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ORIGINAL

Classcraft: The Impact of Gamification in Higher Education

Classcraft: El impacto de la gamificación en la educación superior

Rubén Martínez Sánchez[1]

[1]Valencia. Comunidad Valenciana.

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Corresponding Author
Rubén Martínez Sánchez

ABSTRACT

In response to the challenges faced by educators regarding the lack of interest among university stu-dents, especially in online contexts, a study was conducted to implement gamification using the Classcraft platform. The research compared two groups: a control group (N=118) that used a more traditional method and a study group (N=125) that employed gamification. The results revealed that gamification led to increased student engagement and improved retention of content and the devel-opment of basic competencies related to their degree programs. These findings support the hypothe-sis that gamification is a motivating approach in higher education.

Keywords: Gamification; Higher Education; Classcraft; Motivation; Academic Results; Online Education.

RESUMEN

En respuesta a los desafíos que tenemos los docentes sobre la falta de interés de los estudiantes uni-versitarios, especialmente en contextos en línea, en adquirir conocimientos, se realizó un estudio en el que se implementó la gamificación empleando la plataforma Classcraft. La investigación comparó dos grupos: uno de control (N=118) en el que se utilizó un método más tradicional y uno de estudio en el que se empleó la gamificación (N=125). Los resultados revelaron que, la gamificación generó una mayor partición estudiantil y mejoró la retención de contenidos y desarrollo de competencias básicas relacionadas con las titulaciones cursadas. Estos hallazgos respaldan la hipótesis de que la gamifica-ción es un enfoque motivador en la educación universitaria.

Palabras clave: Gamificación; Educación Superior; Classcraft; Motivación; Resultados Académicos; Educación en Línea.

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INTRODUCTION

The low interest on the part of students in acquiring new knowledge is very noticeable; in a society as over-stimulated as today's, it is very difficult to retain students' attention and even less to generate interest in acquiring new content. Young people tend to show a greater predisposition to retain knowledge in order to pass an exam rather than trying to achieve more authentic learning.[1]

In this context, it is quite common to find students distracted with their computers or cell phones, and more so in online teaching contexts where it is more difficult to control their use by teachers. This behavior is very harmful as it not only interrupts the normal flow of a class but also generates conflict between students and teachers themselves.[2]

Faced with these problems, we teachers must introduce new dynamics that break with the apathy that usually spreads like the worst virus in the classroom. However, new teaching methods generate a risk because the most traditional paradigms that have been used for several years must be broken. This is especially the case in this study when it is desired to apply methods such as gamification in online university teaching.

Gamification is one of the most studied methodologies in recent years due to the results obtained. We understand that using this methodology involves applying video game mechanics such as overcoming missions, winning badges or prizes, and leaderboards... all within an educational framework.[3]

It is important to start from reality: the video game industry has grown exponentially in the last decade, allowing a larger public to access this activity in their leisure time. According to the Spanish Video Games Association (AEVI), more than 18 million Spaniards play video games, around 45 % of them daily.

These figures are significant, even more so if the same association tells us there has been a balanced ratio of gamers over the last five years (53 % men and 47 % women). Other recent studies suggest that this is due to using portable devices such as mobiles and tablets as gaming tools. Based on all this information, a proposal will be made for gamification to be carried out in the university context.

This proposal will be designed so that students feel motivated to participate in the activities carried out in the classroom. Using the dynamics and strategies that the students carry out, they will gain a series of privileges that will make the proposal more attractive.

To understand gamification and its use in the classroom, it is important to consider the elements that compose it, as defined by Kevin Werbach and Dan Hunter. The main elements they defined were mechanics, as one of the main components (including rules and operation); dynamics, the way the mechanics are applied; and components, the resources, and tools that have been employed.

In higher education, gamification transforms learning processes and classroom mechanics by adapting them to the context of video games. This approach enables the development of content and competencies, a very important aspect of university teaching.[4] Below, we detail how this methodology helps the development of general and specific competencies in careers related to the Faculty of Education.

Specifically, and if we look at the competencies of the Primary Education Degree, educational gamification would help us to develop instrumental competencies such as Problem-solving (CGI2), organizational and planning skills (CGI3), oral and written communication in one's language (CGI4). At the same time, specific competencies could also be developed, such as interpersonal skills (CGP7), teamwork (CGP8), and ethical commitment (CGP10).

On the other hand, depending on the activities proposed, we could also develop specific competencies related to the subject we are teaching.[5] These reasons encourage using this methodology in the classroom and the need for more studies on this topic.

This approach seeks to develop content and competencies while pursuing greater student motivation and commitment. The aim is to empower students to be more autonomous in their learning and to solve problems instead of memorizing content for an exam. The classroom climate changes during the process, and greater student participation is achieved.

In the educational field, and for all these reasons, gamification has been used especially to increase students' motivation about the subject they are studying. The interest in this teaching method has increased in recent years, especially in the field that concerns us, and several studies have analyzed the effects of this teaching method on students' participation, motivation, and academic performance. However, studies in this field at the university level are more limited.

On the other hand, in order to use a tool that facilitates the application of gamification in virtual or face-to-face contexts, a series of criteria must be met, according to González et al.[6]. These criteria must respond to four units of analysis: cohesion, coherence, pertinence, and operability. In this sense, Classcraft complies with most of the established criteria.

Classcraft in education

To develop gamification, especially in online contexts, it is recommended to use a platform that helps to introduce the desired mechanics and dynamics. In this context, the Classcraft platform is an educational tool designed to move educational experiences to a more motivating context to improve educational performance.

One of the main features of this platform is that it offers the possibility of setting missions and challenges for students to continue playing the game. In addition, it allows awards and punishments to be given based on student performance and the criteria previously set by teachers.[7]

If we analyze Classcraft in-depth, we can realize that it implements a dynamic based on the idea of a well-known board role-playing game such as Dungeon and Dragons.[8] As in this classic game, students assume a role and count on specific aspects such as health, experience, and skills.

Health points are related to their performance in the classroom. A student can lose heart due to negative consequences such as a lack of participation, late assignments, or being late to the classroom. These consequences are set by the teacher beforehand.

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On the other hand, experience points are a tool used to reward a series of behaviors by the student based on what the teacher wants. This experience is represented by a purple bar that allows the student to level up and achieve a series of unlocked skills when it reaches its maximum point.

Finally, we find the skills that are achieved by raising certain levels and are a series of privileges that students can redeem, such as turning in an assignment later or leaving the classroom earlier. To use these skills; students must obtain a series of crystals that are obtained through the achievement of challenges or missions.

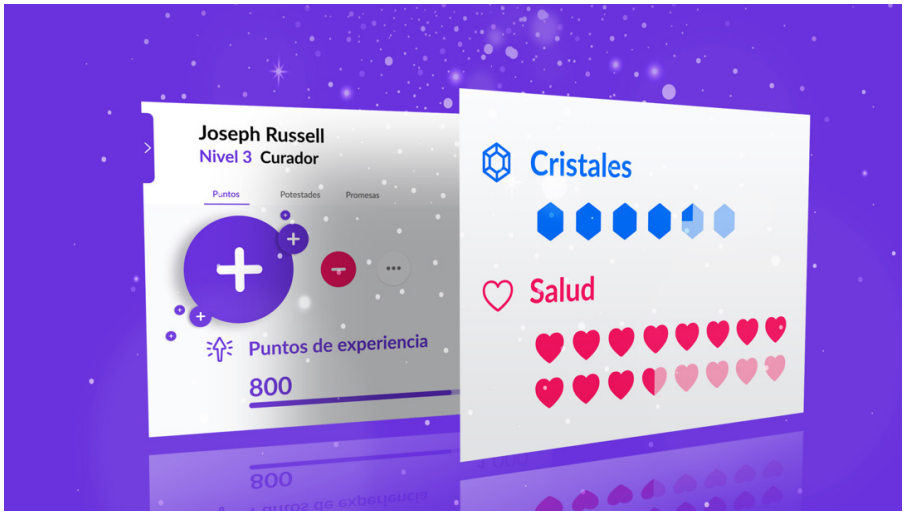


Figure 1. Display of health points, experience and crystals

This platform allows, like Dungeon and Dragons, to customize the character. This allows the student to create a unique character based on the role he/she wants to assume in the gamification proposal to be developed.[9] On the other hand, the teacher would play the role of gamemaster, in charge of customizing the missions and experiences of the game itself.

Each character plays a different role, with the warrior being the character with the most life, ideal for those students who take risks and tend to lose health points. The healers have the role of helping and can heal life to others and themselves. Finally, the mage helps other team members by activating the abilities of other characters or his own.



Figure 2. Personnel

For all these reasons, this platform has been used as a vehicle for gamified proposals in different educational stages due to its customization capacity, allowing teachers to adapt to the interests and ages of the targeted students. It is important to note that Classcraft has been studied in educational research at different stages. In recent research, we found:

- A study by Hernández-Durán et al.[10] after an experience based on using this platform concluded that 77,5 % of students preferred gamification over more traditional experiences.
- Another research conducted by Elles Ardilla et al.[11] concludes that Classcraft allows for improving academic performance by an average of 1,5 points and the motivation index by an average of 0,7.
- Another study conducted at the university in the Degree of Primary Education by Ferriz Valero et al.[12] concluded that gamification and the Classcraft tool are attractive and motivating.

These studies prove that Classcraft is a tool that helps improve teaching and learning processes. In addition, it helps teachers to

adapt the personalization of the platform to the needs of the students, which contributes to increasing their motivation, participation, and academic performance.[13]

The present study is based on the use of Classcraft in the university classroom in virtual teaching contexts. The objectives pursued are:[14,15]

- CG1: Encourage active participation.
- CG2: To increase academic achievement.
- OG3: Develop core competencies related to university studies related to the faculty of education.

Since we are in online education contexts and have predetermined digital tools, the specific objectives were adapted based on the resources available, and that would allow us to measure the degree of achievement of the general objectives previously set.[16]

- SO1: Increase retention and participation in synchronous sessions.
- SO2: Improve academic performance.
- SO3: Develop problem solving skills (CGI2), organizational and planning skills (CGI3), oral and written communication in one's own language (CGI4). In turn, specific competencies such as: interpersonal skills (CGP7), teamwork (CGP8) and ethical commitment (CGP10) could also be developed.

METHOD

This research is based on a comparative study between control groups and other study groups taking university courses related to the faculty of education, that is to say, that belong to the same professional family. The students were distributed into four groups, each belonging to a different subject. Two groups took a subject from the 4th Grade of Primary Education, and two others took a subject from the 2nd Grade of Primary Education. Each subject was taught at a different university, although both shared the same management platform (blackboard) and a very similar type of evaluation. The selection of the groups was based on choosing one belonging to each grade. The distribution of the studies in the groups was carried out homogeneously to facilitate the implementation of the study itself. However, there were some limitations as they belonged to two different universities:

Table 1. Control and study group

Type of group	Number of students	Men	Women
Study group	125	52	73
Control group	118	41	77
Total	243	93	150

The ages of the participants range from 20 to 35 years old. The resources and virtual platforms available to them are very similar: computers with internet connection and Blackboard as a platform for virtual management and activities.

Procedure

In order to use this platform as a gamification tool, three phases were established: the use of the platform would be explained, initial data would be collected, and information would be gathered to assess the effectiveness of the tool and the methodology used.

In the first phase, the use of the platform will be explained, and a questionnaire will be applied to assess prior knowledge about the topic of study, the use of gamification in university education. The intervention project was carried out during the following weeks, with each group following its respective methodology (traditional vs. gamification). In the last week, data based on the interaction of the students and their opinions regarding the methodologies used will be collected; this information corresponds to a third phase.

Phase 1: Prior knowledge of the subject of study.

Table 2. Results of the initial questionnaire

Nº	Ask	Average response rate
1	Are you familiar with the term "gamification" in the educational context?	1,2
2	Are you familiar with the term "gamification" in the educational context?	1,4
3	Do you have knowledge about how gamification is used in teaching?	1,3
4	Have you previously participated in a gamified class or activity?	1,1
5	Can you mention some of the common mechanics used in educational gamification?	1,0
6	Do you know how experience points work in a gamified environment?	1,2
7	Have you heard of educational gamification platforms such as Classcraft or Kahoot?	3,7
8	Do you have knowledge about how gamification can improve student motivation and engagement?	2,9
9	Do you know some of the potential benefits of gamification in the classroom?	2,8
10	Overall, how would you rate your knowledge of educational gamification?	1,8

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At the beginning of this study, it was unknown whether the students had gone through gamified experiences. Therefore, a questionnaire was applied to measure their knowledge on this topic. A total of 10 questions were asked, which the students had to evaluate from 0 to 5, where 0 means "I have no knowledge" and five means "I know quite a lot."

This questionnaire was completed by the sum of the students who made up the control and study groups. The purpose was to check the students' previous experience with this teaching method.

The general results of this questionnaire showed that most of the students did not know and had not experienced this teaching method before (table 2. Results of the initial questionnaire). The question where the students showed greater knowledge was the one related to gamification platforms; when asked about it, they mentioned that they knew the Kahoot platform because they had used it during the confinement period in the virtual sessions (table 2).

Phase 2: Implementation of the intervention plan.

The intervention was carried out for four months, with a fixed duration for the assigned subjects. This proposal was based on a series of activities that responded to the didactic guide of each subject and the competencies they wanted to work on. To this end, the typology of these activities varied, as did the groupings that were made.

The practical exercises established in the respective subjects' teaching guide were used to develop the general competencies. These activities were of two types: In the first block, we found individual exercises of a short length and duration in which students had to answer very specific questions. They were presented with practical cases to solve as a group in the second block.

The typology of the exercises made it possible to work on some specific competencies, especially the case studies that had to be solved in groups. The groupings could be made based on their preferences or with strategy, i.e., some students preferred to include different partners with different roles in order to benefit from the advantages of each one of them.

The exercises and the case studies were presented in the form of missions, the timing and explanation of which coincided with the initial approach set out in the subject's teaching guide. In this way, we ensured that the execution times in both groups were the same.

The rewards of experience points and skills were associated with a series of actions performed in the synchronous sessions or the autonomous work of each student. On the other hand, the loss of life and skill points was associated with other behaviors (table 3).

Table 3. Behavior associated with rewards and punishments

Feature	Description	Points
Experience Points	Participate in class discussions.	50
	Respond to questions asked via chat or microphone.	50
	Get 8 or more questions correct on the Unit review tests.	75
	Participate in the forum, citing at least two references in APA.	100
Health points	Handing in homework late.	-10 HP (for each day of delay)
	You achieve a score of 6 or lower on the review tests.	-20 HP (for each test)
	Missing classes	-30 HP (for each unexcused absence)
Skills	Restores 5 health points to yourself or a companion (Healers only).	-10 AP
	Restores 5 health points to yourself or to a companion (All other classes).	-20AP
	Remove 5 health points from all members of a team (Warriors only).	- 10AP
	You remove 5 health points from all members of a team (all other classes).	-20AP
	Team members may turn in assignments one day late (Wizards only).	-10AP
	Team members can turn in assignments a day late.	-30AP
	You may miss a day of class without excusing it.	-35AP

If a student lost all life, two alternatives were set. The first was that the classmates of the group would spend ability points (AP) to revive the classmate, who had to restore a minimum of 50 HP to be able to resuscitate. The second was that the affected student would perform an extra activity, such as editing a video of the subject, delivering a didactic unit, or giving an oral presentation on a topic. It should be noted that applyinoptionale in any of the cases was unnecessary.

The first three teams that passed all the chapters and kept the most life would be rewarded with a question on the final exam of the corresponding subject. This encouraged all types of characters to play an important role in the development of gamification.

As for the contextualization of the story in which the gamification proposal was presented, it was designed with ChatGPT. This made adapting the chapters presented based on the students' interests possible. 13 chapters were produced, each presented every 2 or 3 synchronous sessions.

The same methodology that had been applied previously was followed regarding the control groups. The activities and contents were the same, but the presentation and work differed. This made it possible to observe the evolution of the student's interest in the control and study groups simultaneously while the respective subjects were being developed.

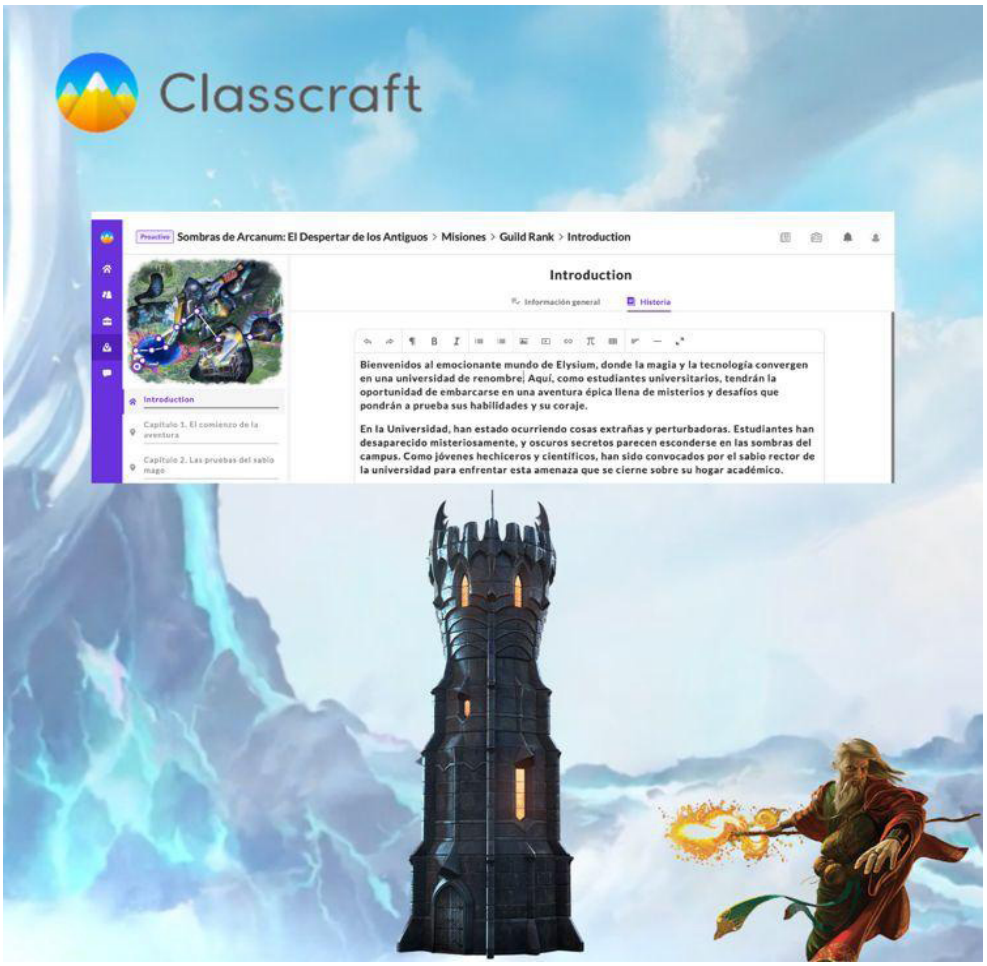


Figure 3. Presentation of chapters

Evaluation instruments

The Blackboard platform allows us to measure student participation fairly detailedly. We can obtain information regarding audience retention and chat participation in the synchronous sessions. This allows us to quantify the time spent viewing the content and the interaction of the sessions. On the other hand, we can observe the involvement of students in the forums and other elements, such as tests or voluntary activities. Therefore, this platform allows us to know the participation of students throughout the course.

In turn, the evaluation instrument designed by the Universidad Autónoma de Nayarit (2011) is used, which allows us to evaluate with a scale of 0 to 5 the elements related to the content and methodology of a subject. This helps us to know the opinions of the students in this regard.

On the other hand, a comparison of the final grades of the subjects will be established to verify the retention of knowledge and the development of the competencies. This will allow for the observation of the general development of the subject both in the activities in the sessions and in the exam of each subject.

Table 4. Questions of the questionnaire

Content	Methodology
1. Were the objectives of the learning unit clearly explained?	6. Work, laboratory practices and assignments during the learning unit.
2. Were the established objectives met?	7. Workbooks and exercises.
3. Was the content of the learning unit and the use of the didactic material understood?	8. Discussions in class, encouraging student participation.
4. Is the content of the learning unit relevant and applicable to my academic program?	9. Audiovisual material (videos, presentations, etc.)
5. Was the duration of the learning unit adequate (hours per week)?	10. Bibliography available to achieve the objectives of the learning unit.

RESULTS

Student participation

Regarding the information obtained in the blackboard platform, we observed that the overall involvement of the students in which the gamification methodology was applied showed a much higher participation than the control group.

The performance of voluntary activities, such as participating in the forum and taking review tests, was quite high compared to the control group. We found 236 responses in forums in the study group and 134 responses in the control group. Thus, participation was 43,22 % higher than in the control group.

Regarding the performance of the subject review tests, we found that the study group performed 101 final reviews compared to the 83 performed by the control group. Thus, a higher participation (17,82 %) was observed in the study group.

As for participation in the sessions, the first, fifth, and last content development sessions were taken as a reference, and they did not correspond to the presentation and review classes. A comparison was made regarding viewing time and the number of messages received through the platform's chat. All this was based on the duration of each session, which was set at 1 hour and 30 minutes.

Regarding the average retention of the sessions, we found that in the first session in which the first reference was taken, the viewing time was 3,49 % less in the control group compared to the study group. A trend that changed in the references taken later, in which we found 21,20 % more viewing time in reference 2 and 20,16 % more in reference 3 in the study group (table 5).

Table 5. Average duration of sessions

Session	Control group	Study group
Reference 1	1:15:23	1:12:45
Reference 2	1:05:18	1:19:09
Reference 3	1:12:09	1:26:42

We found a trend similar to the previous one in the chat interaction. The control group shows higher participation in reference 1, 5,95 % more, but the study group increases its involvement exponentially throughout the following sessions (table 6).

Table 6. Chat interaction

Session	Control group	Study group
Reference 1	84	79
Reference 2	92	145
Reference 3	78	152

In terms of content, the results suggest that students who have experienced gamification have a positive perception of the content compared to the control group, where a more traditional methodology was applied.

A noteworthy fact is that the control group indicated during the sessions that they "would like to have more time to develop the activities of the missions." This is reflected in their evaluation of the duration of each unit.

Regarding the methodology, the results indicate that the study group values the implementation of gamification in comparison with the use of a more traditional methodology, as happened with the control group (table 8).

Table 7. Content evaluation

Content	Control group (N=118)	Study group (N=125)
1. Were the objectives of the learning unit clearly explained?	4,2	4,8
2. Were the established objectives met?	3,3	4,0
3. Was the content of the learning unit and the use of the didactic material understood?	3,6	4,4
4. Is the content of the learning unit relevant and applicable to my academic program?	3,9	3,5
5. Was the duration of the learning unit adequate (hours per week)?	4,1	3,8

Table 8. Assessment of the methodology

Content	Control group (N=118)	Study group (N=125)
6. Work, practices and assignments during the learning unit.	3,3	4,2
7. Workbooks and exercises.	2,6	3,1
8. Class discussions, encouraging student participation.	2,5	4,6
9. Audiovisual material (videos, presentations, etc.)	3,1	3,2
10. Bibliography available to meet the objectives of the learning unit.	2,6	2,9

Acquisition of content and competencies

Regarding the retention of content and acquisition of competencies, the proportion of students in each grading segment was compared between the control group and the study group. The categories were "Not presented," "insufficient," "sufficient," "remarkable," and "outstanding" (table 9).

Table 9. Overall ratings

Rating	Control group (N=118)	Study group (N=125)
Not presented	8,47 %	4,78 %
Insufficient	19,49 %	17,59 %
Suficiente	31,36 %	30,38 %
Well	26,27 %	26,91 %
Notable	9,32 %	11,32 %
Outstanding	5,08 %	8,56 %

The study group had a significantly lower proportion of no-show students compared to the control group. On the other hand, the results obtained in the insufficient, sufficient, and good segments are similar between both groups. Only when the segment is notable and outstanding do we find a new increase in the study group concerning the control group.

Therefore, the methodology used has positively impacted the study group by reducing the number of students who did not present and increasing the number of students with Bs and A's in comparison with the control groups.

CONCLUSIONS

The study's findings suggest the same conclusions as research in this field: gamification is an effective tool to improve student participation, involvement, and learning outcomes. In this research, the students who participated in the gamified intervention showed a much higher engagement than those in the control group.

The results showed that interest in the subjects was greater in those where gamification was applied, generating a notable involvement in voluntary tasks such as completing forums and evaluation tests of didactic units. Participation is crucial for academic success, so encouraging this aspect is essential to improve education.

However, the study has some limitations, especially concerning its implementation. By having closed didactic guides with pre-established activities, it was impossible to adapt the exercises and case studies to the gamification theme. However, this study suggests that this limitation can be adapted if the theme we develop is independent of the missions proposed.

Another area for improvement is concerning the student's previous ideas. In this case, both the control and the study groups had no prior knowledge about gamification because the most similar experience was using applications such as Kahoot! or Quizziz. Therefore, this study cannot conclude the effectiveness of this methodology in the long term if students are more accustomed to it.

Despite these limitations, the results are promising and adapt to an increasingly frequent reality: online university teaching. This type of study sheds some light and new perspectives on how education can change and be consistent with the needs of today's society.

FINANCING

None.

CONFLICT OF INTEREST

None.

AUTHORSHIP CONTRIBUTION

Conceptualization: Rubén Martínez Sánchez.
Data curation: Rubén Martínez Sánchez.
Formal analysis: Rubén Martínez Sánchez.
Research: Rubén Martínez Sánchez.
Methodology: Rubén Martínez Sánchez.
Project Management: Rubén Martínez Sánchez.
Recourses: Rubén Martínez Sánchez.
Software: Rubén Martínez Sánchez.
Supervision: Rubén Martínez Sánchez.
Visualization: Rubén Martínez Sánchez.
Writing – original draft: Rubén Martínez Sánchez.
Writing – proofreading and editing: Rubén Martínez Sánchez.

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