

DESIGN OF A TEACHING SEQUENCE FOR THE DEVELOPMENT OF A VIDEO GAME AS A STRATEGY FOR TEACHING HISTORY IN PRIMARY

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Abstract: This research shows the results of the design of a didactic sequence for the development of a video game using visual block programming as a strategy for teaching history in primary education, using a Design-Based Research methodology with a qualitative approach in which the instruments used were questionnaires and interviews with the participating students and teachers. Additionally, an assessment of the intervention was carried out in relation to the TPACK model. 37 5th grade primary school students, 2 teachers who were experts in the subject of history, and the computer class teacher participated in this research, which took place in the 2021-2022 school year. The design of the didactic sequence consisted of creating sequences, animations and interactions that allow the development of a video game based on the selected history topic together with expert teachers. The final results showed the levels of motivation and participation of the students with the use of Scratch compared to traditional history teaching. With the results it was possible to reach the conclusion that the development of a video game with a technological tool such as block programming increases the motivation of the students, that they find it fun, greater participation is obtained and they were committed to their learning, therefore considering an innovative strategy for teaching history in primary school.

Keywords: educational innovation, educational technology, experimental teaching, educational research

INTRODUCTION

Nowadays it is common for educational institutions to use computers as a teaching tool in which educational software plays an important role; however, in the vast majority of cases, students have a user role, so it is important that teachers are able to integrate

technology into the teaching process in such a way that they generate dynamic pedagogical environments taking into consideration, the learning needs and objectives to ensure that students participate actively, becoming creators and generators of knowledge., that is, they generate processes as well as content.

Taking into account Gardner's (1993) statement that new technologies open an infinite number of opportunities to enhance personalized learning and the plurality of ways of learning, we can take advantage of the use of technological tools to develop multiple intelligences in early childhood education, adapting them according to the need. And this can be done through projects that provide students with an opportunity to improve their understanding of concepts either individually, adapting to their learning pace, or collaboratively, enriching their learning.

Extensive studies have been developed on the benefits of implementing the use of educational video games as a tool in information and communication technologies in the teaching-learning process in which students have a role as users (Roncancio et al., 2017; Solano and Santacruz, 2016) as well as numerous research on gamification as a teaching strategy seeking to motivate students and trying to create a more pleasant environment in the classroom (Sánchez et al., 2020; Torres and Romero, 2018; Morillas, 2016). among the most recent, in the same way the results of computational logical thinking in mathematics are widely proven (Pertejo, 2017; Valverde et al., 2015) but there is little recent research on the implementation of video game creation as a technique. of history teaching in primary education.

Generating appropriate strategies for students to develop as creative thinkers is one of the great challenges that the educational system has. Such strategies must promote individual and complete development

that results in an autonomous and critical student. This requires a classroom in that the environment is active, of interaction between the student, the teacher and the use of technology. The traditional teaching of the subject of history, in general, can be considered to be perceived as a source of data and facts that are memorized for the moment of taking an exam.

Video games are in some cases more attractive and fun than a textbook or the teacher's presentation of the topic. Video games require the player to learn and think in a way that they are not used to, which is why the use of these in classrooms modifies traditional teaching by motivating students to think in a different way, that is active and critical, students can be motivated by engaging in an activity different from the use of traditional resources. In recent years, it has been demonstrated by different authors that the use of video games positively influences the user's cognition and that, by focusing on gamification, they have psychological elements that achieve user collaboration, allowing them to stay longer in the game. and the most important thing is that you learn through the content of the information that the game provides (Díaz, 2013).

Even though video games are motivating and innovative, it is important to keep in mind that they do not replace a traditional class, that is, they must be considered as a tool that complements the design of activities for the transmission of curricular content seeking to ensure that students develop skills other than traditional teaching and, in the process, achieve active learning.

This study consisted of designing a didactic sequence for a thematic unit related at the curricular level of the history subject in which the students developed a video game using visual block programming as a technological tool based on gamification, the development

of multiple intelligences and thinking, computational with the aim of providing the teacher with a strategy for teaching history in primary education.

Figure 1

Integration of history teaching strategy through the creation of a video game based on gamification, multiple intelligences and computational thinking.



Note: Own elaboration

This research was carried out in a prestigious institution in the central area of Veracruz, Mexico, which is responsible for being at the forefront of education, with a teaching staff that is constantly trained in technology and updates their knowledge and techniques. responding appropriately to the educational challenge of the 21st century.

RESEARCH METHOD

This research was carried out from a qualitative approach because its main objective was to design a didactic sequence of a thematic unit in which visual block programming serves as a history teaching strategy in primary education. Design-based research in educational technology was used. Taking into account that this type of

research deals with real-life problems that professionals identify in practice and whose main characteristic is introducing a new element to modify a situation.

For the process, the model proposed by Reeves (2000) was followed, which tells us that “the research process is carried out through continuous cycles of design, validation, analysis and redesign, leading the different iterations to the improvement of the theoretical body and the refinement of the intervention

The sample was made up of the total population, non-probabilistic and intentional, of 37 fifth grade students of primary school, of which there were 20 girls and 17 boys divided into group A with 19 students and group B with 18 students aged 10 and 11 years.

The research phases were carried out taking a procedure applied in the case of a Research oriented to the development of processes (mainly didactic strategies mediated by ICT).

To design the activity, the Instructional Design Model of Dick, Carey and Carey (2005) was used, which is frequently used in the educational field. It is a system composed of 10 phases that interact with each other. (Esteller and Medina, 2009)

This research was designed in stages, the first was a diagnostic stage that resulted in the feasibility of carrying it out, if the institution had the necessary infrastructure and technological skills of both teachers and students, the second was the planning stage. in which the scheduling of the activities was defined with the participating teachers and in which they learned about block programming tools and what the project consisted of, what would be the final product that the students had to deliver and the selection of the history topic to develop. The third was the design stage of the didactic sequence that was carried out together with the participating teachers, a fourth stage that consisted of the

implementation of the project in which the students designed and programmed the video game during 6 sessions of their computer class. and finally, an evaluation stage in which the students were evaluated with a rubric in the presentation of their final product in a sharing before their classmates and some parents.

In order to choose the block programming tool, 4 current tools to be used for the implementation of the project were investigated, which were Scratch, Code, Block Stacks and App Inventor, with the help of the computer teacher in the weekly class that the students were shown and asked to use them to observe their reaction and the difficulty they had in using them.

According to what was observed, it was clearly noted that the students found Scratch to be a tool that was easier to use, easier to understand, they found it fun and friendly, as well as very flexible to incorporate their own images and sounds, which opened up their creativity.

At the end of the implementation, a qualitative evaluation was carried out using interviews and questionnaires directed at the students and experts in the field and an assessment of the intervention was obtained in relation to the TPACK model carried out by the experts with values from the technological integration evaluation rubric. (Harris et al., 2009).

RESULTS

In the first session and before starting the development of the video game, the students completed a diagnostic evaluation on paper that consisted of 5 questions to evaluate the main learning objectives on the topic, and which the teacher had taught in a traditional way.

Once the responses of said evaluation were counted and analyzed, it was obtained from question 1 that 86% of the students identified

the decades in which the events of the topic discussed took place. From question 2 it was obtained that 57% of the students identified the centuries to which the years in which the events of the topic took place belong. From question 3, the result obtained was that 30% of the students were able to identify the most important political change on the topic seen. From question 4 with reference to the identification of the presidents of the period discussed in the topic, 73% of the students managed to identify at least two presidents. Of question 5, which refers to the identification of at least 2 events that occurred in the period of the topic discussed, 54% of the students managed to identify them.

Once the project was implemented in the sixth session, whose objective was to test the video game and make the necessary adjustments, as well as add details that they wanted, good student participation was observed in such a way that some teams added additional objects to the video game, movements and messages to their characters. At the end, most of the teams managed to finish their video game, with 14 teams being able to include all the requested elements and only 4 teams missing some elements.

At the end of the implementation of the didactic sequence, a presentation of the projects was carried out in a sharing in which the students explained what the history of their video game consisted of and the events that occurred in the period they chose, at the end of their presentation. The students began to play the video games developed by their classmates and the teachers rated their product and its presentation with the project rubric, obtaining the following results.

This means that 95% of the students obtained a passing grade and only 5% did not obtain a passing grade.

Later, in the next history class, the evaluation was applied again with the 5 questions on the

topic developed with the video game.

In the comparison of these results we can notice that there was an increase in correct answers in all the questions, so we can assure that carrying out this activity in some students reaffirmed their knowledge and in other cases it was useful for them to identify some of the learning objectives that they They were unable to identify with the traditional class.

The results about their experience with the use of the Scratch tool to carry out the activities inform us that the majority considered it excellent, good and acceptable while 13% of the students considered it passable and only 1% considered it bad.

Regarding the responses about the students' motivation when developing the project, it was found that the vast majority considered it excellent, with 45% of the students responding that they felt motivated.

A survey was applied to the expert teachers that consisted of 25 questions with answers on a Likert-type scale from 1 to 5 to know their experience in the development of the project, with the values being 1=Poor, 2=Passable, 3=Acceptable, 4 =Good and 5=Excellent, with questions 15, 17, 18, 19 and 25 to know the level of satisfaction with the implemented strategy.

The results of the questions about the development of a video game as a history teaching strategy showed that teachers consider it acceptable in general and according to their response to question number 15, they considered that the ability to communicate and express through the created content was excellent.

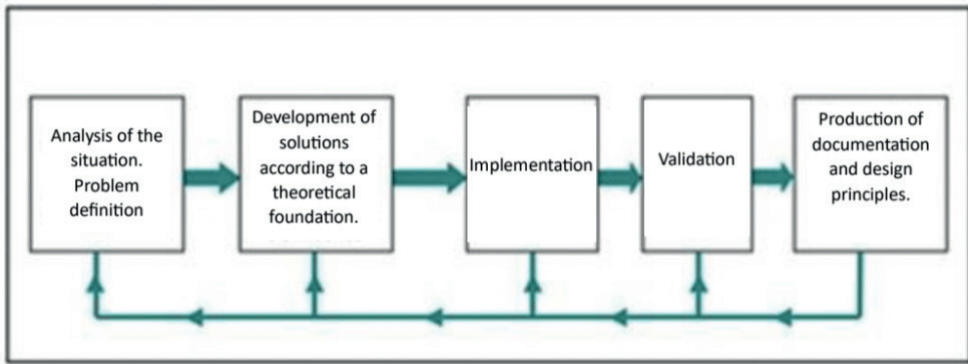


Figure 2

Development research process (adapted from Reeves, 2000 in Benito, 2006)

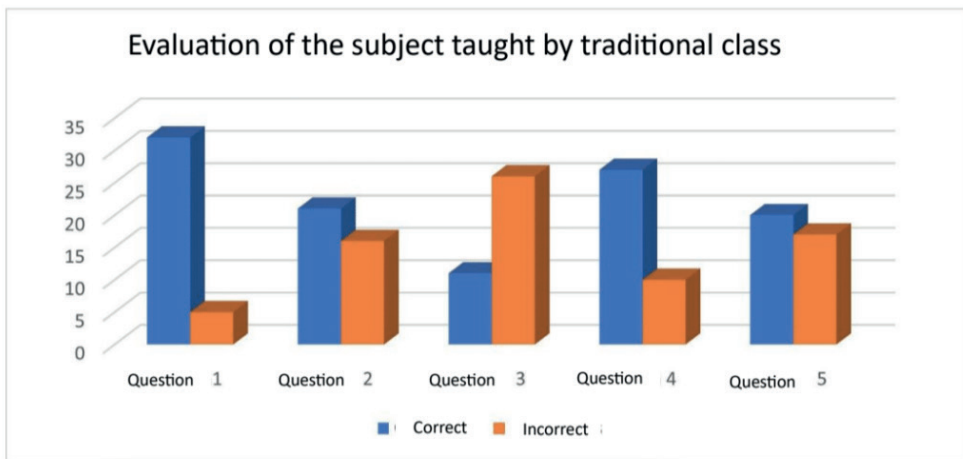


Figure 3

Graph showing the evaluation of knowledge of the topic taught in a traditional class

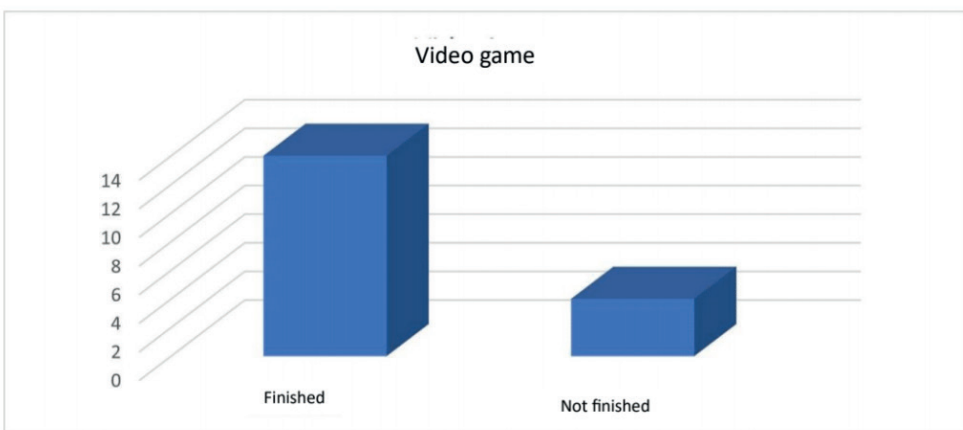


Figure 4

Graph on the results of the teams in their development of the video game

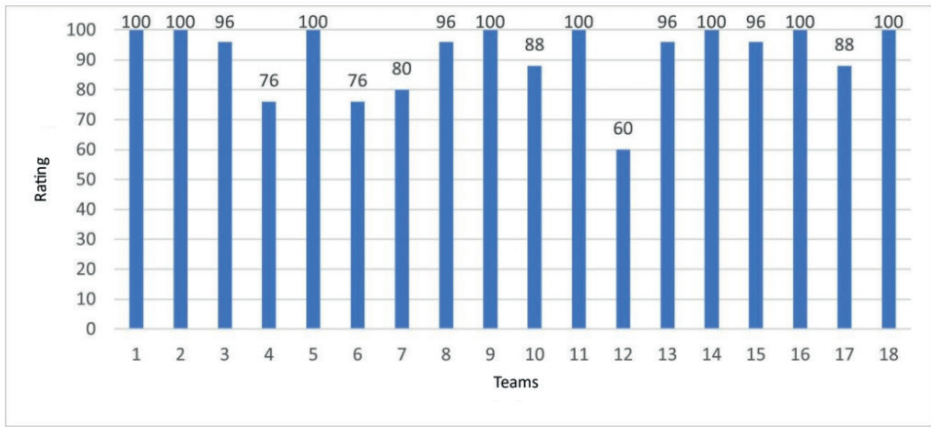


Figure 5

Graph of qualifications obtained by the teams in the development and presentation of the video game

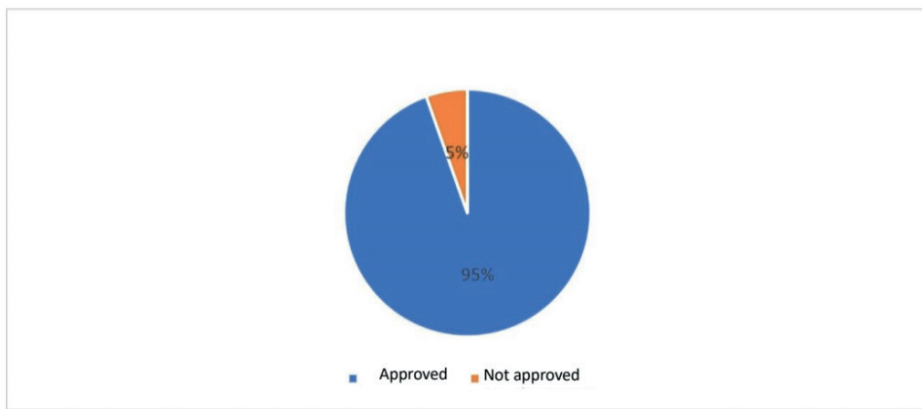


Figure 6

Percentage graph of approved equipment

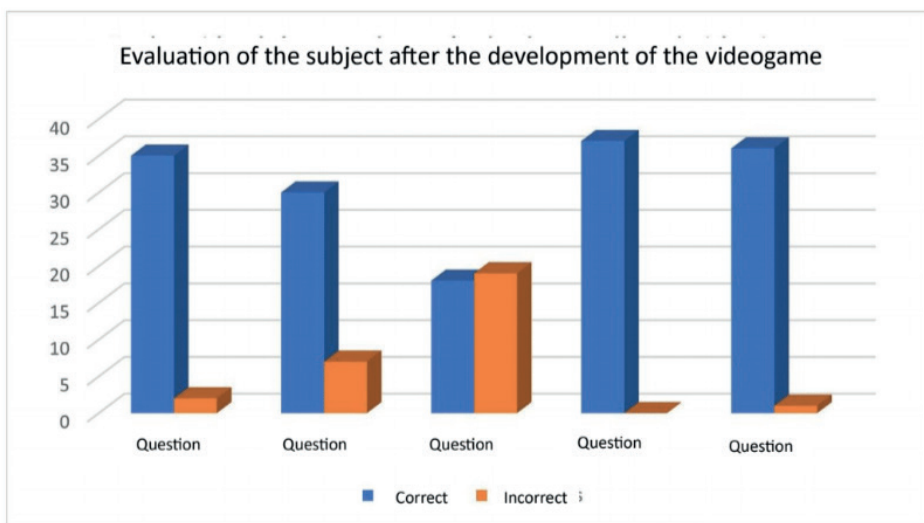


Figure 7

Evaluation graph on knowledge of the topic after the development of the video game

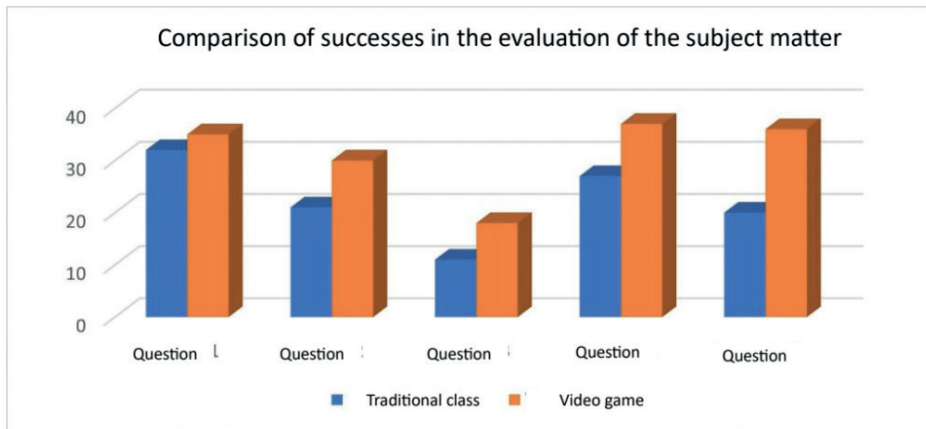


Figure 8

Comparative graph of diagnostic evaluation and final evaluation on knowledge of the topic

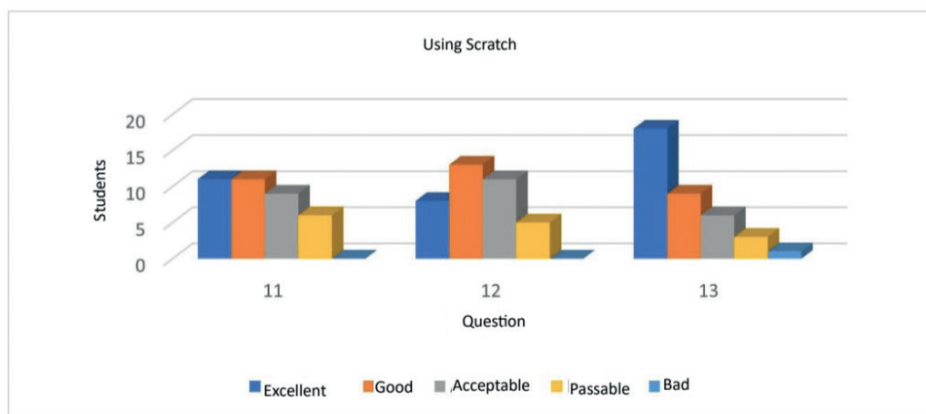


Figure 9

Graph showing the results of the questions to evaluate the students' experience with the use of Scratch in the development of the activities



Figure 10

Graph showing in percentage the results on the students' experience with the use of Scratch as a technological tool for the development of the video game

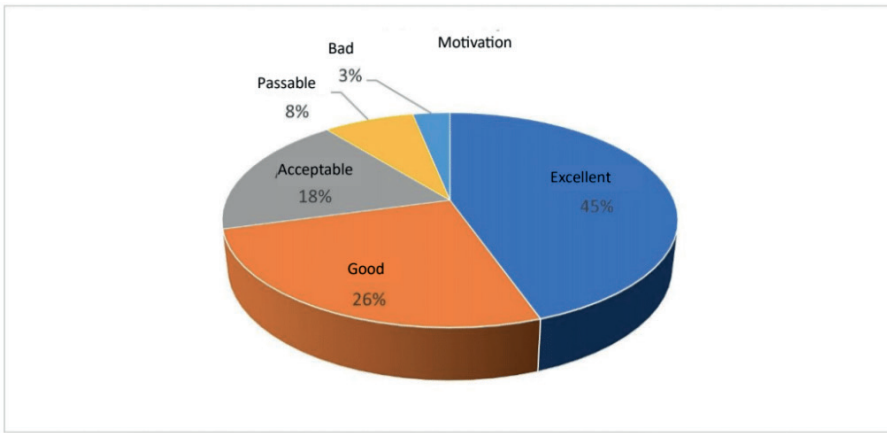


Figure 11

Graph showing the percentage of responses to the questions about the students' motivation in the development of the video game.



Figure 12

Graph showing teachers' responses to questions about the development of a video game as a history teaching strategy.

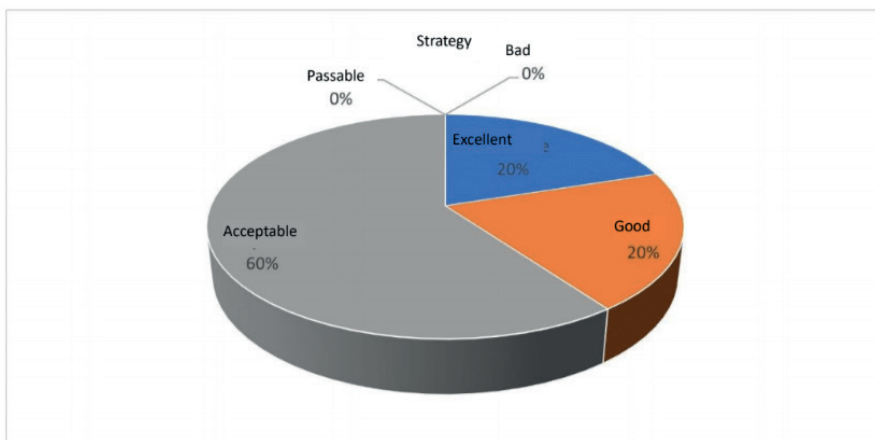


Figure 13

Graph showing as a percentage the teachers' opinion on the development of a video game as a history teaching strategy

DISCUSSION

In this research, when designing a didactic sequence for programming a video game as a history teaching strategy, it was found that the results obtained in the surveys show an 85% preference of students for the project carried out in comparison with traditional teaching and as for the teachers, 100% consider that they noticed greater motivation in the students, as well as greater participation. This means that when students carry out activities that involve the use of technology, games, design and creativity, they experience enthusiasm and motivation, which leads them to become more actively involved in learning history. These results coincide with Del Moral et al. (2017) in whose research it was concluded that educational video games can be a tool that enhances learning as long as it is closely related to primary curricular areas, as well as being a catalyst capable of activating multiple intelligences when the quality of the narrative, aesthetic and technical resources that it presents, also coincide with Sáez and Cózar (2017) who in their research conclude that a game-based approach enhances and allows satisfaction, fun and commitment together with perceived usefulness when working on science concepts. social. It is extremely important that both teachers and students have the basic technological skills for the implementation of the strategy since otherwise they would not be able to do it. In this sense, based on what was mentioned above and by analyzing these results, we confirm that developing a well-structured didactic sequence closely related to the history curricular plan using block programming as an educational technology tool can be used as a didactic strategy for teaching history. in primary school in such a way that when making use of technology, creating video games, they require the player to learn and think in a way that they are not used to,

modifying traditional teaching, motivating students to think in an active and critical way, concluding that if a student If motivated, significant learning can be achieved, which means that there is a long way to go in terms of research on how programming can be implemented as a teaching strategy in different areas of the social sciences.

CONCLUSIONS

We conclude with the results obtained that the use of technological tools, such as in this case a programming tool, can be used as a history teaching strategy in primary school as long as both students and teachers have basic technological skills, it is very important. that the teachers who are the experts in the subject are involved with the design of the didactic sequence attached to the curricular plan and with the knowledge of the operation of the technological tool to be able to use the facilities that the tool offers them in such a way that they lead them to achieve the expected learning. Finally, we consider that technological programming tools can be of great support to innovation in educational technologies at any level as long as institutions are willing to provide the necessary infrastructure and technological training to teachers so that they achieve the integration of pedagogical knowledge., content and technological.

REFERENCES

- De Benito Crosetti, B. y Salinas Ibáñez, J. M. (2016). **La Investigación Basada en Diseño en Tecnología Educativa**. Revista Interuniversitaria de Investigación En Tecnología Educativa, 0, 44–59. <https://doi.org/10.6018/riite2016/260631>
- Del Moral Pérez, M. E., Fernández García, L. C. y Guzmán Duque, A. P. (2017). **Videojuegos: Incentivos Multisensoriales Potenciadores de las Inteligencias Múltiples en Educación Primaria**. *Electronic Journal of Research in Education Psychology*, 13(36). <https://doi.org/10.25115/ejrep.36.14091>
- Díaz Cruzado, J. y Troyano Rodríguez, Y. (2013). **El potencial de la gamificación aplicado al ámbito educativo**. Universidad de Sevilla. Facultad de Ciencias de la Educación. <http://hdl.handle.net/11441/59067>
- Esteller, V. y Medina, E. (2009). **Evaluación de cuatro modelos instruccionales para la aplicación de una estrategia didáctica en el contexto de la tecnología**. Revista de Tecnología y Educación, 3(1), 57–70. <http://servicio.bc.uc.edu.ve/educacion/eduweb/vol3n1/art5.pdf>
- Gardner, H. (1983/1993). **Frames of Mind: The Theory of Multiple Intelligences**. Nueva York, EUA: Basic Books.
- Harris, J., Grandgenett, N., & Hofer, M. (2009). **Testing a TPACK-Based Technology Integration Assessment Rubric Developing and Assessing TPACK**. *Technology*, 2010(1), 3833–3840. <http://www.editlib.org/p/33978>
- Morillas, C. (2016). **Gamificación de las aulas mediante las TIC: Un cambio de paradigma en la enseñanza presencial frente a la docencia tradicional**. Universidad Miguel Hernández.
- Pertejo, J. (2017). **Programación gráfica y robótica para fomentar la competencia matemática**. [Tesis de fin de grado] Universidad Internacional de la Rioja. [https://reunir.unir.net/bitstream/handle/123456789/5717/PERTEJO LOPEZ%2C JUDITH.pdf?sequence=1&isAllowed=y](https://reunir.unir.net/bitstream/handle/123456789/5717/PERTEJO_LOPEZ%2C_JUDITH.pdf?sequence=1&isAllowed=y)
- Roncancio Ortiz, A. P., Ortiz Carrera, M. F., Llano Ruiz, H., Malpica López, M. J. y Bocanegra García, J. J. (2017). **El uso de los videojuegos como herramienta didáctica para mejorar la enseñanza-aprendizaje: una revisión del estado del tema**. *Ingeniería Investigación y Desarrollo*. 17(2). 36-46. <https://doi.org/10.19053/1900771x.v17.n2.2017.7184>
- Sáez López, J. M. y Cózar Gutiérrez, R. (2017). **Programación visual por bloques en Educación Primaria: Aprendiendo y creando contenidos en Ciencias Sociales**. *Revista Complutense de Educación*. 28(2). 409-426. https://doi.org/10.5209/rev_RCED.2017.v28.n2.49381
- Sánchez Pacheco, C., García Balladares, E. y Ajila-Méndez, I. (2020). **Enfoque pedagógico: la gamificación desde una perspectiva comparativa con las teorías del aprendizaje**. 593 Digital Publisher CEIT. 5(4). 47-55. <https://doi.org/10.33386/593dp.2020.4.202>
- Solano Nogales, L. y Santacruz Valencia, L. (2016). **Videojuegos como herramienta en Educación Primaria: caso de estudio con eAdventure**. TE & ET: Revista Iberoamericana de Tecnología En Educación y Educación En Tecnología. (18). 101-112. <http://sedici.unlp.edu.ar/handle/10915/58515>
- Torres Toukoumidis, Á. y Romero-Rodríguez, L. M. (2018). **Aprender jugando. La gamificación en el aula**. En R. García, A. Pérez y A. Torres (Eds.), *Educación para los nuevos medios*. (pp. 61-72). Abya-Yala.
- Valverde Berrocoso, J., Fernández Sánchez, M. R. y Garrido-Arroyo, M. C. (2015). **El pensamiento computacional y las nuevas ecologías del aprendizaje**. *Revista de Educación a Distancia (RED)*, 46(3). <https://doi.org/10.6018/red/46/3>