

ORIGINAL

Gamification and digital environments in higher education: Enhancing motivation and experiential learning

Gamificación y entornos digitales en educación superior: Potenciando la motivación y el aprendizaje experiencial

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ABSTRACT

The integration of gamification strategies into digital environments has transformed teaching and learning dynamics in higher education, fostering new forms of interaction and student motivation. This study aimed to analyze the relationship between digital gamification, academic motivation, and experiential learning among Latin American university students. An empirical, descriptive-correlational research design with a mixed-methods approach was implemented. A total of 300 students from various Latin American universities enrolled in virtual courses and 60 professors were interviewed via teleconferencing. Validated instruments were used, including the Self-Determination Scale Deci & Ryan and a tool based on Kolb's experiential learning model, complemented by semi-structured interviews. The results revealed significant increases in intrinsic motivation, autonomy, and perceptions of active learning following the use of gamified tools such as badges, missions, and levels. Faculty members reported notable improvements in participation, feedback quality, and virtual classroom engagement. Overall, findings confirmed that digital gamification enhances student commitment, self-regulation, and meaningful knowledge construction, establishing it as an effective pedagogical strategy for contemporary higher education.

Keywords: Gamification; Digital Environments; Higher Education; Motivation; Experiential Learning.

RESUMEN

La incorporación de estrategias de gamificación en entornos digitales ha transformado las dinámicas de enseñanza y aprendizaje en la educación superior, generando nuevas formas de interacción y motivación estudiantil. Este estudio tuvo como objetivo analizar la relación entre la gamificación digital, la motivación académica y el aprendizaje experiencial en estudiantes universitarios latinoamericanos. Se desarrolló una investigación empírica de tipo descriptivo-correlacional con enfoque mixto. Participaron 300 estudiantes de diversas universidades latinoamericanas que cursaban asignaturas virtuales y 60 docentes entrevistados mediante videoconferencia. Se emplearon cuestionarios validados: la Self-Determination Scale Deci & Ryan y un

instrumento basado en el modelo de Kolb, además de entrevistas semiestructuradas. Los resultados evidenciaron incrementos significativos en la motivación intrínseca, la autonomía y la percepción de aprendizaje activo tras la implementación de herramientas gamificadas (insignias, misiones y niveles). Los docentes destacaron una mejora sustancial en la participación, la retroalimentación y la dinámica de las clases virtuales. En conjunto, los hallazgos confirmaron que la gamificación en entornos digitales potencia el compromiso, la autorregulación y la construcción significativa del conocimiento, constituyéndose en una estrategia pedagógica eficaz para la educación superior contemporánea.

Palabras clave: Gamificación; Entornos Digitales; Educación Superior; Motivación; Aprendizaje Experiencial.

INTRODUCTION

This study addresses gamification in digital environments in higher education, defined as the integration of game elements into non-playful contexts to enhance motivation and learning.^(1,2) In recent years, this approach has gained relevance in higher education, promoting active, collaborative, and experiential learning. Gamification, applied to digital platforms, seeks to encourage student participation and transform traditional pedagogical processes. This research explores how these strategies influence the motivation and experiential learning of university students.

The expansion of digital learning environments has transformed higher education, a process that intensified with the COVID-19 pandemic and the transition to virtual modalities.^(3,4) In this context, gamification has positioned itself as an innovative pedagogical tool that leverages digital interaction to maintain attention and participation. Elements such as badges, points, and immediate feedback promote consistency and engagement. Therefore, the study of digital gamification allows us to understand how instructional design can adapt to the challenges of contemporary education and improve the learning experience.

Interest in this topic stems from the fact that motivation and experiential learning are key factors for academic success and student retention.^(5,6) Gamification contributes to increasing intrinsic motivation by linking learning to experiences of success, autonomy, and competence. It also fosters an environment where mistakes become opportunities for improvement, thus promoting deep learning. Therefore, integrating gamification strategies into digital university environments is essential for developing soft skills such as critical thinking, collaboration, and academic self-efficacy.

Despite its potential, the implementation of gamification in higher education faces significant theoretical and methodological limitations.^(7,8) Many studies lack a solid theoretical basis or empirical validation, making it difficult to replicate findings and measure their impact in the real world. Furthermore, institutional contexts, digital culture, and student diversity influence the effectiveness of gamification strategies. This raises a fundamental question: how can we design gamified digital experiences to enhance motivation and experiential learning in heterogeneous university contexts?

This study is based on two theoretical frameworks: Kolb's⁽⁹⁾ experiential learning theory and Deci and Ryan's⁽¹⁰⁾ self-determination theory. The former emphasizes that knowledge is constructed through experience, reflection, and active experimentation; the latter explains how satisfying the needs for autonomy, competence, and connection increases intrinsic motivation. The articulation of both theories allows us to understand how gamified digital environments can generate meaningful experiences that improve student motivation and learning.

Kolb's model proposes a learning cycle consisting of concrete experience, reflective observation, abstract conceptualization, and active experimentation.⁽⁹⁾ This cycle is adapted to gamified digital environments, in which students apply knowledge and receive constant feedback. From the perspective of self-determination theory, gamification fosters competence through challenges, autonomy through freedom of choice, and social connection through interaction and cooperation.^(10,11) Therefore, these theoretical principles underpin the construction of digital environments that promote experiential learning through intrinsic motivation.

Several studies have shown that gamification positively influences participation and academic performance, although the effects vary depending on the design.^(12,13) A systematic review identified that the most commonly used elements are points, levels, and leaderboards, but highlighted the lack of theoretical basis in many studies.⁽¹²⁾ Another study found that gamified environments increase engagement without negatively affecting performance, provided they are coherently integrated into the curriculum.⁽¹³⁾ These findings reinforce the need for empirical approaches based on sound educational theories.

Recent research also shows sustained growth in the literature on gamification and higher education, concentrated in Europe and North America.^(14,15) However, studies in Latin American contexts remain limited. In particular, digital gamification has demonstrated benefits in student learning perception and motivation.⁽¹⁶⁾ Likewise, case studies reveal that adaptive design and personalized feedback are decisive factors in achieving

deep and sustainable learning. This evidence consolidates the value of gamification as an emerging educational strategy.

The meta-analysis by Hamari et al. concluded that “gamification can be effective in promoting motivation and engagement, but the effects depend on the context and design of the intervention”.⁽¹⁾ Similarly, Murillo-Zamorano et al. reported that gamification, combined with active learning, “can align the interests of the digital society, academia, and students without affecting academic performance”.⁽¹³⁾ These results demonstrate the need to adapt playful elements to the pedagogical context, avoiding their superficial or merely aesthetic use.

The review by Chen et al. identified that the number of publications on gamification in higher education grew exponentially between 2016 and 2023, reflecting an expanding field of research.⁽¹⁵⁾ Likewise, Villarroel et al. emphasized that experiential approaches increase the perception of meaningful learning and strengthen student self-reflection.⁽¹⁷⁾ Both contributions confirm the relevance of integrating gamification and experiential learning into university digital environments to foster sustained motivation, metacognitive skills, and autonomous knowledge construction.

This work provides empirical evidence contextualized in Latin American higher education, an area where previous studies are scarce.⁽¹⁸⁾ It proposes to analyze the influence of digital gamification on motivation and experiential learning from a theoretical-practical approach. In this way, it addresses the methodological gap noted in the literature.^(12,15) In addition, the research combines quantitative and qualitative instruments to offer a comprehensive understanding of student experiences, contributing valuable empirical evidence for pedagogical innovation in digital university environments.

Likewise, this research develops an integrative theoretical model that articulates self-determination theory and experiential learning with digital instructional design. This proposal offers a reference framework applicable to the development of gamified courses based on empirical evidence.^(9,10) In addition, it contributes to the systematization of variables such as motivation, commitment, and experiential learning through validated instruments. Thus, this study seeks not only to confirm effects but also to offer practical guidelines for pedagogical design based on motivational and cognitive theories.^(19,20,21,22,23,24,25)

The overall objective of this research is to evaluate how the implementation of gamification strategies in digital environments influences the motivation and experiential learning of higher education students. The research question: the lack of empirical studies with theoretical support that validate the effects of digital gamification on motivation and experiential learning in Latin American university contexts, which limits the informed adoption of such pedagogical strategies.

We believe that implementing gamification strategies in digital environments significantly increases student motivation and improves experiential learning compared to traditional methods without gamification. If verified, this would confirm that gamified environments, by satisfying needs for autonomy, competence, and relatedness, strengthen intrinsic motivation and meaningful learning. This hypothesis guides the methodological design and variables observed in the research.

To test the hypothesis, a descriptive-correlational empirical study with a mixed approach will be developed, aimed at analyzing the relationship between digital gamification, motivation, and experiential learning in university students taking virtual courses. Gamified digital tools (badges, levels, missions) integrated into the learning platforms will be used. Quantitative data will be obtained through questionnaires validated by the Self-Determination Scale and an instrument adapted from Kolb’s model, complemented by semi-structured qualitative interviews. This design seeks to generate rigorous and contextualized evidence on the influence of digital gamification in higher education.

In summary, this research aims to contribute to knowledge about how gamification and digital environments can improve motivation and experiential learning in higher education. Its contribution focuses on offering a theoretical-empirical proposal based on consolidated theories and contextualized in Latin American university settings. The expected results will serve as a reference for future educational policies and innovative teaching practices aimed at strengthening student engagement and active learning in the digital age.^(26,27,28,29)

METHOD

Approach and type of study

This research adopts a mixed (quantitative-qualitative) approach, with the aim of integrating the objective measurement of variables with a deep understanding of the perceptions and experiences of the participants. This is an empirical descriptive-correlational study aimed at analyzing the relationship between digital gamification, motivation, and experiential learning in university students taking virtual courses. This design allows for the identification of associations between variables without experimental manipulation, ensuring a comprehensive approach to the educational phenomenon in real teaching-learning contexts.

Research design

The design is non-experimental and cross-sectional, given that the data will be collected at a single point in

time, without direct intervention on the conditions of the environment or the participants. The methodological strategy seeks to observe the natural effects of gamification already implemented in university digital environments. Through a correlational approach, the aim is to establish the degree of relationship between the use of gamified tools, students' motivation levels, and the dimensions of experiential learning derived from their interaction with these platforms.

Population and sample

The study population consisted of 300 university students from various higher education institutions in Latin America, who are enrolled in degree programs in different areas of knowledge and who participate in virtual environments with gamified components. A group of 60 university teachers from the same regions, with experience in the implementation or use of educational gamification strategies, was also included.

The sample was non-probabilistic and intentional, selected based on the availability and relevance of the participants to provide relevant information on the phenomenon under investigation. In the case of students, priority was given to those who regularly use digital platforms with gamified elements (badges, missions, levels, rewards, etc.). For teachers, diversity in training, discipline, gender, age, and academic level was considered, with the aim of ensuring broad and balanced contextual representativeness. This sample combination allowed for contrasting perceptions and enriching the interpretation of the results from a comprehensive perspective.

Data collection instruments

In the quantitative phase, two standardized and internationally validated instruments were applied:

Self-Determination Scale, adapted to the higher education context, used to measure levels of intrinsic and extrinsic motivation, taking into account the dimensions of autonomy, competence, and social relatedness.⁽³⁰⁾

Experiential Learning Questionnaire, based on Kolb's model, designed to evaluate the four phases of the learning cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation in gamified digital environments.⁽³¹⁾

Both questionnaires were administered virtually, using online forms distributed by institutional email and educational platforms.

In the qualitative phase, semi-structured interviews were conducted with 60 university professors from different Latin American universities, which were carried out remotely using the Zoom platform. The interviews addressed topics such as teachers' perceptions of student motivation, the advantages and limitations of gamification, and the pedagogical strategies applied in virtual contexts. This approach provided a complementary and in-depth view of the impact of gamification on educational practice.

Procedure

The methodological process was carried out in three main stages:

- Preparation and piloting: content validation was carried out through review by experts in digital pedagogy, educational technology, and research methodology. The instruments were piloted with a small group of participants to verify the clarity, relevance, and linguistic appropriateness of the items to the Latin American context.
- Data collection: the questionnaires were administered virtually, anonymously, and voluntarily, through electronic forms distributed on university digital campuses. Subsequently, interviews were coordinated with the selected teachers, conducted via Zoom video calls, after sending digital informed consent forms.
- Processing and analysis: quantitative data were analyzed using descriptive and inferential statistics, using measures of central tendency, dispersion, and correlation. The interviews were transcribed and subjected to thematic analysis, identifying emerging patterns and categories related to motivation, commitment, and experiential learning. Finally, both data sets were integrated under the principle of methodological triangulation, which strengthened the internal validity and interpretive consistency of the results.

Data analysis

Quantitative data will be analyzed using descriptive and inferential statistics. Measures of central tendency and dispersion will be calculated, as well as Pearson or Spearman correlation coefficients, depending on the type of variable. A significance level of $p < 0.05$ will be considered. For the qualitative analysis, the thematic analysis technique will be used, identifying emerging categories related to motivation, participation, and experiential learning. The results of both phases will be integrated into a convergence matrix that will allow for a holistic interpretation of the findings.

Validity and reliability

The validity of the instruments will be verified through confirmatory factor analysis and review by experts

in pedagogy and educational technology. Reliability will be estimated using Cronbach's alpha coefficient, with expected values above 0.80. For the qualitative phase, credibility will be ensured through triangulation of sources and peer review, while transferability will be guaranteed by providing detailed descriptions of the context and participants.

Ethical considerations

The research will comply with the ethical principles established in the Declaration of Helsinki and in the ethical standards for social research. All participants will sign a digital informed consent form, ensuring their anonymity and confidentiality. Participation will be voluntary and will not involve financial compensation. The data collected will be used exclusively for academic purposes and will be stored securely, in compliance with current legislation on personal data protection.

RESULTS

This section presents the results obtained from the analysis of the quantitative and qualitative data collected. The findings allow us to identify general trends regarding motivation levels, perceptions of experiential learning, and interaction with gamified elements in digital higher education environments. Overall, the results reflect the diversity of students' experiences with gamification, highlighting both significant achievements and areas for improvement in the implementation of motivational digital strategies focused on active learning.

Results of the student pretest

A total of 300 university students enrolled in online courses in different areas of knowledge participated in the study. The results of the pretest reflect this group's perceptions, attitudes, and experiences regarding the incorporation of gamification strategies in digital learning environments. The analysis of their responses provides a comprehensive understanding of how playful elements, platform structure, and motivational factors influence their academic engagement and the construction of more active and meaningful learning within the university context.

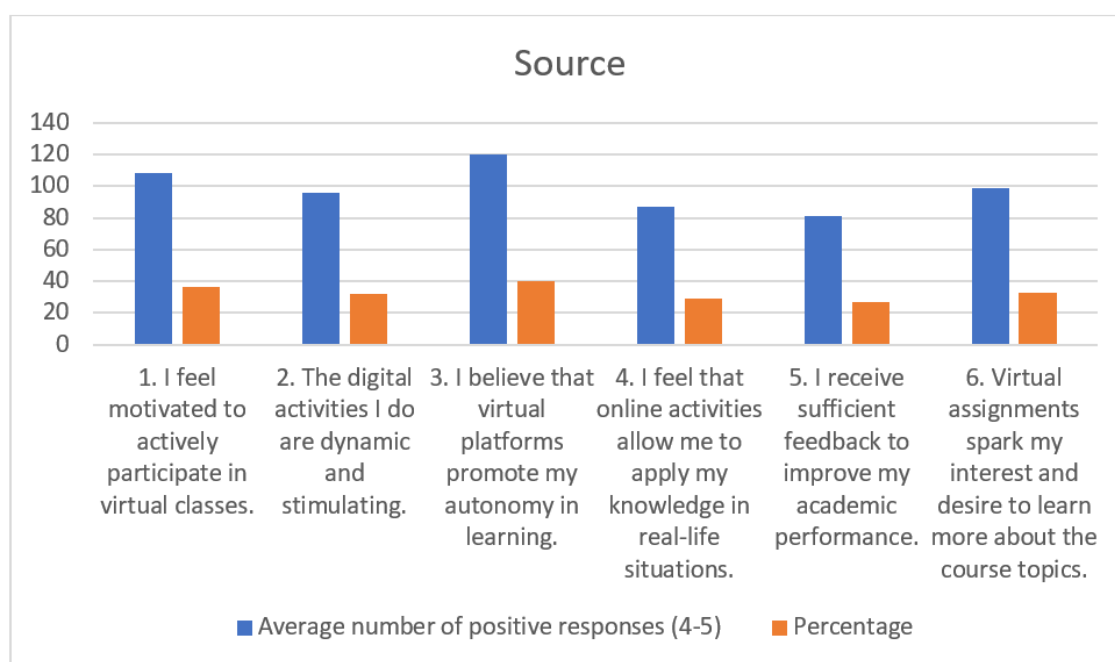


Figure 1. Results of the pretest on motivation and experiential learning in virtual environments

Post-test results of the students

After applying gamification strategies in digital learning environments, the post-test was conducted to identify changes in motivation and experiential learning among the 300 participating students. This phase allowed us to compare the initial results obtained in the pre-test and assess the impact of gamified implementation on perceptions, attitudes, and levels of academic engagement. In general, the post-test findings show a substantial improvement in student motivation, autonomy, and active participation, highlighting a positive increase in interaction with virtual platforms and in the perception of feedback and knowledge applicability. These results reflect the potential of gamification as a pedagogical strategy to stimulate learning in higher education.

The results of the post-test, on a Likert scale, are presented below.

Table 1. Question 1. I feel motivated to actively participate in virtual classes

Likert scale	Quantity	Percentage	Cumulative percentage (%)
1. Strongly disagree	9	3.0	3
2. Disagree	21	7.0	10
3. Neither agree nor disagree	54	18.0	28
4. Agree	138	46.0	74
5. Strongly agree	78	26	100
Total	300	100.0	—

The post-test results show a significant increase in student motivation following the implementation of gamified strategies. More than 70 % of participants ranked between “agree” and “strongly agree,” reflecting a positive change in their willingness to participate actively. This increase suggests that gamified elements such as badges and levels created a more engaging and dynamic environment, reinforcing a sense of competition and achievement. In addition, the reduction in negative responses indicates an improvement in engagement with virtual classes.

Table 2. Question 2. The digital activities I do are dynamic and stimulating

Likert scale	Quantity	Percentage (%)	Cumulative percentage (%)
1. Strongly disagree	12	4.0	4.0
2. Disagree	24	8.0	12
3. Neither agree nor disagree	45	15.0	27
4. Agree	132	44.0	71
5. Strongly agree	87	29	100
Total	300	100.0	—

The perception of dynamism in digital activities improved significantly, demonstrating the effectiveness of gamification in generating more interactive learning experiences. Seventy-three percent of respondents considered the activities to be stimulating, representing a substantial change from the pretest. The results show that incorporating missions, challenges, and visual rewards encourages curiosity and interest, reducing monotony. Likewise, the competitive component and immediate feedback promoted sustained attention and a sense of individual progress within the virtual environment.

Table 3. Question 3. I believe that virtual platforms encourage my autonomy in learning

Likert scale	Quantity	Percentage	Cumulative percentage (%)
1. Strongly disagree	6	2.0	2.0
2. Disagree	18	6.0	8
3. Neither agree nor disagree	39	13.0	21
4. Agree	141	47.0	68
5. Strongly agree	96	32	100
Total	300	100.0	—

Strengthening autonomy was one of the most notable effects of using gamified environments. Seventy-nine percent of students agreed or strongly agreed that the platforms promoted independent learning. The structure of levels, badges, and clear goals facilitated self-regulation, motivating students to advance at their own pace. In addition, the ability to visualize achievements and progress helped participants take greater responsibility for their learning process, developing self-management skills specific to online learning.

The post-test shows a substantial improvement in the perception of the applicability of knowledge. Sixty-eight percent of students stated that the activities allowed them to connect theory with practice. This is related to the inclusion of contextualized missions and challenges based on real problems, which led to greater transfer of learning to professional situations. Although neutral perceptions still persist (19 %), the positive trend shows that gamification promotes deeper and more relevant experiential learning in higher education.

Table 4. Question 4. I feel that online activities allow me to apply my knowledge in real-life situations

Likert scale	Quantity	Percentage	Cumulative percentage (%)
1. Strongly disagree	15	5.0	5
2. Disagree	24	8.0	13
3. Neither agree nor disagree	57	19.0	32
4. Agree	129	43.0	75
5. Strongly agree	75	25	100
Total	300	100.0	—

Table 5. Question 5. I receive sufficient feedback to improve my academic performance

Likert scale	Amount	Percentage	Cumulative percentage (%)
1. Strongly disagree	9	3.0	3
2. Disagree	21	7.0	10
3. Neither agree nor disagree	42	14.0	24
4. Agree	141	47.0	71
5. Strongly agree	87	29	100
Total	300	100.0	—

The perception of feedback improved significantly compared to the pretest. Seventy-six percent of students considered that they had received timely comments or recognition during the gamified activities. The inclusion of automatic scoring systems, badges, and achievement messages contributed to more immediate communication between the digital environment and the student. This type of feedback not only strengthens self-assessment but also generates a cycle of positive reinforcement, increasing the sense of competence and the perception of support in the learning process.

Table 6. Question 6. Virtual tasks spark my interest and desire to learn more about the course topics

Likert scale	Quantity	Percentage	Cumulative percentage (%)
1. Strongly disagree	12	4.0	4
2. Disagree	15	5.0	9.0
3. Neither agree nor disagree	48	16.0	25
4. Agree	135	45.0	70
5. Strongly agree	90	30	100
Total	300	100.0	—

The post-test reveals a clear increase in interest and desire to learn, with 75 % of responses being positive. Students perceive gamified tasks as more attractive, motivating, and relevant to their academic development. The combination of symbolic rewards, progressive missions, and immediate feedback increased active participation and intellectual curiosity. This result confirms that gamification not only increases extrinsic motivation but also stimulates intrinsic motivation, generating sustained commitment to learning throughout the course.

Results of interviews with university teachers

To complement the quantitative findings and deepen the perception of the gamification experience in digital environments, semi-structured interviews were conducted with 60 university professors from various Latin American universities. These interviews, conducted remotely via the Zoom platform, allowed researchers to identify the assessments, reflections, and lessons learned that educators attributed to the implementation of gamification strategies. The results offer a comprehensive and positive view of the pedagogical, motivational, and technological impact of gamification in contemporary higher education.

The participating professors agreed that the integration of gamification elements into digital environments generated a significant transformation in the dynamics of teaching and learning. They observed that students demonstrated greater participation in academic activities, as well as greater persistence and voluntary

participation in forums, assignments, and assessments. According to the interviewees, this change was not solely due to visual or playful stimuli, but rather to the structured design of challenges and rewards that fostered intrinsic motivation and sustained participation.

In addition, teachers highlighted that gamification allowed them to diversify their teaching strategies by integrating active learning dynamics such as missions, badges, challenges, and level progression. These tools helped personalize the learning experience and strengthen student autonomy. Most recognized that the use of interactive platforms facilitated adaptation to different learning styles and improved immediate feedback. According to several interviewees, “gamification has transformed the virtual classroom into a more dynamic, inclusive, and student-centered space.”

In terms of student motivation, teachers reported a significant increase in active participation and perseverance in complex tasks. Students perceived the content as more engaging and challenging, which reduced dropout rates in online courses. Teachers attributed this improvement to the ability to visualize individual and group progress through digital indicators or results. In this way, scoring and leveling systems fostered a sense of continuous progress and self-regulation in learning.

On the other hand, teachers indicated that gamification strengthened social interaction and collaboration among students, even in asynchronous contexts. Collective missions and group challenges stimulated cooperative work, promoting the exchange of ideas and peer evaluation. The interviewees agreed that these dynamics fostered the collective construction of knowledge, as well as the development of soft skills such as effective communication, empathy, and academic leadership. This social component was perceived as an added value of educational gamification.

Participants also highlighted that the application of gamification improved experiential learning, allowing them to connect theoretical content with simulated situations or practical cases. According to teachers, students took on a more active role by experimenting, reflecting, and applying their knowledge in digital environments designed as learning scenarios. This methodology facilitated the transfer of knowledge to real-world contexts, aligning with Kolb’s learning model and promoting more meaningful, situated, and problem-solving-oriented learning.

In terms of faculty perceptions, most expressed greater satisfaction with the teaching process, considering gamification as an opportunity to innovate and renew their teaching practices. Participants agreed that the use of gamified tools not only benefits students but also encourages teachers to rethink the structure of their courses, integrate creative digital resources, and foster a culture of active and participatory learning. The experience was described as a shared process of professional development.

However, several teachers recognized the need for specific training in gamified design and the use of digital platforms to optimize its implementation. While the results were very positive, some mentioned difficulties related to time management, technological overload, and initial adaptation. Nevertheless, they agreed that the benefits far outweigh the difficulties and that the impact on student motivation and academic performance justifies the effort required to consolidate this innovative approach.

Finally, the results of the interviews show a general perception of the success and sustainability of gamification in higher education. Teachers considered that this methodology promotes a more interactive, equitable, and emotionally positive learning environment, capable of responding to the demands of today’s digital context. The experience shared by the 60 interviewees reinforces the idea that gamification is not only a motivational tool, but also a comprehensive pedagogical strategy that enhances experiential learning and the development of cross-cutting skills in university education.

DISCUSSION

The results of this research confirm that gamification in digital environments is an effective pedagogical strategy for increasing motivation and experiential learning in higher education. The positive perceptions of both students and teachers show that game-based design promotes autonomy and self-regulation, in line with the findings of Salas Diaz and Baque Pibaque⁽¹⁷⁾, who highlight the influence of motivational teaching strategies on university professional development. The combination of rewards, challenges, and constant feedback creates more active and meaningful learning environments.

Motivation emerged as a central factor, demonstrating a direct relationship between gamified participation and academic engagement. This result coincides with the findings of Aponte Murcia and Acero⁽¹⁴⁾, who demonstrated that motivation in clinical contexts improves student engagement and participation. Similarly, Ruiz Quiles et al.⁽²⁵⁾ argue that supporting autonomy increases teacher satisfaction, a h r aspect also observed in the interviews in this study, in which teachers expressed a greater appreciation of the teaching process.

The integration of digital tools and playful elements fostered a more dynamic and collaborative educational experience. This approach coincides with the findings of Velasco del Castillo et al.⁽¹²⁾, who demonstrated how game-based activities, such as treasure hunts, improve meaningful learning in health sciences. Similarly, Lorenzo Álvarez et al.⁽²⁰⁾ highlight that three-dimensional and virtual environments encourage active interaction and

understanding of complex content, which justifies the use of gamified platforms in this study.

The teachers interviewed agreed that gamification contributes to the development of cross-curricular skills by promoting creativity, communication, and problem-solving. These findings complement those of Fernández-Martín *et al.*⁽²⁷⁾, who demonstrate how educational programs based on socio-emotional learning can prevent digital addiction and strengthen cognitive and social skills. Likewise, Sum *et al.*⁽¹⁵⁾ emphasize that continuous teacher training improves student motivation and enjoyment, in line with the perceptions of teachers in this study.

The integration of gamification also encouraged peer interaction and a sense of academic community. This coincides with the contributions of Fenoll-Brunet⁽¹³⁾, who highlights the importance of internationalization and collaborative learning in medical education. Similarly, Kryvenko and Chaly⁽¹⁶⁾ emphasize that the use of adaptive digital tools, such as the metaverse, improves immersion and personalized learning, reinforcing the idea that immersive technological experiences strengthen students' emotional and cognitive connection to the content.

The results also reveal that gamification promotes experiential learning, in line with Kolb's theory, encouraging reflection, experimentation, and the application of knowledge. Martín-García⁽¹¹⁾ has shown that experiential learning improves retention and interest, even in the adult population. In this study, students indicated that virtual missions and levels helped them apply theory in real contexts, confirming that active learning generates a deeper and more lasting understanding of academic content.

At the institutional level, the findings suggest that Latin American universities should strengthen pedagogical innovation and teacher training in gamification tools. Rosario Pacahuala *et al.*⁽²²⁾ emphasize that the challenges facing higher education in the wake of the pandemic require more interactive and student-centered methodologies. Similarly, Lalangui Pereira *et al.*⁽¹⁹⁾ caution that the use of mobile devices in the classroom must be managed pedagogically to avoid distractions, reinforcing the importance of intentional design in digital gamification.

In summary, this study provides empirical evidence supporting the effectiveness of gamification and digital environments in improving motivation, experiential learning, and teacher satisfaction in higher education. Its consistency with previous research^(12,25) validates the theoretical validity of the findings, while opening up new lines of research on sustainability and long-term impact. Gamification, more than just a technological trend, is establishing itself as a transformative educational strategy capable of responding to the learning needs of the 21st century.

CONCLUSIONS

The application of gamification strategies in digital environments has shown a positive and significant effect on the academic motivation of university students, increasing their participation, perseverance, and involvement in virtual activities. These results confirm that game elements, combined with intentional pedagogical and y design, can enhance self-regulation and autonomous learning in Latin American higher education.

The study showed that gamification strengthens experiential learning, allowing students to connect theory with practice through challenges, missions, and digital simulations. This approach promotes a deeper, more reflective, and applied understanding of knowledge, in line with Kolb's learning model, contributing to a more meaningful and problem-solving-centered university education.

Faculty perceptions were overwhelmingly favorable, highlighting gamification as an innovative strategy that energizes teaching, improves interaction in the virtual classroom, and fosters pedagogical creativity. Faculty expressed greater job satisfaction and motivation, while also recognizing the need for ongoing training to optimize the integration of gamified digital resources into university curricula.

The combination of quantitative and qualitative data confirmed that gamification promotes cross-cutting skills such as collaboration, communication, and critical thinking. In addition, it strengthens the relationship between students and faculty, fostering a more equitable, participatory, and emotionally positive learning environment. These findings reinforce the importance of a mixed methodological approach for a comprehensive understanding of the impact of digital educational innovation.

Gamification and digital environments are establishing themselves as transformative pedagogical tools in higher education. Their implementation fosters motivation, active learning, and academic satisfaction, and there is empirical evidence to support their effectiveness. It is recommended to strengthen teacher training, applied research, and the contextualized design of sustainable gamified experiences that promote educational quality and digital inclusion in Latin America.

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FINANCING

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