

ORIGINAL RESEARCH

Gamification to improve learning in dental students at the Catholic University of Cuenca

Gamificación para mejorar el aprendizaje en estudiantes de odontología de la Universidad Católica de Cuenca

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ABSTRACT

Introduction: Teaching Diagnostic Orthodontics in the Dentistry program requires innovative teaching resources to motivate students and facilitate learning. Gamification is presented as an educational strategy capable of increasing participation, interest, and knowledge retention. Objective: To design and implement a plan of gamified teaching strategies to improve learning among Diagnostic Orthodontics students at the Catholic University of Cuenca. Methods: A qualitative-descriptive study was conducted using an action research approach, based on the researcher's direct experience. The intervention included interactive activities and online tests using platforms such as Kahoot and Nearpod, assessing students' perceptions and performance. Results: The majority of students positively valued the gamified tools, considering the online tests (83.4%) and interactive activities (79.6%) to be very useful in reinforcing learning and participation. Furthermore, 85.2% perceived improvements in topic comprehension and exam preparation, while 79.6% reported benefits in concentration and motivation, although some technical difficulties were reported. The program-related incentives were well received (85.2%), as was the use of Nearpod (81.5%) and Kahoot (75.9%). Overall satisfaction reached 81.5%, confirming the effectiveness of gamification on academic performance. Conclusions: Gamification significantly contributed to overcoming difficulties in key topics in Diagnostic Orthodontics, promoting active, motivating, and collaborative learning. This strategy strengthened cognitive, social, and technological skills, as well as creativity and logical thinking, facilitating the understanding of complex content and fostering a dynamic and meaningful learning environment.

Keywords: Gamification; Dental Education; learning; student motivation

RESUMEN

Introducción: La enseñanza de la cátedra de Ortodoncia Diagnóstica en la carrera de Odontología requiere innovar los recursos didácticos para motivar a los estudiantes y facilitar el aprendizaje. La gamificación se presenta como una estrategia educativa capaz de incrementar la participación, el interés y la retención de conocimientos. Objetivo: Diseñar e implementar un plan de estrategias didácticas gamificadas para mejorar el aprendizaje de los estudiantes de Ortodoncia Diagnóstica en la Universidad Católica de Cuenca. Métodos: Se realizó un estudio cualitativo-descriptivo con enfoque de investigación-acción, basado en la experiencia directa del investigador. La intervención incluyó actividades interactivas y test en línea mediante plataformas como Kahoot y Nearpod, evaluando la percepción y el rendimiento de los estudiantes. Resultados: La mayoría de los estudiantes valoró positivamente las herramientas gamificadas, considerando los test en línea (83,4%) y las actividades interactivas (79,6%) como muy útiles para reforzar el aprendizaje y la participación. Además, el 85,2% percibió mejoras en la comprensión de los temas y preparación para exámenes, mientras que un 79,6% señaló beneficios en concentración y motivación, aunque se registraron algunas dificultades técnicas. Los incentivos vinculados a la carrera fueron bien aceptados (85,2%), al igual que el uso de Nearpod (81,5%) y Kahoot (75,9%). La satisfacción general alcanzó un 81,5%, confirmando la efectividad de la gamificación en el rendimiento académico. Conclusiones: La gamificación contribuyó significativamente a superar dificultades en temas clave de Ortodoncia Diagnóstica, promoviendo un aprendizaje activo, motivador y colaborativo. Esta estrategia fortaleció habilidades cognitivas, sociales y tecnológicas, así como la

creatividad y el pensamiento lógico, facilitando la comprensión de contenidos complejos y fomentando un ambiente de aprendizaje dinámico y significativo.

Palabras clave: Gamificación; Educación Odontológica; aprendizaje; motivación estudiantil.

INTRODUCTION

Education is a fundamental pillar for social development, and teachers are key actors in ensuring quality and equity in learning ⁽¹⁾. In an increasingly digitalized society, there is a need to update educational methods by incorporating technological tools and playful applications. In this context, gamification—understood as the use of game dynamics to motivate learning—makes it possible to address challenges related to motivation, engagement, and the cognitive, emotional, and social development of students (2,3). For it to be effective, this strategy requires games with clear rules and well-defined pedagogical objectives.

Within this teacher–student dynamic, recent approaches seek to strengthen their connection through new methodologies and tools. This research focuses specifically on one of them: game-based gamification to motivate learning. Some authors suggest that gamification provides an opportunity to tackle two major problems in education—motivation and engagement—and that it can also support cognitive, emotional, and social development. To achieve its objectives, gamification must include games with specific characteristics, such as clear rules and parameters, always aligned with learning goals ⁽¹⁾.

Games used in gamification should enhance learning theory, high-quality experiences, collaborative methods, and motivation through competition. Once the process is completed, students should be assessed to determine their mastery of the subject. This process involves certain challenges, including technological, procedural, economic, pedagogical, and conceptual difficulties. However, all these must be overcome in order to foster student engagement and stimulate curiosity toward knowledge ^(1,2).

Gamification promotes collaboration, healthy competition, and the evaluation of content mastery by integrating learning theory into practical experiences (4). Although it may face technological, economic, and pedagogical barriers (5,6), these must be addressed to encourage student engagement and curiosity. Educational institutions face the challenge of adopting innovative methodologies that respond to changes in a digital society and generate meaningful learning experiences ^(7,8).

In this sense, higher education institutions have the responsibility to incorporate innovative strategies that improve teaching–learning processes, adapting to the characteristics of a digitalized society. Despite advances in this field, there is limited evidence regarding the application of gamification in specific subjects within dentistry, especially in Diagnostic Orthodontics, where students often face difficulties in understanding and integrating theoretical and practical content.

This issue is reflected in decreased interest, motivation, and active participation among students, which negatively affects their academic performance. Therefore, there is a need to design and implement innovative methodological strategies that improve these processes, promoting more meaningful and contextualized learning.

This study focuses on the implementation of gamification in the Diagnostic Orthodontics course at the Catholic University of Cuenca, aiming to improve student motivation, participation, and comprehension, as well as to strengthen cognitive, social, and technological skills ^(9,10). The research addresses the central question: How can learning be improved through gamification? It also explores three sub-questions: identifying difficulties in the subject, designing a gamified strategy plan, and evaluating its results in the teaching–learning process. This approach seeks to provide evidence on gamification in health education—a field with limited research—and to offer practical tools to transform traditional teaching methods and improve academic performance.

MATERIALS AND METHODS

Type of Study

This study is based on an action-research method; it is non-experimental, cross-sectional, and descriptive. A group of students from the Faculty of Dentistry at the Catholic University of Cuenca was selected. Specifically, sixth-semester students from groups C and E enrolled in the Diagnostic Orthodontics course during the September 2023–February 2024 academic period were included.

Population and Sample Size

A non-probabilistic convenience sampling method was used, including all sixth-semester students from groups C and E enrolled in the Diagnostic Orthodontics course at the Catholic University of Cuenca during the September 2023–February 2024 period. According to academic records, 55 students were enrolled in these groups.

Inclusion Criteria:

- Sixth-semester students from groups C and E enrolled in the Diagnostic Orthodontics course at the Catholic University of Cuenca during the September 2023–February 2024 period.
- Students with regular in-person class attendance.

Exclusion Criteria:

- Students who choose not to participate in the research.
- Students who have withdrawn from the course.

Data Collection Description

For this research, a nominal-scale questionnaire based on Rodríguez ⁽¹¹⁾ was used to identify students’ weaknesses prior to the implementation of gamification, in order to determine the most difficult content areas. Once these weaknesses were identified among sixth-semester students in groups C and E, reinforcement classes were implemented using digital gamified tools such as Kahoot and Nearpod. Subsequently, a Likert-scale survey based on Sainz de Abajo et al. ⁽¹²⁾ was applied to measure student satisfaction with the gamified process, as well as to analyze teacher–student interaction and connection.

Data were collected through Google Forms interviews that included seven items: satisfaction with class blocks, identification of difficult topics, perception of theory and practice, subject difficulty, and teaching methods. This provided a clear overview for improving teaching. Through gamification, student behavior, engagement, and motivation were observed, and results were confirmed using a satisfaction survey.

The analysis of results was based on observation, teaching experience, student participation, and collected responses. The research was divided into two phases: first, the presentation of results through tables and graphs, and second, a critical discussion comparing findings with other studies and incorporating personal insights.

Diagnostic Test:

After applying the data collection instruments, the results of an initial survey administered to 48 sixth-semester students from groups C and E of the Diagnostic Orthodontics course at the Catholic University of Cuenca were recorded. The survey, conducted via Google Forms, consisted of seven nominal-scale questions and aimed to identify learning difficulties in previously studied content blocks, in order to reinforce topics and prepare students for mid-term exams.

Once weaknesses were identified, reinforcement classes were delivered using gamification methodology through digital platforms such as Kahoot and Nearpod. The results of each question were later broken down for analysis.

Ethical Considerations

This study was conducted within the framework of action research approved by the corresponding Scientific Council and followed established ethical principles. Informed consent was obtained from the students, explaining the objectives of the research, the voluntary nature of their participation, and the guarantee of anonymity and confidentiality of the data.

It was clarified that non-participation would not result in any academic or personal consequences. The intervention did not interfere with the normal development of classes, as it was designed to be integrated into curricular activities, with the aim of strengthening student learning without affecting their educational process.

RESULTS

Table 1. General results of the diagnostic survey (48 students)

Question	Evaluated Aspect	Main Results	Interpretation
1 How satisfied are you with the overall format of the class in Block 1?	Satisfaction with Block 1 format	8.3% not satisfied at all 33.3% average 31.3% Good 27.1% very satisfied	Most students perceive the classes as average or good; however, the overall level of satisfaction is low, generating distrust and a lack of connection with the teacher
2 Within the block corresponding to pre- and postnatal growth and	Difficulties in Block 1 topics	Greatest gaps in: Stages of general growth and development (25%)	The main problems are concentrated in basic and general growth topics, indicating initial gaps that affect subsequent learning.

Question	Evaluated Aspect	Main Results	Interpretation
development, I need to reinforce:		Methods for studying the skull and face (25%) Theories of craniofacial growth (16.7%) Prenatal craniofacial growth (14.6%) Growth terminology (8.3%)	
3 How satisfied are you with the overall format of the class in Block 2?	Satisfaction with Block 2 format	2.1% very poor 25% average 39.6% good 33.3% very good	Perception improves compared to Block 1, although 100% satisfaction is still not achieved. Motivation and connection with the subject need to be strengthened.
4 Within the block corresponding to dentition development, I need to reinforce:	Difficulties in Block 2 topics	Permanent dentition (10.4%) Mixed dentition and dimensional changes (14.6%) Normal characteristics of primary arches (16.7%) Occlusion in primary dentition (37.5%)	The topic of occlusion in primary dentition is the most problematic, showing a strong need for reinforcement through more dynamic strategies.
5 How difficult is the class for me?	Level of difficulty of the subject	8.3% easy 12.5% difficult 77.1% average (neither easy nor difficult)	Most students show neutrality, reflecting disinterest and a lack of deep engagement with the subject.
6 Do you think the class provided an adequate amount of theory and practice?	Theoretical–practical preparation	87.5% feel prepared 12.5% do not feel prepared	Most students feel ready for pre-professional practice; however, a group still does not master the theory, representing a risk in practical training.
Did the teacher’s methods help you better understand the topic?	Perception of teaching methods	0% strongly disagree 16.7% slightly agree 25% agree 56.3% neutral	Although there is no total rejection, more than half remain neutral, indicating a lack of teacher–student connection and the need to improve teaching methodology.

Source: Own elaboration.

After the diagnostic evaluation, a gamification strategy was applied, which consists of using game dynamics, mechanics, and elements in an educational context to motivate, engage, and encourage participation. In this project, it was implemented through instructional sequences using Kahoot and Nearpod. During its application, it was observed that students were motivated, focused, and enjoyed unlocking different sections of the sequence, showing interest in the topics due to the novelty of the methodology.

Based on the results obtained, a gamification-based strategy plan was designed. Students were asked to bring digital devices with internet access. In Kahoot, multiple-choice, true/false, and timed questions were used, rewarding the winner with cumulative badges. Although it presented limitations in question length, it promoted quick and motivating responses. With Nearpod, the dynamic included image projection and avatars climbing a summit, particularly reinforcing the occlusion content from Block 2 and achieving a strong theory–practice connection.

Satisfaction Survey:

Finally, after completing the reinforcement classes based on gamification and the use of playful tools, and after observing students’ behavior and performance throughout these activities, an anonymous survey was conducted to ensure greater reliability. A total of 54 students who attended the gamified classes participated.

The purpose was to assess students’ experiences after the implementation of gamification in their classes. The survey used a nominal scale from 1 to 5 to evaluate different aspects of gamification, where 1 = very poor, 2 = poor, 3 = average, 4 = good, and 5 = very good. The following results were obtained.

Table 2. Results of the survey on the gamification experience (54 students)

Question	Evaluated Aspect	Main Results	Interpretation
1. Do online tests help you learn/review content and retain it in memory through a playful experience?	Usefulness of online tests for learning	Very poor: 5.6% Average: 11.1% Good: 31.5% Very good: 51.9%	Most students perceive tests as very useful tools for reviewing content and learning
2 Does it encourage participation and make the class more engaging?	Participation and interactivity in class	Very poor: 7.4% Poor: 3.7% Average: 9.3% Good: 22.2% Very good: 57.4%	Gamification encourages participation, although technical issues reduced concentration and motivation for some students.
3 Is it interesting as a continuous assessment system by facilitating understanding for final exam preparation?	Understanding of topics and exam preparation	Very poor: 5.6% Poor: 1.9% Average: 7.4% Good: 27.8% Very good: 57.4%	It strengthens understanding and exam preparation, benefiting most students.
4 Does it involve agility and concentration from students, motivating them to pay attention during class?	Improvement of concentration and agility through gamification	Very poor: 5.6% Poor: 3.7% Average: 11.1% Good: 22.2% Very good: 57.4%	It promotes concentration and motivation, although technical issues affected some students.
5 Does rewarding effort encourage students to strive to outperform their peers while learning?	Opinion on incentives/rewards	Very poor: 5.6% Poor: 1.9% Average: 7.4% Good: 31.5% Very good: 53.7%	Incentives linked to achievement increase motivation and positive competitiveness in most students.
6 My evaluation of the online testing tool Nearpod is:	Nearpod application	Very poor: 5.6% Poor: 1.9% Average: 11.1% Good: 31.5% Very good: 50%	High acceptance and usefulness for reinforcing knowledge and correcting weaknesses, although some students are unfamiliar with the tool.
7 My evaluation of the online testing tool Kahoot is:	Kahoot application	Very poor: 5.6% Poor: 1.9% Average: 16.7% Good: 27.8% Very good: 48.1%	Kahoot is well valued as a learning tool, with slight disadvantages due to technical issues and limited time
8 Overall level of satisfaction with the gamification methodology	Overall satisfaction with gamification	Very poor: 1.9% Poor: 3.7% Average: 13% Good: 20.4% Very good: 61.1%	Overall, students consider gamification very useful for reinforcing weaknesses and improving their academic performance.

Source: Own elaboration.

DISCUSSION

When comparing the results of this research with other studies, several similarities can be observed. Iquise et al. ⁽¹³⁾ concluded that video games enhance learning through emotions, while López ⁽¹⁴⁾ reported that Kahoot and Quizizz increase interest and participation among sports medicine students. Similarly, Gamero (2022) ⁽¹⁵⁾ demonstrated in sixth-grade children that gamification improves competencies and motivates more than traditional methods. In Spain, Edo (2021) ⁽¹⁶⁾ found high levels of satisfaction and improvements in teamwork and communication, while both Porcar ⁽¹⁷⁾ and Medina ⁽¹⁸⁾ confirmed increased motivation, although they noted the risk that some students may focus solely on rewards.

Moscoso et al. ⁽¹⁹⁾ showed that although most teachers recognize the usefulness of gamification, few apply it due to lack of time and training. In the same vein, Ordóñez ⁽²⁰⁾ found that this strategy increases motivation in mathematics but requires proper teaching planning. Likewise, Herberth and Garrido ^(21,22) highlighted that it helps overcome traditional teaching, although external factors such as lack of family support or the digital divide limit its implementation. Similarly, this study also found that poor connectivity affected equitable participation.

Other findings reinforce these results: Vargas ⁽²³⁾ documented the development of critical thinking and student debate, and Vásquez ⁽²⁴⁾ reported high acceptance of gamification, similar to the findings of this study. In addition, Hervada et al. ⁽²⁵⁾ demonstrated benefits in reading, mathematics, and foreign languages, although they emphasized limitations related to the availability of technological resources and connectivity issues. In the national context, Yunga ⁽²⁶⁾ reported an increase in academic performance, while Aguilar ⁽²⁷⁾ confirmed that motivation is directly linked to virtual rewards. Tenesaca ⁽²⁸⁾ highlighted the importance of establishing clear rules. Finally, Sagñay ⁽²⁹⁾ and other authors emphasize that a gamified class should include narrative, progressive challenges, and motivating elements that facilitate the transition from extrinsic to intrinsic motivation. In summary, scientific evidence and the results of this study confirm that gamification is an effective and motivating strategy for learning, although limitations related to connectivity, technological resources, and teacher training still persist.

CONCLUSIONS

It was found that students presented difficulties in Blocks 1 and 2 of the Diagnostic Orthodontics course, mainly in topics related to growth, development, and occlusion in primary dentition. In response to these gaps, a gamification plan was designed and implemented using platforms such as Kahoot and Nearpod, which helped to energize the teaching–learning process with an innovative and engaging approach.

The application of gamification showed clear benefits: increased motivation, greater participation, autonomous and collaborative learning, development of technological and social skills, as well as strengthening of creativity and logical thinking. In conclusion, this methodology not only facilitated the understanding of complex content but also promoted an active, dynamic, and meaningful learning environment, with a positive impact on students' motivation, satisfaction, and academic performance.

REFERENCES

- 1 Ahmed, A. & Sutton, M. J. D. Gamification, serious games, simulations, and immersive learning environments in knowledge management initiatives. *World Journal of Science, Technology and Sustainable Development*, 2017;14(2/3), 78-83.
- 2 Álvarez H. Influencias de la comunicación no verbal en los estilos de enseñanza y en los estilos de aprendizaje. *Rev Educ.* 2004;(334):21-32. Disponible en: <https://www.educacionyfp.gob.es/>
- 3 Aarseth E. Playing research: methodological approaches to game analysis. In: *Proceedings of the 5th International Digital Arts and Culture Conference (DAC 2003)*; 2003; Melbourne, Australia.
- 4 Bernate A, Vargas J. Desafíos y tendencias del siglo XXI en la educación superior. *Rev Cienc Soc.* 2020;26. Disponible en: <https://www.redalyc.org/articulo.oa?id=28064146010>
- 5 Burbano P, Basantes M, Ruiz I. Estilos de enseñanza: un estudio descriptivo. *Rev Cátedra*;4(1):18-34. Disponible en: <https://revistadigital.uce.edu.ec/index.php/CATEDRA/article/view/2569/3468>
- 6 Canela AJ. Gamificación en entornos educativos: desde la enseñanza infantil a la universitaria. *Rev Para el Aula – IDEA.* 2020;35. Disponible en: <https://www.usfq.edu.ec/sites/default/files/2020-10/5-gamificacion-en-entornos-educativos-desde-la-ensenanza-infantil.pdf>
- 7 Marne B, Wisdom J, Huynh-Kim-Bang B, Labat J. The six facets of serious game design: a methodology enhanced by our design pattern library. In: *European Conference on Technology Enhanced Learning.* 2012. p. 208-21. Disponible en: <https://www.researchgate.net/publication/262370367>
- 8 Lee J, Hammer J. Gamification in Education: What, How, Why Bother? *Acad Exchange Q.* 2011;15(2):1. Disponible en: https://www.researchgate.net/publication/258697764_Gamification_in_Education_What_How_Why_Bother#fullTextFileContent
- 9 Lozada AC, Betancur GS. La gamificación en la educación superior. *Rev Ingen Univ Medellín.* 2017;16(31). Disponible en: <https://doi.org/10.22395/rium.v16n31a5>
- 10 Mendoza GM, Bermúdez IE. La gamificación educativa y sus desafíos actuales desde la perspectiva pedagógica. *Rev Cognosis.* 2021;VI(2). Disponible en: <https://doi.org/10.33936/cognosis.v6i2.2902>
- 11 Rodríguez MB. La Gamificación como predictor de la integración en la enseñanza. *Rev Int Tecnol Educ Docentes 2.0.* 2021;11(2). Disponible en: <https://doi.org/10.37843/rted.v11i2.253>
- 12 Sainz de Abajo BD. El valor de los videojuegos y las simulaciones en el desarrollo de habilidades cognitivas, espaciales y motoras [Tesis de Maestría]. Alcalá: Universidad de Alcalá; 2019. Disponible en: <https://www.academia.edu/21064244>
- 13 Iquise AM, Rivera RL. La importancia de la gamificación en el proceso de enseñanza y aprendizaje. Lima: Universidad San Ignacio de Loyola; 2020. Disponible en: <https://repositorio.usil.edu.pe/entities/publication/55ef43e0-7ecf-4be7-82d2-16908598aee4>

- 14 López JD. La gamificación como estrategia para mejorar los procesos de aprendizaje en el curso medicina deportiva de la tecnología en entrenamiento deportivo de las Unidades Tecnológicas de Santander. Bucaramanga: Universidad Autónoma de Bucaramanga; 2021. Disponible en: <https://repository.unab.edu.co/handle/20.500.12749/15103>
- 15 Gamero MW. La gamificación como estrategia para el fortalecimiento de competencias del componente celular en los estudiantes de sexto grado de la Institución Educativa Técnica Manuela Beltrán de Soledad [Tesis de Maestría]. Bucaramanga: Universidad Autónoma de Bucaramanga; 2022. Disponible en: <https://repository.unab.edu.co/handle/20.500.12749/17472>
- 16 Edo AE. La metodología de Gamificación para el aprendizaje de historia de la educación española: investigación acción en la formación universitaria de docentes [Tesis Doctoral]. Valencia: Universitat Politècnica de València; 2021. Disponible en: <http://www.upv.es/>
- 17 Porcar O. La gamificación, una solución para la falta de motivación y escasez de participación en clase. Castellón: Universitat Jaume I; 2018. Disponible en: <http://hdl.handle.net/10234/180113>
- 18 Medina VR. La gamificación y su influencia en la calidad educativa en los estudiantes de un instituto tecnológico superior, Ecuador, 2022 [Tesis de Maestría]. Trujillo: Universidad César Vallejo; 2022. Disponible en: <https://repositorio.ucv.edu.pe/handle/20.500.12692/94415>
- 19 Moscoso ME, García DG, Álvarez MI. Aprendizaje basado en juegos como estrategia. Digital Publisher. 2022;7(4). Disponible en: <https://doi.org/10.33386/593dp.2022.4-2.1428>
- 20 Ordóñez GM. La gamificación como estrategia didáctica en el aprendizaje de operaciones aritméticas con números racionales en séptimo de básica de la escuela Juan José Flores. Cuenca: Universidad Politécnica Salesiana; 2022. Disponible en: <http://dspace.ups.edu.ec/handle/123456789/22673>
- 21 Herberth AO. La gamificación como estrategia metodológica en el contexto educativo universitario. Realidad y Reflexión. 2016;(44). Disponible en: <https://doi.org/10.5377/ryr.v44i0.3563>
- 22 Garrido C. Gamificación como estrategia educativa para el desarrollo de la motricidad fina en niños de educación básica preparatoria [Tesis de Maestría]. Ambato: Pontificia Universidad Católica del Ecuador; 2022. Disponible en: <https://repositorio.pucesa.edu.ec/handle/123456789/3590>
- 23 Vargas SA. Aplicación de la gamificación en la enseñanza de Historia en las aulas de Secundaria y Bachillerato. Murcia: Universidad Católica de Murcia; 2019. Disponible en: <http://hdl.handle.net/10952/4022>
- 24 Vásquez UM. Gamificación y estándares de aprendizaje del área de matemáticas en estudiantes U.E. Veinticuatro de Mayo, Santo Domingo, Ecuador 2021 [Tesis de Maestría]. Trujillo: Universidad César Vallejo; 2022. Disponible en: <https://hdl.handle.net/20.500.12692/78247>
- 25 Hervada RC. La gamificación como recurso motivador en el aprendizaje de una lengua extranjera. Valladolid: Universidad de Valladolid; 2020. Disponible en: <http://uvadoc.uva.es/handle/10324/42994>
- 26 Yunga ST. Recursos educativos digitales basados en la gamificación para fortalecer el proceso de enseñanza-aprendizaje de Ciencias Naturales en el 8vo año de EGB [Tesis de Maestría]. Cuenca: Universidad Politécnica Salesiana; 2022. Disponible en: <http://dspace.ups.edu.ec/handle/123456789/21989>
- 27 Aguilar P, Briones J, Córdova R. La gamificación como estrategia metodológica y la gestión de herramientas ofimáticas como logro de aprendizaje en los estudiantes de primer ciclo en la asignatura de Fundamentos de Informática de la Facultad de Administración y Negocios. Loja: Repositorio Institucional; 2019. Disponible en: <https://hdl.handle.net/20.500.12867/2087>
- 28 Tenesaca M. La gamificación como estrategia didáctica para el fortalecimiento de la lectura comprensiva a nivel literal en niños de quinto año de EGB. Azogues: Universidad Nacional de Educación (UNAE); 2020. Disponible en: <http://repositorio.unae.edu.ec/handle/56000/1646>
- 29 Sagñay M. Metodología de gamificación para estudiantes de educación básica superior de la Unidad Educativa Intercultural Ambrosio Lasso, cantón Guamote. Riobamba: Universidad Nacional de Chimborazo; 2021. Disponible en: <http://dspace.unach.edu.ec/handle/51000/8313>

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“Conceptualization and design: Karla Zhunio and Miriam Lima; Literature review: Karla Zhunio and Miriam Lima; Methodology and validation: Karla Zhunio and Miriam Lima; Formal analysis: Karla Zhunio; Research and data collection: Karla Zhunio and Miriam Lima; Resources: Not applicable; Data analysis and interpretation: Karla Zhunio; Writing: original draft preparation: Karla Zhunio; Writing: review and editing: Karla Zhunio; Supervision: Miriam Lima; Project administration: Not applicable; Funding acquisition: Not applicable.”

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