The Role of Gamification in Teacher Training for Educational Inclusion

Mayra Tatiana Acosta Yela[1], Roxana Maribel Manrique Toro[2], José Rodríguez Triviño[3], Efrén Alejandro Viteri Chiriboga[4]

[1]Magister en Tecnología de la Información y Comunicación, Doctorando en Educación Universidad César Vallejo, Piura - Perú. Docente universitaria de Tecnología Educativa
[2]Máster Universitario en Formación y Perfeccionamiento del Profesorado en Biología. Doctorando en Educación Universidad César Vallejo, Piura - Perú, Docente Biología y Química de U.E Réplica Montúfar.
[3]Magister en Gerencia y Liderazgo Educacional. Doctorando en Educación Universidad César Vallejo, Piura - Perú, Rector de la UEF Replica 28 de mayo.
[4]Doctor en Educación Universidad César Vallejo, Piura - Perú, Magister en Terapia Familiar Sistémica y de Pareja, Psicólogo Clínico, doctorando en Psicología, docente en la Universidad de Guayaquil - Facultad de Ciencias Psicológicas
Email: macostay@ucvvirtual.edu.pe

Abstract

This research sought to evaluate the impact of a gamified resource program on inclusive education learning and the strengthening of inclusive skills in university students in the city of Machala, Ecuador; focusing on knowledge and understanding. The research has a quantitative approach, with a quasi-experimental design, used an Educational Inclusion questionnaire with multiple options which was based on a Likert scale, was used as a data collection instrument, with a representative sample of 60 students of the seventh semester of the Pedagogy of Experimental Sciences career. After the implementation of the learning sessions, a significant improvement was observed in the experimental group, evidenced by an increase in the "Achieved" category and a significant reduction in the "Start" category. Inferential analysis showed that the program had a significant impact compared to the control group, with a significance level of 0.001. In conclusion, the program proved to be an effective tool to strengthen the dimension of knowledge and understanding in university students, thus contributing to Sustainable Development Goal number 4 on quality education.

Keywords: education, gamification, inclusive education, university.

1. Introduction

Nowadays, classrooms with greater educational diversity are observed every day, diversity in the classroom is an element that enriches the students who are part of that context, it is here where students with different cultures, religions, educational needs, among others, are identified; according to records obtained by the national education system of Ecuador in 2022, 50977 students with special educational needs were registered, where it has been observed that multiple strategies have been developed for attention to diversity, which are reflected in the development of classroom planning, the adaptation of resources, The development of activities and time control are essential elements for students to achieve the skills established in the educational curriculum. It is here where something very important appears and that is the development of inclusive skills in the educational training of future teachers, when meeting a wide variety of students who require attention, this study has been developed focusing on the future professionals of the Experimental Sciences career of a university in the City of Machala, The development of inclusive skills in teacher training is an essential element in the area of education since it allows future professionals to obtain the necessary skills to reach students who have educational needs. Educational inclusion learning A program on gamified resources in inclusive learning has been implemented, allowing compliance with the minimum contents established for the approval of the inclusion subject.

Inclusive education as a research variable is structured by the dimension of knowledge and understanding, according to Adams et al. (2021) that incorporating knowledge and understanding into the teaching process is an important contribution to the practice of inclusive education. Sukuolu et al. (2013) add that, in order to prepare teachers to work in inclusive classrooms, they need basic knowledge such as basic skills and teaching knowledge for students with disabilities. Ekstam et al. (2018) also argue that teachers need content integration knowledge to meet the learning needs of students in inclusive classrooms.

The implementation of this gamified resources program for educational inclusion was an important element that allowed significant changes to be developed in the group of students implemented. It is important to recognize that the term inclusion in education refers to equality in education, where all students have the right to a quality education that guarantees learning and participation. UNESCO (2002) states that inclusion in education is the application of policies, practices and cultures in the classroom that promote learning and participation of learners and the learning communities in which they participate. Similarly, Habermas (2012) argues that inclusion is directly linked to constitutional patriotism, which creates multicultural opportunities that respect human rights.

This study is based on the need for students to complement in a practical way the concepts learned during their studies, with the theme of inclusion in education and provide useful tools in learning environments with students with special educational needs. The general objective of the research was to determine the effectiveness of gamified resources for educational inclusion, based on the knowledge and understanding of university students in the seventh semester of the city of Machala, 2023.

The relevance of this study lies in its potential to offer a practical and effective solution for the development of educational inclusion skills in future teachers in the area of educational technology.

2. Conceptualizations

A. Gamified Resources in Education

Educational resources are elements that can be used to complement student learning (UN [UNESCO] 2016, 2019, 2022) states that they can be considered as powerful tools that can support quality education and that their use can reduce the digital divide that currently exists and promote innovation in education. From this perspective, it can be assumed that the use of open educational resources (OER) creates a number of opportunities to integrate digital literacy into the educational process, minimizing the costs invested in texts and at the same time allowing students to access reusable resources.

According to Zichermann and Cunningham (2011) in their book Gamification by Design by Zichermann (2011) describe gamification as a playful thought process that aims to involve users in problem solving through techniques and strategies related to the game, an approach that emerged in the field of education with Kapp's (2012) book Gamification of Learning and Teaching, which focused on the theoretical power of gamification to transfer it to the classroom, promoting the importance of teaching through the characteristics of games that allow active learning.

In-game resources are elements that combine the characteristics of the didactic material used in classrooms with the objective of learning through game strategies. These in-game resources are more attractive and motivating for students, which generates greater commitment and academic performance. Werbach and Hunter (2012) argue that the use of these elements in non-playful environments aims to motivate learning and encourage commitment, and that these elements must have accessibility, adaptability, feedback, and participation as fundamental characteristics; being aligned with game mechanics, such as point accumulation, clear objectives, and progressiveness.

From an epistemological point of view, gamification arises from the need to teach content in an innovative, motivating and varied way to increase commitment and conceptual understanding, as Díaz and Troyano (2013) point out. Some elements of the gamification process can be explored using technological tools related to the cognition of human behavior, and when reward is used as an incentive, these elements are complementary to the didactic dimension used in classroom learning. Games are also based on connectionism, which reinforces the link between knowledge by creating a motivational and dynamic environment.

B. Inclusive Education

Marchesi and Martín (2014) argue that teachers acquire experience to face the challenges posed by inclusive education, since sometimes educational institutions lack the necessary conditions to address educational diversity; similarly, Marchesi and Pérez (2018), in their proposal for an

evaluation model, argue that teachers need to develop competencies that allow them to respond flexibly to diversity in the classroom. This suggests that all the methodologies, strategies and activities applied by teachers are part of the knowledge and skills that must be developed to promote student learning.

By considering gamification as an active methodology, it is recognized how these elements can be applied in different contexts, as well as to a diverse society, where all students are recognized as important in the classroom; Dueñas (2010) states that the acceptance of diversity in a positive way in the environment, that is, their skills and characteristics are elements that allow them to stand out, and contribute their own talents; In many cases, this perception goes almost unnoticed in society, so it is important to understand and develop skills and recognize the measures to be taken when it comes to students with special educational needs, gender diversity and cultural pluralism.

Cabardo et al. (2014) argue that it should be understood as a counter-hegemonic and transformative intervention in the production of knowledge, while Ocampo (2019) argues that it is the result of an educational critique that responds to the specificities of learners and, on the other hand, to the intellectual, methodological and taxonomic diversity of the contemporary world. According to Ocampo (2021), it is important to understand that inclusive education lays the foundations of modern education because it creates knowledge that impacts people's lives.

The concept of educational inclusion means equality in education, where all students have the right to receive a quality education that allows them to learn and participate. UNESCO (2002) affirms that policies, classroom practices, and cultures that promote student learning and participation are inclusive of the educational community in which students find themselves. Similarly, Habermas (2012) states that inclusion is directly linked to constitutional patriotism, which creates multicultural opportunities that respect human rights.

According to Adams et al. (2021), inclusive education is about changing the education system to focus on inclusive teaching practices, and preparation plays a critical role in developing the beliefs, skills, and knowledge so that a group of students can be considered inclusive. The preparation of future inclusive education practitioners includes knowledge and understanding of inclusion, skills and attitudes, and is considered a critical factor for inclusion success.

3. Methodology

A. Study design

This study is based on applied research as it evaluates a gamified resource program for inclusive education, whose theoretical and methodological contributions can be applied to future social intervention projects.

The study is based on a quantitative approach in which the research variables (gamified resources and educational inclusion) are defined in a way that they can be measured and quantified. The methodological design is quasi-experimental, which allows the analysis of causal relationships in a natural scenario and closer to the real world with fewer controls, and allows the manipulation

of the variables through questionnaires and validated scales to measure and verify the impact after the intervention of the program.

Hernández Sampieri et al (2010) mention that rigorous statistical comparisons strengthen the results obtained, paying special attention to the control of concomitant variables which can bias or distort the relationship between independent and dependent variables, to maintain the internal validity of the results, as well as to the consideration of the conditions that may affect the external validity and generalizability of the results to other populations.

B. Participants and sample

POPULATION AND SAMPLING

The target population included 155 students from the Education area distributed in morning and night shifts. The selection of this sample was representative given the direct contact of the researcher with the groups. The inclusion criteria considered students of both genders.

Hernández et al (2014) mention that a population is a set of elements that share the same characteristics. The participants in this study were 157 seventh-semester students of the Education Careers of the Faculty of Social Sciences of the Technical University of Machala.

Sampling

A non-probabilistic intentional sampling was used because it allowed the selection of the research population, and the research group was chosen because it was part of the empirical research profession and had knowledge in the field of education.

Type of sample: The final sample consisted of 60 students of the experimental sciences pedagogy career, distributed equally between the experimental group (30 students) and the control group (30 students). The sampling was non-probabilistic for convenience, selecting accessible students with similar characteristics to the target population.

Materials and instruments

Data collection was carried out through a questionnaire called Educational Inclusion structured under a Likert scale, which was taken from the research of Adams (2021). Ayken's V was used and a procedure for the validation of experts, structured with 30 items, the validity of the designed questionnaire was verified by first calculating the criterion validity, reliability and, finally, construct validity, the instrument has a reliability coefficient (Cronbach's Alpha) of 0.83, allowing to have an acceptable level of reliability. It followed a scheme on knowledge at a start, process and achieved level, this in order to more easily identify the student's level before and after the intervention.

Used as the main tool, it allowed the collection of significant information from the sample, facilitating the isolation of issues of main interest and precisely defining the focus of study.

A variety of didactic and technological tools were used to support the educational program, including multimedia resources, specific educational software, and communication technologies to collaborate and disseminate results. For data analysis, the statistical software SPSS version 25 was used, facilitating the organization and analysis of the information collected.

C. Procedure

The research was structured in several phases. Initially, a 14-session educational program designed to strengthen the development of inclusive skills was implemented and applied to the experimental group, while the control group continued with the traditional teaching method. The sessions were held during an academic semester, with a frequency of three times a week and a duration of 45 minutes each. To evaluate the impact of the program, evaluations were carried out at the beginning (pretest) and at the end (postest) of the academic semester. These evaluations allowed for comparison of performance before and after the intervention, providing empirical data for statistical analysis.

DATA ANALYSIS PROCEDURE AND PLAN

Table 1: Procedural Phases and Data Analysis

Phase 1	Analysis of the Proposal, selection of the sample.
	A process of identification and familiarization of the selected communities and identification of the key agents that facilitate access to these communities is carried out. Next, a sample composed of pairs of experimental and control groups is extracted.
Phase 2	Design and execution of the Proposal
	The design of the proposal will proceed The InclusiGamer Academy program is presented and the consent form will be signed. The interventions of the InclusiGamer Academy program will take place in a series of meetings or face-to-face sessions in selected groups.
Phase 3	Data collection:
	The following variables were measured: • Independent: Gamified Resources • Dependent: Educational Inclusion The data obtained will allow comparisons to be made between both groups: the treatment group and the control group.
Phase 4	Data collection after the implementation of the program:
	Once the program is completed and phase two is over, a second data collection will be carried out from both groups (experimental and control). Based on these new results, the effects of the program on the study variables for both groups will be evaluated.
Phase 5	Data analysis:
	To this end, statistical tests, such as Student's t-test, were performed to determine the significant differences between the experimental and control groups before and after the application of the program. It is important to note that the results obtained supported the choice of the Mann-Whitney U test as a statistical test, as it is suitable for the type of data collected using the Likert scale and guarantees the reliability of comparisons between groups. In addition, the validity of the criterion was verified using Pearson's method, correlating the values of each item with the questionnaire variable. The validity of the construct was evaluated through correlations between the values of the variable and its dimensions, ensuring that the instrument effectively measured what it was intended to measure.
Phase 6	Interpretation of results:
	Finally, the results will be interpreted by analysing the data, ensuring that the objectives have been achieved and reflecting on the main conclusions. These results will be clearly presented and compared with similar or different results from other studies, integrated with existing theories and applied to theoretical processes. This will allow conclusions to be drawn about the impact of the programme.

Source: own elaboration 2024

Data analysis

Data analysis was performed at two levels: descriptive and inferential. At the descriptive level, statistics were used to summarize the distribution of inclusive skills before and after the intervention. Graphs and tables generated in SPSS were used to visually represent the data and facilitate its interpretation.

At the inferential level, various statistical tests were applied to examine the significance of the observed differences. First, the Shapiro-Wilk normality test was used to check if the data followed a normal distribution. Subsequently, the Mann-Whitney U test was applied to compare the differences between the experimental group and the control group before and after the implementation of the program. In addition, confidence intervals were used to estimate the accuracy of the results and hypothesis tests were used to assess the statistical significance of the findings.

4. Results

In the main results obtained, a pretest/post-test comparison is established on the influence of gamified resources on the educational inclusion of students in the seventh semester, see table (2).

Table 2

Cross-Table Gamified Resources*Cross-Tabulated Groups

			Groups				Total
			Control Input (GC)	Experimental Input (GE)	Control Output (GC)	Experimental Output (GE)	
Educational inclusion	Beginning	fi	10	10	9	0	29
		% fi	33,3%	33,3%	30,0%	0,0%	24,2%
	Process	fi	12	9	13	7	41
		% fi	40,0%	30,0%	43,3%	23,3%	34,2%
	Accomplished	fi	8	11	8	23	50
		% fi	26,7%	36,7%	26,7%	76,7%	41,7%
Total		fi	30	30	30	30	120
		% fi	100,0%	100,0%	100,0%	100,0%	100,0%

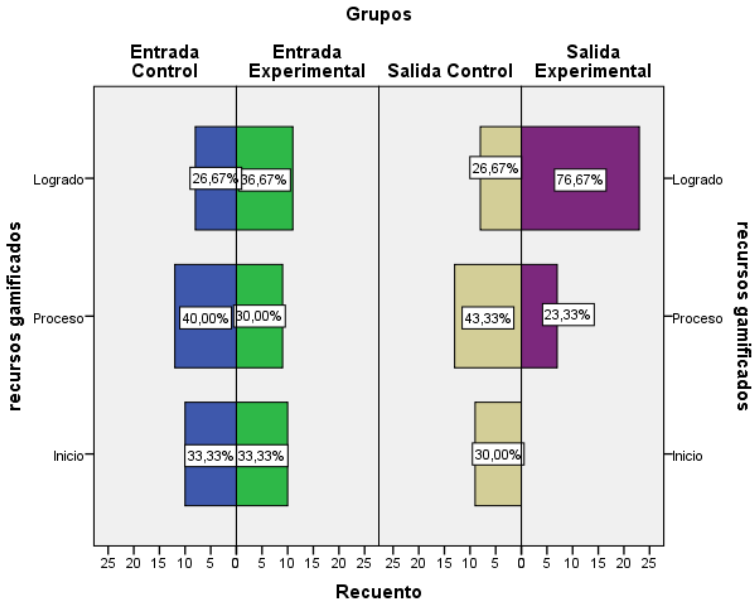
Source: own elaboration 2024

It is denoted that when entering the data of the CG and the EG, both were at an initial level of 33.3%. When comparing the results, the CG decreased slightly to 30%, while in the EG, after the application of the program, there were no longer any students at that level.

In terms of the process level, the GC was at 40%, while the GE was at 30%. After the application of the program, a minimal change is observed in the GC, which reached 43.3%, while the GE achieved a level of 23.3%.

In addition, significant changes can be seen in the EG due to the implementation of the gamified program. This group showed remarkable results by going from 36.7% to 76.7% in the level of achievement.

Figure 1 Crossing group dice over the independent variable



Source: own elaboration 2024. In original language Spanish

In relation to the results obtained on the use of gamified resources in educational inclusion, and the knowledge and understanding by university students, the following findings were established.

Table 3 Pre-test/post-test results on gamified resources for educational inclusion based on knowledge and understanding

knowledge - comprehension *Groups cross-tabulation

			Groups				
			Control Input (GC)	Experimental Input (GE)	Control Output (GC)	Experimental Output (GE)	Total
Knowledge Understanding	-Beginning	N°	10	10	9	0	29
		%	33,3%	33,3%	30,0%	0,0%	24,2%
	Process	Recount	11	7	12	5	35
		% within Groups	36,7%	23,3%	40,0%	16,7%	29,2%
	Accomplished	Recount	9	13	9	25	56
		% within Groups	30,0%	43,3%	30,0%	83,3%	46,7%
Total		Recount	30	30	30	30	120
		% within Groups	100,0%	100,0%	100,0%	100,0%	100,0%

Source: own elaboration 2024

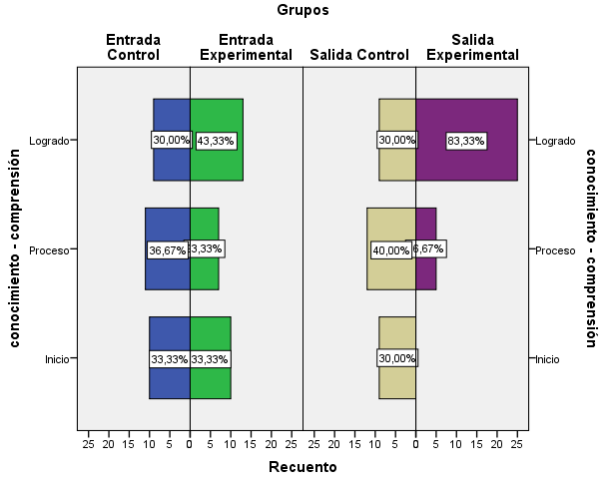
It can be observed that when entering the data from the Control Group (CG) and the Experimental Group (EG), both were at an initial level of 33.3%. When comparing the results, the CG

decreased slightly to 30%, while in the EG, after the application of the program, there were no longer any students at that level.

Regarding the process level, the GC was at 36.7%, while the GE was at 23.3%. After the implementation of the program, there is a minimal change in the CG, which reached 40%, while the EG achieved a level of 16.7%.

It can be clearly seen that the EG starts with an achievement level of 43.3%. After the implementation of the program, this level increases significantly, reaching 83.3%. In contrast, the CG maintains a consistent achievement level of 30% at both baseline and end of the study.

Figure 2 Crossing group dice on the knowledge and understanding dimension



Source: own elaboration 2024. In original language Spanish

5. Discussion

From the results obtained, during the initial phase of the study, it was observed that the CG presented a level of achievement of 26.7%, while the EG showed 36.7%. After the implementation of the gamified program, a comparative evaluation was carried out to contrast the results obtained with the objective of the study.

At the end of the program's implementation, the results showed a significant increase in the level of achievement of the EG. While the control group remained at 26.7% in the achievement stage, the EG achieved a remarkable 76.7%. This increase conclusively demonstrates that the intervention with gamified resources had a positive and significant influence on the development of knowledge and understanding of educational inclusion among GE students.

The result of the hypothesis establishes that the statistics of the exit test U=157.500 Zc= - 4.327 less than (1.96 which is parameter z) and p_valor is less than 0.05(0.000<0.05), so the research hypothesis is approved, resulting in the application of gamified resources is effective for learning educational inclusion in university students of the seventh semester of the city of Machala, 2023. This finding is similar to what Chang et al. (2022) mention in their research on the design and evaluation of a course incorporating elements of gamification and scaffolding for students with blindness, where it is evident that when performing an ANCOVA analysis to determine the difference in learning achievements using prior assessment, there were no significant differences in them; while when performing the t-test when applying the subsequent assessment, a significant difference was observed for the EG ($t = -2.385$, $p < .001$) and also for the control group ($t = -2.100$, $p < .001$) demonstrating that gamified activities promote the effectiveness of learning in students.

The analysis of the data suggests that the use of gamified resources not only facilitates educational inclusion learning, but also promotes greater participation and motivation among students, thus contributing to a more inclusive and effective education. The results obtained support the effectiveness of gamified strategies as innovative pedagogical tools to improve educational quality, promote inclusion and inclusive learning in the university context. Likewise, Zichermann and Cunningham (2011) establish that learning based on gamification elements significantly increases the development of skills and content comprehension, it is understood that gamification can not only improve academic performance, but can also foster a more dynamic and participatory learning environment, thus promoting greater interest and commitment on the part of students.

In relation to knowledge and understanding, it was possible to establish that, when applying the test in the initial phase, the control group presented a level of skill achievement of 30%, while the EG reached 43.3%. These initial results indicate that both groups started from relatively similar levels of understanding and knowledge, although the EG showed a slight advantage in terms of skills.

The EG performed better after participating in the gamified resources program. While the control group that did not receive the game program obtained only 30% and did not improve their knowledge and comprehension skills, the EG that participated in the program obtained 83.3%, indicating a significant increase in performance, and the students who participated in the program improved their knowledge and comprehension skills. The study's hypothesis that students who participated in the programme can improve their knowledge and understanding was confirmed. Regarding the alternative hypothesis that the application of the gamified resources program is effective in terms of the knowledge and comprehension dimension of university students in the seventh semester of a university in Machala in 2023, a Mann-Whitney U statistical test was performed to evaluate this aspect.

The results of the Mann-Whitney U test for the dimensions of knowledge and comprehension are U = 175,500, Zc = -4,071. The calculated Z-value (Zc) is -4.071, which is significantly lower than the critical Z-value (1.96 at a significance level of 5%). This result shows that there is a significant difference between CG and experimental after the use of the game program.

6. Conclusions

The GE's performance increased from 36.7% to 76.7%, while the control group showed no change in pre- and post-test results, with a performance of 26.7%.

Regarding the inferential analysis, the results of the difference were obtained with a p-value of 0.000, which confirms the effectiveness of the implemented program and indicates the importance of using gamification resources in the learning process, while the difference between the control and experimental groups is significant.

The use of gamified resources contributed significantly to the development of knowledge, improving the understanding of concepts and facilitating the assimilation of complex knowledge, in this dimension it was shown that after the implementation of the program the EG increased significantly from 43.3% to 83.3%, while the CG remained with 30% pre and post-test. with a p_valor of 0.000, demonstrating the importance of the use of gamified resources in the variable of knowledge and understanding.

The use of a gamified resource program for teaching educational inclusion topics has proven to be highly effective in improving both knowledge and understanding of inclusion. Gamified elements, such as missions, challenges, and badges, not only increase student motivation and engagement, but also facilitate a deeper and more meaningful understanding of inclusion concepts.

This innovative approach allows students to experience and reflect on inclusive situations in an interactive and engaging way, promoting a more dynamic and participatory learning environment. That is why gamification in inclusive education not only enriches the teaching-learning process, but also contributes significantly to the development of a more inclusive and empathetic culture within the educational environment.

It is crucial to recognize the limitations associated with the sample used in this study. The use of non-probability convenience sampling could have introduced bias in the selection of participants, thus restricting the possibility of generalizing the results to the entire population of high school students in science. This limitation underscores the need for future research to use probabilistic sampling methods and consider a more diverse and inclusive sample to validate and expand the results obtained.

WORKS CITED

Adams Donnie, Ahmed Mohamed, Visal Moosa & Mariyam Shareefa (2021): Preparing Teachers for Inclusive Education in a Developing Country: Fantasy or Possibility?, Educational Studies, DOI: 10.1080/03055698.2021.1908882

Cabardo, D., Crenshaw, K., Mays, V. M., & Tomlinsom, B. (2014). INTERSECTIONALITY: Mapping the Movements of a Theory. Du Bois Rev., 10(2), 303-312. https://pubmed.ncbi.nlm.nih.gov/25285150/

Castro, S. & Yunga, T. (2022). Digital educational resources based on gamification to strengthen the teaching-learning process of natural sciences in the 8th year of basic general education (EGB) in the educational unit "Molleturo", school year 2020-2021.Salesian Polytechnic University.

Cuenya, L., & Ruetti, E. (2010). Epistemological and methodological controversies between the qualitative and quantitative paradigm in psychology. Colombian Journal of Psychology, 19 (2) 271-277.

Dewey, J. (1910). How we think. Lexington, Mass: D.C. Heath

Díaz Cruzado, J., & Troyano Rodríguez, Y. (2013). The potential of gamification applied to the educational field. Retrieved from En III Jornadas de Innovación Docente. Educational Innovation: Response in Times of Uncertainty: https://idus.us.es/xmlui/bitstream/handle/11441/59067/EL%20POTENCIAL%20DE%20LA%20GAMIFICACION%20APLICADO%20AL%20AMBITO%20EDUCATIV.pdf?sequence=1&isAllowed=y

Ekstam, U., J. Korhonen, K. Linnanmäki and P. Aunio. 2018. "Self-Perceived Preparation of Special Education Teachers and Subjects to Teach Mathematics to Low-Achieving High School Students," Journal of Special Educational Needs Research 18(1): 59–69. doi/10.1111/1471-3802.12393.

Habermas, J. (2012). The inclusion of the other. Studies in political theory. Spain: Paidós

Hernández Sampieri, R., Fernández Collado, C. & Baptista, M. P. (2010). Research Methodology (Fifth Edition). Mexico City: McGraw-Hill.

Hernández, R., Fernández, C., & Baptista, P. (2014). Research Methodology (6th Edition). Mexico City: McGraw-Hill / Interamericana Editores, S.A.

Kapp, Karl M. The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education. San Francisco: Pfeiffer, 2012.

Khan, S., & Krell, M. (2019). Scientific reasoning competencies: A case of preservice teacher education. Canadian Journal of Science Mathematics and Technology Education, 19(4), 446–464. https://doi.org/10.1007/s42330-019-00063-9

Marchesi, Álvaro, & Hernández, Laura. (2019). Five Key Dimensions to Advance Educational Inclusion in Latin America. Latin American Journal of Inclusive Education, 13(2), 45-56. https://dx.doi.org/10.4067/S0718-73782019000200045

Marchesi, A. & Pérez. E. M. (2018). Evaluation model for teacher professional development. Madrid: Fundación SM and IDEA. https://www.scielo.cl/scielo.php?script=sci_nlinks&pid=S071873782019000200045000012&lng=en

Ocampo, A. (2019). Theoretical contours of inclusive education. Revista Boletín Redipe, 8(3), 66-95. https://revista.redipe.org/index.php/1/article/view/696

Ocampo González, A (2021). Epistemology of inclusive education. Colombian Journal of Social Sciences, 12 (2), 438. https://doi.org/10.21501/22161201.4066

United Nations Educational, Scientific and Cultural Organization [UNESCO]. (2019, November 25). Recommendation on Open Educational Resources (OER). [Website]. Retrieved from: https://es.unesco.org/about-us/legal-affairs/recomendacion-recursos-educativos-abiertos-rea

United Nations Educational, Scientific and Cultural Organization [UNESCO]. (2021, July 20). Education 2030 Framework for Action. [Website]. Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000374704

United Nations Educational, Scientific and Cultural Organization [UNESCO]. (2021). Education 2030 Framework for Action. Paris: UNESCO.

United Nations Educational, Scientific and Cultural Organization [UNESCO] (2017). Inclusive education: the path to quality education for all. Paris: UNESCO.

Sucuolu, B., H. Bakkalolu, F. I. Karasu, Ş. Demir and S. Akalin. 2013. "Inclusive Preschool Teachers: Their Attitudes and Knowledge on Inclusion." International Journal of Early Childhood Special Education 5(2): 107–12

UNESCO. (2016). Global Citizenship Education. Prepare learners for the challenges of the twenty-first century. UNESCO.

Zichermann, G. & Cunningham, C. (2011). Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps. Cambridge, MA: O'Reilly Media.