

Evaluación del e-learning mediante gamificación: estrategia complementaria al modelo presencial. Caso en el grupo de 5.º, escuela primaria Valle de Bravo

Evaluation of e-learning through gamification complementing the face-to-face model: case in the 5th group, "Valle de Bravo" primary school

Avaliação do e-learning através da gamificação: estratégia complementar ao modelo presencial. Caso na turma do 5º ano, escola primária Valle de Bravo

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Resumen

El modelo de *e-learning* se ha trabajado con éxito en el nivel superior; sin embargo, durante la pandemia 2019 surgió la necesidad de expandirlo a otros niveles educativos y al llegar a su fin esta situación global en el nivel básico de educación quedó nuevamente como una forma de trabajo extraordinaria. Por tanto, el objetivo de esta investigación es determinar las ventajas y desventajas del modelo *e-learning* mediante la gamificación en la educación básica, específicamente en un grupo de quinto grado del nivel primaria en la materia Historia. Para ello, se diseñó una metodología de tipo cualitativo experimental, a través de un estudio de caso. Los participantes fueron 14 alumnos de un grupo de quinto grado de la Escuela Valle de Bravo. Los resultados indican amplias ventajas de trabajar el *e-learning* mediante gamificación como complemento del modelo presencial en este nivel educativo, lo cual se reflejó en mejor rendimiento académico, mayor motivación por parte de los alumnos, aprendizaje significativo y trabajo colaborativo durante el proceso.

Palabras clave: *e-learning*, gamificación, motivación, nivel básico, trabajo colaborativo.

Abstract

The e-learning model has been working successfully at the higher level, however, during the 2019 pandemic, the need arose to expand it to other educational levels, and when this global situation came to an end, at the basic level of education, it remained as an extraordinary form of work. The objective of this research was to determine the advantages and disadvantages of the e-learning model through gamification in basic education, specifically in a Primary Level Fifth grade group working on History subjects. An experimental qualitative methodology was designed through a case study where 14 students from a Fifth grade group of the “Valle de Bravo” School were observed and interviewed. The results indicate broad advantages of working on e-learning through gamification as a complement to the face-to-face model at the basic level, showing effectiveness as an educational strategy; besides reflecting in better academic performance, greater motivation on the part of the students, meaningful learning and collaborative work during the process.

Keywords: e-learning, gamification, motivation, basic level, collaborative work.

Resumo

O modelo de e-learning foi trabalhado com sucesso ao nível superior; Porém, durante a pandemia de 2019, surgiu a necessidade de expandi-lo para outros níveis educacionais e quando esta situação global no nível básico de educação chegou ao fim, voltou a ser uma forma extraordinária de trabalho. Portanto, o objetivo desta investigação é determinar as vantagens e desvantagens do modelo de e-learning através da gamificação no ensino básico, especificamente numa turma do quinto ano do ensino primário na disciplina de História. Para isso, foi desenhada uma metodologia experimental qualitativa, através de um estudo de caso. Os participantes foram 14 alunos de uma turma de quinta série da Escola Valle de Bravo. Os resultados indicam amplas vantagens de trabalhar o e-learning através da gamificação como complemento ao modelo presencial neste nível educativo, o que se reflectiu num melhor desempenho académico, maior motivação por parte dos alunos, aprendizagem significativa e colaboração. trabalhar durante o processo.

Palavras-chave: e-learning, gamificação, motivação, nível básico, trabalho colaborativo.

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Introduction

Since the appearance of the Internet in the 20th century as a communication and support tool in daily life, society found a different and quick way to communicate, as well as transport information, acquire knowledge, exchange products and access databases. of available knowledge (Cardona *et al .*, 2018). Furthermore, in the educational field, ICT has generated endless modifications and new strategies to work, which has generated the emergence of various strategies to promote learning and cognition, as well as interactivity and didactic personalization (UNESCO Thesaurus , 1995, cited by Zamudio *et al .*, 2021).

In this area of globalization, Gilbert *et. to the.* (2020) point out that the idea of internationalization in educational pedagogy has allowed teachers to be able to develop interdisciplinary work and use computing as a tool and learning networks as cooperative and training spaces. In this way, an integration between learning and ICT has been promoted, which has served to give rise to the *e-learning concept* .

However, currently, *e-learning* is an educational challenge, since it consists of the development of a teaching-learning process characterized by virtuality, high interactivity, simultaneous communication and participation, which has forced us to reorganize the educational concepts and practices.

Among the various methodologies that have emerged, gamification, for example, consists of the application of game strategies in spaces with a non-playful nature (Deterding *et al .*, 2011, cited by Torres-Toukoumidis *et al .* , 2019), through a process related to player thinking and game techniques to engage users and solve problems (Zichermann and Cunningham, 2018) in order to promote learning.

This invites us to rethink the individual and collective dimension of the teaching-learning processes, as well as their rhythms or times, the new information structures to build knowledge, the media or platforms that will be used, the types of activities and tasks, the competencies. teachers and students to be developed, and the evaluation and its instruments, without leaving aside face-to-face education.

This rethinking has been carried out at the higher educational level, where the capacity of this modality to place the student at the center of training so that they can self-manage their learning through synchronous and asynchronous communication between teachers and students through the in which a continuous didactic interaction is carried out (García-Cabrero *et al .*, 2008) and a constant reflection aimed at improving processes in search of high levels of quality (Ortiz-López *et al .*, 2021).

However, very little is known about the results of using *e-learning* at basic levels, specifically in primary school, although the last 2019 pandemic forced work with this modality,

but its results are not yet known exactly. Furthermore, *e-learning* and the major readaptations that its implementation requires great academic and institutional flexibility, since there are still few specific protocols for the planning and execution of this new teaching modality in many educational institutions (Cerdas-Montano et al . *al .*, 2020).

Now, in the specific case of this investigation, it was carried out at the private institution Escuela Valle de Bravo, located in the municipality of Valle de Bravo, State of Mexico, registered with the Ministry of Public Education (SEP) with the key 15PPR2690U and founded since 1987 to provide a high-level bilingual education in a healthy environment.

Over the years, Escuela Valle de Bravo has maintained its original philosophy with the objective of offering its students a pleasant environment that encourages comprehensive academic development and the discovery of their own intellectual, creative and physical potential. Currently, it has an enrollment of 200 students, 30 workers (including teachers, directors, coordinators, administrators and cleaning staff) and support as part of its educational community. Its teaching staff is made up of six teachers of Spanish, six of English, one of Physical Education, one of Music, one of Arts, one of Library, one of Sciences, a psychologist for Socio-Emotional Skills and a teacher for Digital Skills.

We work under the supervision of the Primary and Essentials Coordination and the English Coordination; at the head of both, the General Directorate and the School Council, in charge of governing and accepting all proposals and work strategies. The administrative staff is represented by a secretary, an accountant, three legal representatives and a director before the SEP, in charge of the paperwork of the administrative part before said official institution, registration of qualifications and attending meetings by the Secretariat. The assistance staff has four support people.

There are six grades, with a maximum capacity of 21 students each. Everyone has their own classroom where they take the subjects of Spanish, English and Social-Emotional Skills. The school has a space known as Blackmore Library, where the Library class is taught; Likewise, a play area, a patio, a basketball court and a soccer field, where you can teach the Physical Education class; In addition, a laboratory for the Science class, an area with 21 computers for the Digital Skills class, a room for Arts and Music, an office for coordination, an office for Management, a reception, and a food area and a cafeteria.

The services that Valle de Bravo School has are electricity, gas, water, Internet throughout the campus and a classroom with a copier. The school has been characterized during its more than 34 years by its commitment and good relationship with the community of the municipality. It has participated every year in the Festival of Souls, activities at the animal adoption center, reforestation and cleaning of local areas such as Monte Alto, in addition to being considered a green school, among others.

By analyzing and determining the favorable factors (strengths) and unfavorable factors (weaknesses) within the Valle de Bravo School, as well as the opportunities and threats (conflicts) that operate in the immediate environment and in the social system that affects it, we have the following scheme (Table 1):

Table 1. SWOT analysis of the Valle de Bravo School, based on personal observation and interviews with teachers and directors

Strengths	Opportunities
inclusive school. Cultural diversity. Various learning methodologies (Reggio Emilia, project work, CIME method). Bilingual system, high level of English. Constant teaching update. Conscious Discipline Program. Promotion of reading and active research. Social commitment and connection with current issues. Green school. Multidisciplinary, active, comprehensive and project-based learning. Comprehensive education considering artistic and socio-emotional areas.	There are only two private schools with official validity in Valle de Bravo. Recognition for more than 34 years in the community. Its high level of English helps students obtain international certifications. Active participation in community activities. Attractive and well-equipped facilities, which also have all the services.
Weaknesses	Threats
Constant change of personnel in English Coordination. Problems finding certified personnel for the subject of English and who meet the parameters of the institution. Reduced work times. Little time to work on SEP projects and work plans at the same time. Null exam evaluation system. No homework or work is left outside of school hours. High rate of absences by students. Little link between SEP plans and programs with institutional projects.	Creation of new private schools at basic levels in Valle de Bravo. Unstable registration. Poor results on national standardized tests.

Source: self made

On the other hand, it is important to specify that the fifth grade group of the 2022-2023 cycle, with which this research was carried out, was made up of 14 students, all with internet access in their homes and a family or own device to carry out the activities. requested.

Their strengths as a group are the following: a) they mostly manage to finish proposed activities within the established time; b) it has students with artistic abilities, which is reflected in the performance of creative work; c) they enjoy supporting and explaining to their classmates topics in which they have difficulty; d) they fully function in project work, working as a team,

reaching agreements and participating both in the organization and in the implementation of the product or prototype; e) most of them do extra-class work; f) they manage to work neatly in notebooks and activities; g) 90% of its members manage to self-regulate and act responsibly; h) they are attracted to videos and documentaries; i) 85% read with good fluency and reading comprehension; j) show motivation in the subjects of Spanish, Mathematics and History.

Knowing the context of the institution and the group where we worked serves to establish that the fundamental objective of this research was to analyze and evaluate the effectiveness of e-learning *as* a complement to basic education (in this case, in the fifth grade).) to detect its advantages and disadvantages; That is, if the learning generated improves academic performance and thus the effectiveness of this educational modality at this level of primary education.

General objective

Determine the advantages and disadvantages of the *e-learning model* in basic education in the fifth grade of the primary level and its effectiveness through the application of the gamification strategy in the subject of History.

Specific objectives

1. Using an ASSURE instructional design, carry out the following strategies:

- a) Analyze the characteristics of each student in the group: the type of player in gamification, their prior knowledge, skills and attitudes, through observation and diagnostic and summative evaluations.
- b) Establish learning objectives and determine the results that students must achieve when taking the course to indicate the degree to which they will be achieved.
- c) Select strategies, technologies, media and materials.
- d) Organize the virtual learning scenario (Classcraft and Google Classroom).
- e) Promote student participation and student learning through active and cooperative gamification.
- f) Evaluation and review of the implementation and learning results, leading to reflection and the implementation of improvements that result in a higher quality of the training action.

2. Carry out an analysis of the activities that promote greater generation of meaningful learning.

3. Carry out a study and analysis of the results of their academic performance, based on the diagnostic evaluation and the achievement of expected learning in comparison with face-to-face work and work with the e-learning model *through* gamification.

Materials and methods

The research was of an experimental qualitative type, through the case study, due to the advantages of this method (Canta and Quesada, 2021), which include adaptability and organization to examine various problems in an exploratory study, in the choice of the profile of the case and in its interpretation of information through the role of the researcher during the development of the study. This allows the results to be taken as a starting point for the development of subsequent research.

This case study aimed to observe, know, analyze and understand the work and acquisition of learning in the subject of History of the students of the fifth grade group of the Valle de Bravo School, through the application of the gamification strategy in the modality of *e-learning*, in a predefined, structured and simple contextualization.

The case worked on has been chosen due to the nature of the Classcraft platform where gamification in the *e-learning modality was considered*, through participant observation of the students through other different techniques, such as focus group interviews. Likewise, a diagnostic evaluation exercise was implemented to explore the previous knowledge that the group had and analyze, based on this, the achievement or not of the expected learning of unit III of the subject History, which are established by the Ministry of Public Education (2011). To this end, activities were developed on the virtual platform during the third quarter of the 2022-2023 school year, which made it possible to analyze their effectiveness, advantages or disadvantages.

In the experimental research, the population consisted of 14 fifth grade students from the Valle de Bravo School (six men and eight women), between nine and ten years of age, with access to the internet and a technological device (computer, iPad, cell phone, tablet, etc.), which would allow work in the virtual Classcraft scenario to be individual and self-directed. During block III, the group worked on the History subject in the *e-learning modality*. To collect the information, surveys and observation with instruments were used, such as questionnaires for the learning experience and self-assessment of the expected learning.

The testing and validation of the instruments were carried out by Dr. Sandra Conzuelo and teacher Liliana Mora, both experts in educational aspects.

Techniques

The techniques that were applied during the investigation were the following:

a) Participant observation. It is a technique commonly used in qualitative studies. It requires that the researcher be integrated into the study group and relate to them as much as possible to descriptively record what was observed from the interaction with the subjects. Trujillo *et al.*

(2019) affirm that it is necessary for the researcher to delve into the context, the feelings and mainly allow the sharing of experiences, notions and purposes of the people whom they will observe. To do this, it requires a high level of commitment, so that you can collect the information that allows you to understand and reveal the situation studied from your perception of the environment with the aim of diagnosing or evaluating student learning.

b) Focus group interview. This was carried out in a discussion context and at the end of the gamified activities of the Classcraft platform in *e-learning mode* with the fifth grade group of the Valle de Bravo School. The objective was to analyze and understand their perception regarding their learning compared to traditional face-to-face work in the subject of History. In this regard, Sánchez *et al.* (2021) point out:

[The strategy] seeks to generate a space and situation of comfortable and natural interaction for people, where there is an intermediation of the moderator, promoting a conversation that provides information with detail and depth (p.113).

Instruments

The application instruments for each mentioned technique, and which served for the analysis of data collection, were these:

- a) Battery of player types and the diagnostic evaluation applied through a Google Forms in Classroom / in person. Both instruments were helpful to know the characteristics that the group has to plan the activities and to know the prior knowledge based on the expected learning at the end of the research.
- b) Activities designed in Classcraft. In these, each student's progress was observed and analyzed individually; Then, a session was held that would allow group review of them.
- c) Final self-assessment using a checklist. The objective of this instrument was for students to generate a self-assessment regarding the expected learning that they consider acquired to create awareness regarding what it was necessary to continue working on.
- d) Observation guide. This was used to record what was observed from the fifth grade group, which made it possible to list elements of interest for the research that can be observed (Useche *et al.* , 2019).
- e) Focus group interview script. This allowed obtaining information easily and in a short time. To do this, it was applied at different times to continuously monitor the student's performance and record their achievements and progress in a simple way (Arias-González, 2020).

The information processing was generated according to the application of the different stages, beginning with the analysis of the results of the battery of player types, which served to

plan the gamification mode. This was followed by a diagnostic evaluation, which allowed us to know what knowledge the students had. In this way, the activities and strategies that would serve to achieve the expected learning of the fifth grade for the subject of History were structured and planned.

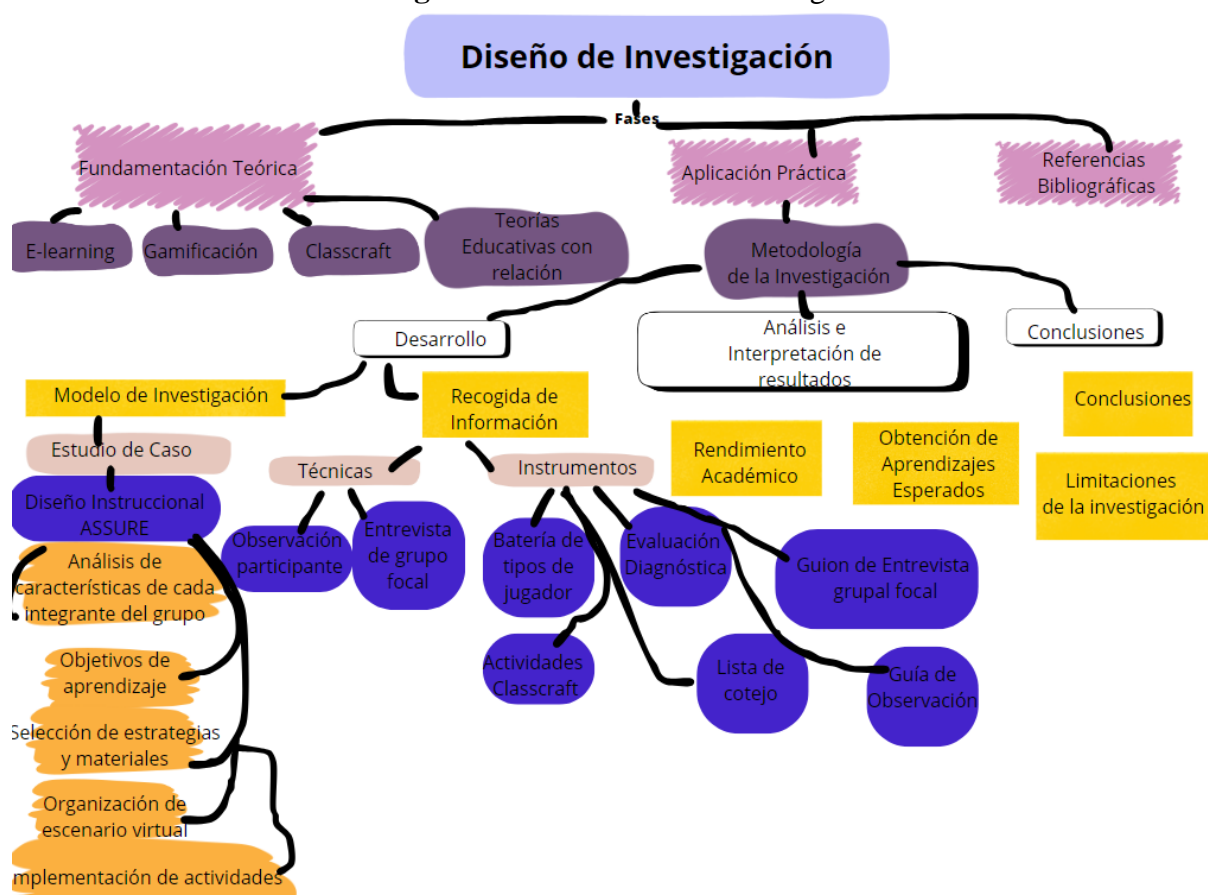
During the work on the Classcraft and Classroom platform by the students, a session was held after the completion of each mission with the objective of analyzing the expected learning achieved, in development or that required support. The information collected was recorded in the observation guide.

At the end of all the activities planned in Classcraft and with it the topics of block III of the History subject, a focal interview was carried out to learn about the students' experience during the research. All of this was recorded in the observations of the interview script.

Finally, the diagnostic evaluation was applied again with the objective of analyzing the progress and obtaining of the expected learning of the fifth grade History subject, contemplated in the plans and programs and establishing how much constructivism, connectivism and resource-based learning Virtual educational programs contribute and are related to the effectiveness, advantages or disadvantages of *e-learning* through the gamification strategy at the primary level.

For the research process, the stages or phases presented were considered, as seen in the following conceptual map (Figure 1), which are subsequently explained:

Figure 1. Phases in research design



Source: self made

Stage 1. Theoretical and practical research on *e-learning* , gamification, theories related to it and the Classcraft platform.

Stage 2. ASSURE Instructional Design of the gamifiable *e-learning platform* used with the following activities:

- The type of gamification player of each student was analyzed by applying a battery of questions developed by Richard Bartle, which were adapted to the educational field by Manel Rives.
- Establishment of learning objectives. The results that the students had to achieve when taking the course were determined and the degree to which they would be achieved was indicated, according to the expected learning established by the Ministry of Public Education in the 2011 Plans and Programs.
- Preparation and application of a diagnostic evaluation. We sought to know their prior knowledge, skills and attitudes regarding the topic. The diagnostic evaluation was validated before application.
- The strategies, technologies, media and materials were selected, validating each of the activities designed as strategies.
- Organization of the virtual learning scenario (Classcraft and Google Classroom).

- f) Promote student participation and learning through active and cooperative gamification. Carrying out activities independently in Classcraft and Classroom.
- g) Evaluation and review of the implementation and learning results, leading to reflection and the application of improvements that result in a higher quality of the training action, through observation and management of an observation guide. Carry out an analysis of the activities that promote greater generation of meaningful learning through a focus group interview.
- h) Carry out a study and analysis of the results of their academic performance, based on the diagnostic evaluation and the obtaining of expected learning compared to working in person and working with the e-learning model through the gamification *strategy*.

Stage 3. Conclusions

Literature review and analysis

The literature reviewed revealed that there are many investigations referring to the *e-learning modality* or work through gamification at the higher level based on constructivist theories and connectivism. On the other hand, the few studies found regarding this modality and the basic level are aimed at subjects such as Mathematics and English (mainly), which demonstrates advantages that agree with what was proposed by Area Moreira et al . (2018) regarding providing updated information and content, flexibility of information, multimedia training and cost and travel savings. However, the implication of the expected learning established by the Ministry of Public Education in the 2011 plans and programs is left aside.

For example, Maset-Llaudes and Cabedo (2019) consider *e-learning* as an initiative focused on improving the learning process in higher education based on gamification in specific learning *software* in classrooms through personal electronic devices. , which facilitates learning with the active involvement of students in face-to-face classes. With the latter, active work can be rescued in an *e-learning model* accompanied by gamification; However, work was done during face-to-face classes and one of the characteristics of *e-learning* was left aside in terms of its flexibility of time and space on the part of the student, who can work and learn at his own pace (Santamaría and Alcalde, 2020).

Personally, I define *e-learning* as learning that is generated and transmitted by electronic means (that is, through the use of the Internet and ICT) in order to improve access to knowledge and its quality. This teaching system allows us to put aside the barriers of time and space to favor virtual collaboration by those involved.

For their part, Reyes-Cabrera and Quiñones-Pech (2022) recommended selecting and articulating gamification strategies in the design of an *e-learning course* by carrying out constant measurements that allow identifying and maintaining the levels of collaborative learning of university students. The aforementioned authors taught interesting information and results linked to the research problem, but without going beyond its advantages and disadvantages, that is, without landing on the effectiveness of e-learning with the support of gamification *at* the primary level and specifically in the subject of History.

Now, the theories that defined this investigation were the following:

Constructivism theory. This considers that the student is a social being, capable of reconstructing the knowledge he has based on his personal, social and emotional experience, which serves to create new knowledge and generate significant learning.

Theory of connectivism. In this, learning is generated from connections within networks that are promoted through the use of virtual learning environments, which motivates self-learning. Learning based on virtual educational resources. This is supported by the creation and use of multimedia resources and content (videos, audios, gamification, etc.) to acquire and develop ICT skills and stimulate the generation of own content, which turns the student into an active actor in the Teaching and learning process.

Gamification. This theory improves the assimilation, retention and putting into practice of new knowledge by exploring a topic autonomously and stimulated to solve challenges and tasks by obtaining rewards.

Regarding basic regulations, the current plans and programs established by the Ministry of Public Education (2011) and the current educational reform were resumed.

For this research, the third topic of the History subject was considered, entitled *Porfiriato to the Mexican Revolution*. The competencies that were intended to be promoted were understanding of historical time and space, management of historical information and formation of a historical consciousness for coexistence.

In the following table (Table 2), the expected learning and contents that were worked on with the fifth grade group of the Valle de Bravo School were established:

Table 2. Expected learning and content of the History subject (fifth grade of primary school)

Expected learning	Contents
<ul style="list-style-type: none"> • Locate the main events of the Porfiriato and the Mexican Revolution using the terms year, decade and century, and locate the areas of influence of the revolutionary leaders. 	<p>Panorama of the period: Temporal and spatial location during the Porfiriato and the Mexican Revolution.</p>
<ul style="list-style-type: none"> • Describe the process of consolidation of the Porfiriato. • Recognize the role of foreign investment and economic, scientific and technological development during the Porfiriato. • Describe the living conditions and disagreements of the different social groups in the Porfiriato. • Recognize the causes of the Mexican Revolution, the moments of development of the armed struggle and the proposals of the revolutionary leaders. • Assess the guarantees established in the 1917 Constitution for the formation of a more just society. • Value the legacy that revolutionary culture has left in our present. 	<p>Topics to understand the period Why did the Mexican Revolution arise? The political differences between the liberals and the consolidation of the dictatorship of Porfirio Díaz. The Porfiriato: Stability, economic development and foreign investment. Science, technology and culture. Porfirian society and protest movements: peasants and workers. The Mexican Revolution: Maderismo and the beginning of the Mexican Revolution. The development of the armed movement and the proposals of revolutionary leaders: Zapata, Villa, Carranza and Obregón. The Constitution of 1917 and its main articles. The revolutionary culture.</p>
<ul style="list-style-type: none"> • Investigate aspects of the culture and daily life of the past and assess their importance. 	<p>Topics to analyze and reflect on. "Foreign influence on fashion and sports." "Life on the farms."</p>

Source: Own elaboration based on information from the plans and programs of the Ministry of Public Education (2011)

Results

The *player type battery* allowed us to know what characteristics of players existed in the fifth grade group of the Valle de Bravo School. This allowed them to identify what type of game and dynamic they would be most intrinsically interested in; From this, the activities were designed considering the learning profiles, as part of a gamified activity, according to the proposal of Richard Bartle (1996, cited by Bauer, 2021).

The results obtained show that the general characteristics of the group are related to *Achiever or triumphant*, interested in exceeding the objectives set in the game, successfully solving challenges and getting a reward for it, discovering new scenarios or levels of personal satisfaction; *Explorer or explorer*, interested in discovering the unknown, enjoying learning or knowing more and self-improvement; Lastly, although in smaller quantities, *Socializer or sociable*, interested in social aspects above the game strategy itself and sharing with others.

Based on the above, the activities planned and established on the Classcraft platform contemplated a) the definition of a system of milestones and achievements; b) complex challenges and achievements; c) levels and hidden areas to discover; d) accessible chats and friend lists; and e) the possibility of creating a network of contacts or friends.

The *diagnostic evaluation* was applied in person, considering the questions and answers based on the expected learning. This was linked to the constructivist theory, which establishes that the process of knowledge construction fundamentally depends on prior knowledge or representation of new information or the activity or task to be solved, an issue for which this instrument was so relevant.

Based on this, it was detected that the most common prior knowledge was related to the recognition of the role of foreign investment and economic, scientific and technological development during the Porfiriato.

Taking this prior knowledge into consideration, we began by placing the students temporally and spatially in the time. Then logically structured activities were designed with a conceptual hierarchy, located from the most general to the little differentiated. Likewise, at all times, jobs were considered that would allow them to remain motivated to build new knowledge and achieve meaningful learning.

Once the activities were designed, evaluated and modified on the Classcraft platform, it was time to begin practical work, that is, independent work by the students. To do this, the theory of connectivism was considered, in which connections are proposed within networks through the use of virtual environments, which stimulates self-learning.

Classcraft is a gamification platform that allows you to design learning experiences that can be experienced as a game (Cornellà and Estebanell, 2018) with the aim of achieving changes in behavior. This places the student in a scenario with certain rules and where a system of rewards and the assessment of the results obtained are used (Liberio, 2019) that can be organized in metaphorical classrooms based on reality or fantasy to achieve greater clarity and scope of the topic. by placing them in practice (Jadán-Guerrero and Ramos-Galarza, 2018).

The first activity consisted of entering the platform and creating their avatar, as well as the scenario in which they would be during the missions. The next day, they were asked what their experience had been like: if they had had any difficulties and if they had had the opportunity to enter a mission.

It was gratifying to see that they were motivated with this first approach to the platform; Although it should be noted that there were students who commented that they had difficulty entering, but seeing how interested the others were, they tried again in the afternoon of that day.

The *first mission* consisted of an organization of activities focused on the expected learning, that is, locating the main events of the Porfiriato and the Mexican Revolution using the terms *year*, *decade* and *century*, as well as locating the areas of influence of the revolutionary leaders. In the review session, it was observed that of the 14 students, only three of them did not access the platform. Furthermore, the achievement of the objective was relevant by temporally and spatially locating both events; However, it was necessary to emphasize that one of the activities requested the location in centuries, since some established it in years. This led to establishing this measurement and helping them convert amounts of years into centuries, and vice versa.

With this, it was intended that the activities create learning situations that facilitate the construction of knowledge, for which varied and graded activities were proposed that would promote reflection on what was learned and draw conclusions to rethink the process. All based on constructivist theory.

The *second mission* aimed to describe the process of consolidation of the Porfiriato by analyzing and understanding the differences between the liberals and conservatives of the time. During the review session, interesting comments emerged in which students were able to identify the main differences and objectives of these political groups.

At the end, they were asked whether these groups—according to the identified characteristics—were currently seeing each other, which was discussed in groups of four people. Their conclusions focused on the fact that today there are many political parties that are governed by the objectives of liberals and conservatives. In fact, one of the participations pointed out that the current government defends the ideas of liberals and criticizes those of conservatives; In addition, he offered a reflection on the positive aspects of both and whether this division in the country would be prudent.

During this intervention, the expected learning was achieved, that is, describing the process of consolidation of the Porfiriato and identifying the characteristics of the government and the sociopolitical aspects existing in it, as well as information processing related to a sensory register, a short-term memory. term and a long-term store that allowed connections to be made, analysis of its immediate context and conclusions (Atkinson and Shiffrin, 1968, cited by Shiffrin, 2018).

The *third mission* started from the expected learning based on the recognition of the role of foreign investment and economic, scientific and technological development, as well as the living conditions and disagreements of the different social groups during the Porfiriato. In this review session, the students' contributions were directed towards the description of the Porfiriato and an analysis of the positive and negative issues of this era.

The students were able to identify that during the Porfiriato, foreign investment was of utmost importance for the development of various aspects of the country, which was considered positive; while the characteristics generated - such as a dictatorship and the lack of respect and development of citizens' rights, strikes and their prohibition - were part of the negative aspect. This aspect led them to estimate the Porfiriato as a not so good time, which led to an uprising of the people against the government.

For this moment, the strategies used were elaboration strategies, which focused on the integration and relationship of the new information that had to be learned with the previous knowledge identified in the diagnostic evaluation. This was carried out based on a strategy that allowed the information to be constructively reorganized to achieve a correct exploration of what had to be learned, as well as the forms of schematic organization internalized by the students, as mentioned by Díaz and Hernández (2002, cited by Huerta, 2014).

The latter was quite useful during the *fourth mission*, since by recognizing the causes of the Mexican Revolution based on the negative situations of the Porfiriato, they learned about the moments of development of this struggle and the proposals of each revolutionary leader.

It is worth mentioning that this mission was carried out in teams. At first it was difficult, since they insistently wanted to do it coincidentally in a virtual space, so they tried to agree on the time and day to carry out a video call via Zoom. Seeing that it was not that easy, since the team members had other activities, they began to show annoyance and frustration, so I decided to intervene.

The teaching intervention consisted of asking them some questions regarding the pandemic, so they were asked to remember what they had done when they could not meet to complete an activity and what the solution had been. Two of them commented that they had often worked on shared documents. In this way, a strategy was devised that allowed everyone to work while respecting the times and activities of each of them.

The latter is linked to what was established by Silva-Peña and Salgado (2021), who explain that those collaboration tools that allow easy authoring of content on the web are those that in e-learning terms are known as *wikis*, for which which requires basic computer knowledge and easy access to the network, which allows overcoming time and place restrictions (Lamb, 2004, cited by Orta et al., 2018), and facilitates peer review based on the publication of works online (Xiao and Lucking, 2008, cited by Hervás, 2020). This made it possible to promote cooperation and promote the zone of proximal development, a theory according to which a person's learning can be obtained with the support of others (team learning, team research) (Núñez et al., 2019).

In this way, it was possible that during that week they could work on the activity collaboratively; In addition, it was possible to make small exhibitions of the topics worked on,

such as the identification of the different leaders who intervened in the Mexican Revolution, their ideals and their performance during the struggle.

During the *fifth and last mission*, collaborative work continued to be present to analyze the end of the Mexican Revolution and the beginning of the Carrancista government. This challenge consisted of identifying the guarantees established in the 1917 Constitution for the formation of a more just society, with emphasis on articles 3, 27 and 123, and their contributions for citizens. After making a collaborative mind map, they discussed these articles and their importance.

The latter served to discuss whether these articles are still present and whether they know what the current characteristics of education, labor laws and what private property implies are like. Their conclusions were interesting, since they valued the importance of the Constitution created in 1917, the current basis of coexistence in our country.

In general, it can be stated that the group maintained its interest and motivation regarding the topic and the completion of the missions, so as a last challenge they were asked to investigate some aspects of the culture and daily life of the revolutionary era to Discuss it in the next face-to-face class in teams.

It was gratifying to observe and listen to the interventions, since some not only shared information, but also brought videos, music, clothing, photographs, etc., which allowed us to recreate a revolutionary situation and go back to what we experienced at that time; In addition, they shared corridos and experiences told by their great-grandparents or grandparents that someone else had told them, with which the expected learning indicated by the Ministry of Public Education in the 2011 plans and programs was achieved, that is, valuing the legacy that has been left. revolutionary culture in our present.

focus group interview to be carried out in the next face-to-face session where questions were addressed with the aim of knowing how they considered the learning to be when carrying out the gamified activities of the Classcraft platform autonomously. The questions asked were the following: how motivated they felt during the activities; What were the activities that cost them the most work and why? what they considered were the activities in which they learned the most and why; and how they consider they learned more: in a traditional way by using the textbook and commenting on it during class or by carrying out activities on the Classcraft platform in a gamified and autonomous way and why (Pinto and Palacios, 2022).

As Arias-González (2020) mentions, the advantages of this instrument were, among others, allowing information to be obtained easily and in a short time. The results of this interview showed that the students considered that they had learned a lot with the gamified activities of the Classcraft platform, since they had the opportunity to go at their own pace when carrying out the activities and when discussing the information with some family

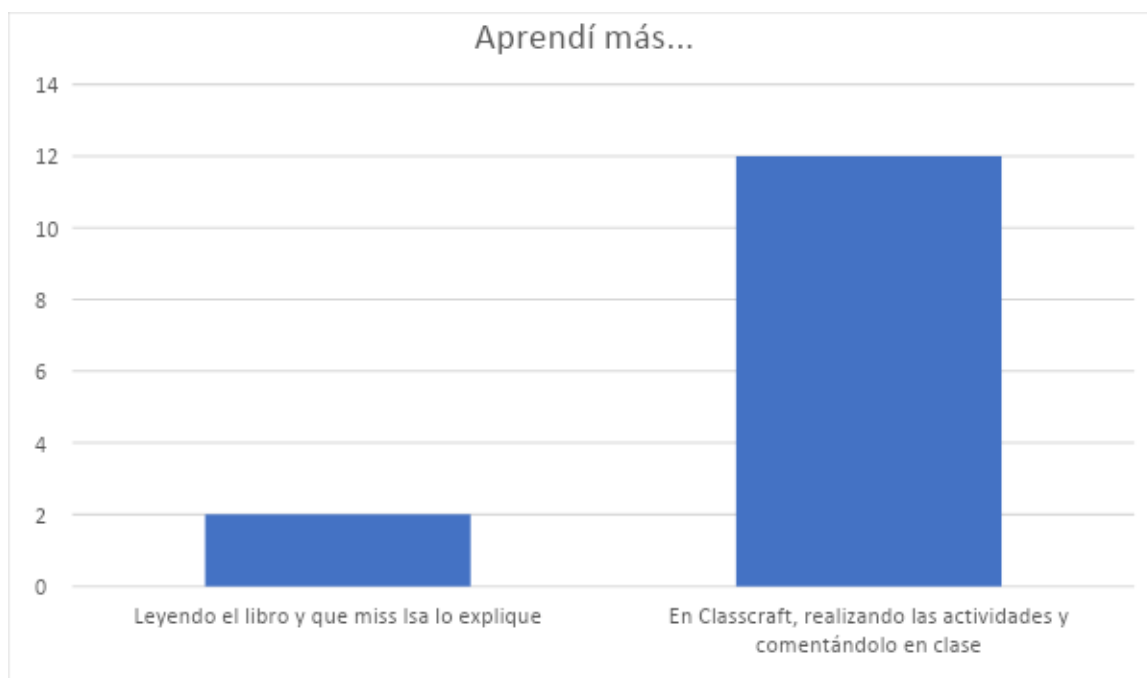
members and in the group of in person at the end of each mission. In this way, they were able to identify important ideas and correctly answer the exercises or questions.

Likewise, they expressed having felt motivated from the beginning to the end of the work on this platform, since they enjoyed the story of the game and could imagine that their character was the one who achieved and unlocked each mission, which served to feel part of the game and interested in it. carrying out activities. Furthermore, they were excited to realize that when they were asked about certain information in the face-to-face sessions, they could identify and express it without problem.

However, the activities that cost them the most work were those carried out as a team, since it was difficult for them not to work at the same time as their colleagues, although they could do their extracurricular activities and carry out platform work when possible. Likewise, they did not at all like that they had to read everything that their classmates had already written so that the information was not repeated; In fact, sometimes the ideas they had were already in the document, so they had to continue researching or developing the topic.

Regarding the last question, in the following graph (figure 2), you can see the group's responses. The students commented that they learned when they read in class, when I explained it to them or when we discussed it, but sometimes the time was very long, so they became bored. On the other hand, when carrying out the activities in Classcraft they felt that they were playing a video game, so they could enter the platform in their free time and when analyzing the information in the classroom they answered. In this way they realized that they were understanding, so they wanted to continue advancing in the missions.

Figure 2. Identification of each student regarding their preference regarding the learning strategy implemented



Source: self made

Regarding the final application of the diagnostic evaluation, the results showed a greater mastery of the expected learning compared to the first application; Furthermore, they were able to analyze and relate previous knowledge with that acquired.

Discussion

E-learning has become a model that allows learning based on the principle of “training in the moment”, since it allows students to advance at their own learning pace by combining various materials (auditory, visual and audiovisual). This approach also considers knowledge as an active construction process, which offers flexibility in both individual and collective learning.

In this sense, Vásquez Medina (2019) highlights some advantages of *e-learning*, such as access at any time and place for students, the promotion of learning at their own pace, and the notable interaction and collaboration between students and instructors. Likewise, it points out that the teacher can directly motivate each student, thereby promoting comprehensive learning by integrating various sources and instructional tools, such as virtual classes and simulations.

For Cabrero (2005, cited by Area Moreira *et al.*, 2018) the most significant advantages of *e-learning*, analyzed and extracted from its implementation in higher education, are the following:

- Make a large volume of information available to students.
- Facilitate the updating of information and content.
- Make information more flexible, regardless of the space and time in which the teacher and the student are.
- Allow the relocation of knowledge.
- Provide training in time and personnel.
- Offer different synchronous and asynchronous communication tools for students and teachers.
- Promote multimedia training.
- Facilitate group and collaborative training.
- Promote interactivity in different areas.
- Allow the activity carried out by students to be recorded on the servers.
- Save costs and travel.

Now, it should be noted that the most significant approach of this model to the basic primary level has only occurred recently due to the pandemic experienced in 2019. In this context, the country's basic education schools were forced to reformulate their strategies. and work activities and implement the distance *e-learning model* as a contingency measure to stop the advance of the infectious outbreak, which led to the temporary closure of educational institutions (Tippe and Soto, 2021).

Consequently, this research aimed to verify the ideas previously studied, observed, analyzed and developed at the basic level. For this, an instructional model was designed to encourage the active and committed participation of the student in the teaching-learning process in the *e-learning model* . Specifically, the theoretical ideas of the ASSURE model by Heinich and collaborators were applied, based on constructivism and considering the specific characteristics of the student and their learning styles. In addition, a gamification platform was incorporated as part of the work strategies and activities to be evaluated and analyzed.

The analysis of the results, by contrasting the diagnostic evaluation and the final one, allowed us to determine the effectiveness of *e-learning* as a complement to face-to-face education at the primary level. Likewise, advantages and disadvantages were identified, and the usual planning of teachers at this level was adjusted with the aim of improving the academic performance of the groups and, at the same time, the educational quality.

e-learning education at the primary level for its implementation as a complementary strategy to the face-to-face model in different schools, thereby addressing a current gap in this sense.

Finally, the limitations presented must be considered, such as the fact that the research was carried out in a private school with only one group per grade. Furthermore, although the students had electronic devices at home, they were not their own, which meant they had to wait for them to borrow them.

Conclusions

After analyzing the results and the case study, the following conclusions are derived regarding the general objective of this research, which sought to determine the advantages and disadvantages of the e-learning model *in* basic education, specifically in the fifth grade of the primary level, and its effectiveness through the application of gamification in the subject of History. In this sense, this analysis has revealed that the implementation of this model has more advantages than disadvantages.

For example, among the advantages identified, the development of skills such as the analysis of information, the identification and understanding of antecedents and consequences of historical situations, the relationship with present events and the ability to create proposals to address current problems stand out. in line with the objectives of the History subject in the fifth grade of primary school.

Another obvious benefit is that the introduction of the *e-learning model* as a complement to in-person learning contributes to improving academic performance. In addition, it promotes dynamic and constant collaborative work in the subject of History in fifth grade at the primary level, compared to a completely in-person model. In this sense, it is essential to remember that in this *e-learning* and gamification approach, prior knowledge must be considered as an integral part of the teaching-learning process, which not only constitutes the starting point or basis for comparisons, but also They are significantly integrated with the new learning to be developed.

e-learning model , through the active and cooperative gamification strategy, encourages student participation and learning. To achieve this, tools such as wikis, chats or videoconferences are used, which allows the time and space of each participant to be respected. Therefore, the application of gamification through the *e-learning model* is presented as a resource that contributes to generating and maintaining constant motivation in the student not only in relation to the story or the activities to be carried out, but also in the construction of your own learning process.

Another significant advantage is the presence of self-regulation of learning, facilitated by the process of planning, execution and self-reflection of the work and information managed on the Classcraft platform, which promotes awareness about one's own learning.

In short, the *e-learning model* in fifth grade students allows, through the consideration of strategies based on the theories of constructivism, connectivism, learning based on virtual resources and gamification, meaningful, conscious and self-regulated learning. .

As for the disadvantages, the additional work for teachers when planning activities both in person and on virtual platforms stands out. This involves the design of virtual activities or digital resources that are additional and independent of the daily work with the group in person. Additionally, there is a need for all students to have constant access to virtual devices and platforms, which poses challenges, such as impediments caused by weather conditions that may affect Internet access. The dependence on the loan of devices by parents is also highlighted.

Finally, considering the previously mentioned advantages and disadvantages, it is concluded that the *e-learning model* through gamification, as a complement to a face-to-face model, is an effective educational strategy with numerous benefits in the teaching-learning process. It is highlighted that this modality is not only applicable and beneficial at higher levels, but is also appropriate and successful in basic level institutions, as long as they have a favorable context and have the objective of promoting meaningful learning through self-regulation, motivation. and collaborative work.

Future lines of research

This research gains relevance in the scientific community by demonstrating the successful applicability of the *e-learning model* at basic levels of education, which serves as an effective complement to the face-to-face model. The positive results show that students between nine and ten years old can stay motivated and develop skills to work and generate knowledge in a self-regulated manner, both individually and through collaborative work.

These findings lay the foundation for future lines of research, since they allow the consideration of *e-learning* through gamification at all primary levels. Thus, the possibility opens up of specifically studying self-regulation in lower primary students and exploring the viability of implementing fully online subjects at the primary level.

On the other hand, this research marks a starting point to analyze and study evaluation in gamification platforms. The objective is to develop tools and instruments that enable more precise monitoring of the indicators of significant learning reflected in academic performance.

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