtained in the implementation of the gamified didactic unit, according to the source (students and teachers), as shown in Figure 8.

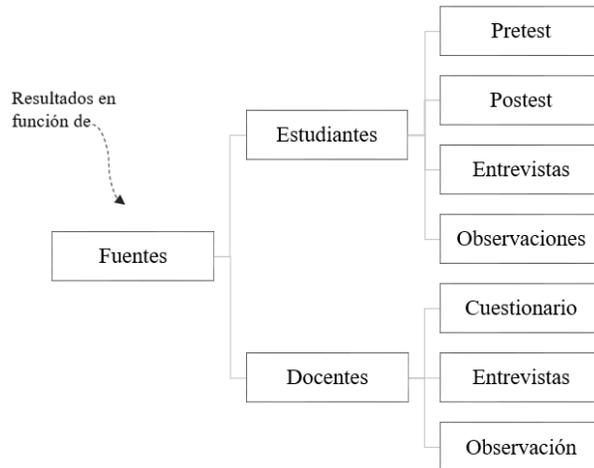
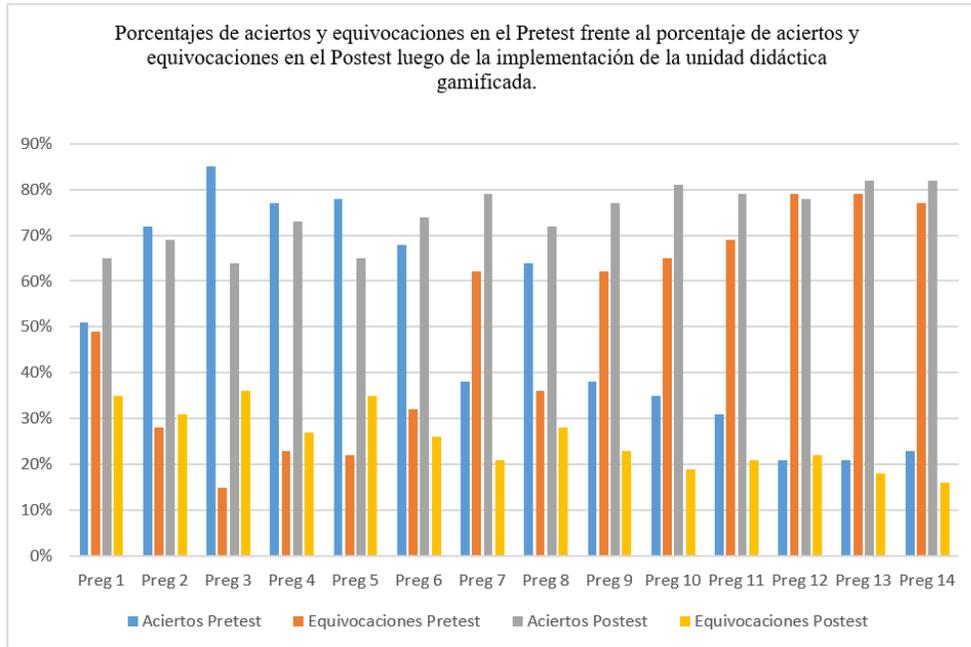


Figure 8. Results according to the sources of information.

In relation to the results obtained by the students, Figure 9 shows the results of the questionnaires (pretest and posttest) obtained by the fourth grade students who participated in the implementation of the gamified didactic unit in the area of social sciences. It was noticed that the learning oriented under the pedagogical strategy of gamification with ICTs showed better results, allowing a better development of the classroom programming intended in the established academic period. It can also be observed that the questions (2, 3, 4, and 5) that were not addressed in depth in the planning of the gamified didactic unit obtained a lower number of correct answers in the posttest, which allows us to indicate that the academic reinforcements supported by ICTs, and with the focus on gamification, allow us to strengthen classroom learning more effectively.



Percentages of hits and misses on the pretest versus the posttest.

Table 3 shows that there was a significant difference between the means of the scores obtained in the pretest and posttest because $P(T \leq t)$ two-tailed is less than Alpha, which allows us to affirm that the implementation of the gamified unit had a positive impact on the academic performance of the students. It can also be evidenced that the averages went up from 2.42 to 3.67.

Table 3
T-test for paired two-sample means

	PRETEST	POSTEST
Mean	2,424	3,677
Variance	1,629	1,715
Remarks	78	78
Pearson correlation coefficient	0,213507086	
Hypothetical difference of means	0	
Degrees of freedom		
T-statistic	-6,8216	
$P(T \leq t)$ one tail	0,0000	
Critical value of t (one-tailed)	1,6649	
$P(T \leq t)$ two-tailed	0,0000	
Critical value of t (two-tailed)	1,9913	

Regarding the control group, the post-test was also applied in order to compare the learning progress of these two groups of students. Table 4 shows that there is a significant difference between the average results of the group of students who participated in the implementation of the gamified didactic unit and the average results obtained by the traditional teaching students.

Table 4
Independent samples test in SPSS control group

Test of independent samples									
Levene's test of equality of variances				t-test for equality of means					
	F	Sig.	t	gl	Sig. (bilateral)	Difference in averages	Standard error difference	95% confidence interval of the difference	
								Inferior	Superior
Equal variances are assumed	4,818	,096	1,710	36	,036	-,59474	,34771	-1,29993	,11046
Equal variances are not assumed			1,710	28,747	,038	-,59474	,34771	-1,30616	,11669

In the interviews with the students, we inquired about the dynamics and mechanics designed within the gamified didactic unit (badges, point tables, game levels), some students stated that it is difficult for them to understand how to earn points, *"sometimes I do not understand quickly"* (EST.3_Ref.4), but that as they advance in the practices, they assimilate the mechanics of participation and how to obtain points. They also indicated that obtaining points is very simple and that for them it is more favorable that the area grades are the product of the points obtained in the course of each gamified lesson, *"it is better with points and not with evaluations"* (EST.2_Ref.6), *"I do better with points"* (EST.4_Ref.6), *"the points help me in the verbal report"* (EST.7_Ref.6). It was possible to corroborate that students consider favorable for their academic performance the development of classes with the use of gamification tools with ICTs *"that the computer and games are used more"* (EST.5_Ref.11), *"I wish the evaluations would not come back because they are very difficult"* (EST.9_Ref.11). The presence of game elements in the classes allowed the necessary spaces to advance in the pedagogical innovation in the development of evaluations through electronic devices and applications designed for that purpose. They considered that classes could be more enjoyable, *"that it had more games"* (EST.9_Ref.4) because the use of games motivates and awakens the interest in acquiring new knowledge, *"I think they are all good and better for learning"* (EST.6_Ref.10). The students expressed their interest for this methodology to be adopted by other teachers and implemented in other areas of knowledge.

As a result of the observation of the gamified class sessions, it is possible to highlight the active participation of the students and their constant interest in attending to the teacher's

indications; some of the work done by the students is exhibited in the classroom. The treatment between the students and the teacher is maintained under the basic rules of respect and tolerance, showing warmth in their relationship. The scarce use of netiquette rules for virtual communication is highlighted.

In terms of teachers, Figure 10 shows the results of the questionnaires applied. The values highlighted in this figure are within the range of the scale established in this case (High - high from 91 to 100, High - medium from 81 to 90, High - low from 71 to 80, Medium - high from 61 to 70, Medium - low from 41 to 50, Low - high from 31 to 40, Medium - medium from 51 to 60, Medium - high Low - medium from 21 to 30, Low - low from 11 to 20, and Null from 0 to 10). However, teachers' perceptions regarding the implementation of gamification in the classroom are framed within the High - high and Medium - low levels. The importance of maintaining students' motivation is highlighted while they consider the game a motivating element in the classroom. However, class time dedicated to the game is moderate; although the use of technological resources is vital in the teaching process, their level of appropriation is basic and generates insecurity; perhaps for this reason, they make little use of them in class.



Figure 10. Results of the questionnaire to teachers.

The concept of gamification seems interesting to them, and although they have not used gamification tools for teaching social sciences, they agree with the implementation of a gamification technique, which requires training in these topics.

With regard to the interviews conducted with teachers, once the different content units were analyzed and the proposed objectives were compared with the established variables, elements were found that show the interest of teachers in the area of social sciences in the implementation of gamified strategies in the classroom. In relation to the design of the sessions that make up the gamified didactic unit, it could be verified that *"The gamified didactic unit corresponds to the planning of our area is relevant, enjoyable, and entertaining for its development by the students; it is a very nice topic because it rescues our land and the value we should give to our department"* (DOC.3_Ref.7). In addition, they consider that *"Gamification brings curiosity, fun, or motivation to the classes and a novel methodology for teachers"* (DOC.2_Ref.3).

Regarding the attitudes of students and teachers towards the implementation of the gamified didactic unit. It is highlighted that *"The most outstanding result for me is the pleasure with which the children work in class; they have developed a lot of autonomy, they already know how the work strategy operates, and apart from learning, they also have fun and participate more in class"* (DOC.3_Ref.10). It is also noted that the use of ICTs allowed students to improve their behavior in the classroom and to take more care in the development of the proposed workshops, *"they like too much what has to do with ICTs, with technology and being told about games in class, much better, because they leave laziness behind and are more willing to do what they have to do, if they are more motivated and one does not make an effort to do (...), they already know how to do it"* (DOC.1_Ref.10). Autonomous and collaborative work was perceived among students based on respect and better participation in class, *"The development of the didactic unit has been very interesting because new things are learned, and the use of applications that motivates student participation in class is allowed"* (DOC.2_Ref.7).

The implementation of the gamified didactic unit contributed to strengthening the bonds of friendship and fraternity among the students, which generates satisfaction in the teachers *"to see the children happy, developing their tasks, without pressure and feeling that they are playing, but they are really in a class where they are learning several theoretical concepts that in another context would be very boring for them"* (DOC.3_Ref.13). These types of activities enrich soft skills and strengthen healthy coexistence among each of the members of the educational community because they are based on tolerance and respect for differences that promote the tireless search for peace that our country has long sought.

When observing the classes, the teacher constantly motivates the students and is very attentive to their questions, effectively accompanying them in the achievement of their learning. Sometimes there are verbal calls for attention related to the unpunctuality of some students, but there are justifiable reasons because in the midst of the economic recovery, the necessary school routes have not yet been assigned.

The moments of the class are presented in an organized manner by the teacher and the students correspond with good attitude and discipline in search of the satisfactory achievement of the proposed activities. The implementation of the dynamics and mechanics of the games in the class activities are successfully carried out, as well as the consistent use of ICT tools to evaluate.

Discussion and conclusions

The fact of teaching with the characteristics of games and ludic practices in the classroom also enjoys a certain level of preference on the part of teachers. However, a clear (conceptual) difference between gamification as a technique and game-based learning (GBL) is not yet established. For Reyes (2016), "each approach can give the necessary motivation and inspiration to the target population; in fact, they can be mixed, commonly this combination is referred to as *Serious Games*" (p.9). Despite the existing terminological confusion, after the implementation of the proposal, both teachers and participating students agree in highlighting the suitability of gamification strategies in the classroom for the improvement of motivation and learning, responding to the objective of this work.

Thus, when comparing the results obtained in the post-test by the control group with the scores obtained in the same test by the grades participating in the study, it became evident that the posttest results favor learning oriented under the gamification strategy with ICTs, in contrast to the scores obtained through the traditional methodology; also confirming that there is a significant difference between the averages of the experimental and control groups.

The classroom climate improved with the development of the gamification activities because, through participant observation, it was evident that the students were pleased when performing the proposed activities, as well as an improvement in the development of their autonomy, a better knowledge of the work strategy, and an increase in motivation and participation in class. In relation to classroom climate, for Arón and Milicic (2000), there are environments that allow the student to feel accompanied, safe, loved, calm, and that make possible a positive personal development; to feel that what they learn is useful and meaningful. In this aspect, the gamified didactic unit favored the strengthening of these characteristics of a positive classroom climate.

Students indicate that the use of points turns out to be a bit confusing at the beginning, but that, once they recognize the dynamics of the game, the points allow them to improve their academic results; which for Postigo, Barbosa, and Soto (2016) is framed in the concept of formative evaluation and is carried out through the acquisition of badges, and the accumulation of points for behavior based on the activities developed during a course.

While it is true that the pandemic boosted the use of applications from home, it was also noted that some children could not participate virtually in the development of the proposed workshops. Encouraged by this context, teachers recognize the importance of technological skills because they stimulate curiosity, fun, and motivation, corroborating what Borrás (2015) wrote. In this line, the teachers' proposal regarding the use of gamification tools to plan, motivate, learn, and evaluate stands out, together with other training or exchange of successful gamification experiences, also in other areas of knowledge.

The classroom observation guidelines also showed a clear need for change in the educational processes prior to the pandemic. Following this idea, there is a need to review and update the area plans and didactic resources, taking into account that the students' interest in games and technology should be used as a support tool to motivate students who for a long period of time were working at home and are now returning to school with great expectations and great challenges. In overcoming these challenges, teachers play a key role through their

determination and innovative spirit in the search for strategies to improve pedagogical practices, as shown by the findings of this paper. These support what was presented by Suárez and Custodio (2014), considering that education, as a relevant aspect in the life of the human being, has given rise together with ICTs to a new learning environment. In this environment, the student is able to become the protagonist of his own learning, while time and flexibility play an important role in an education that, increasingly, tends to be virtual.

While it is true that different resources are required for the implementation of this type of projects in the educational institution, it is also true that, with a positive attitude, great improvement options can be generated, for which it is necessary to rethink methodological strategies but, above all, to learn to work as a team in search of a common goal: the success of the students.

In short, the implementation of the gamified didactic unit in social sciences classes has allowed teachers to develop the activities more fluently, generating a positive impact on the motivation and participation of students in class and, therefore, on the improvement of their academic performance.

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Receipt date: 04/03/2022
Revision date: 07/08/2022
Acceptance date: 08/18/2022