Proposal Information of Contribution 1807

Design and Programming Procces of an Educational Video Game in Primary Education

<u>Blas González-Alba</u>, Pablo Cortés-González, Deseada Ruiz-Ariza, Ana Carolina Alix-González, Moisés Mañas-Olmo
university of Malaga, Spain
Presenting Author: **González-Alba, Blas**

The incorporation of new technologies into the field of education has meant a transformation (Gómez-Galán, 2020) and a challenge for teachers. The continuous appearance of applications and technological devices requires teachers committed to their use and in continuous training.

In this context of technological innovation and even though there are many researchers and teachers who claim the enormous educational potential that video games have (Holbert and Wilensky, 2019) in psychomotor development (Liu et al., 2020), cognitive, communicative (Hartanto et al., 2018) and social (García et al., 2019), there are few formative experiences that use videogames as a learning tool in Primary and Middle School. In this regard, and as perceived in various investigations, the use of video games in schools contributes to the acquisition of content in subjects such as mathematics (Baek et al., 2020), language and literature (Gee, 2003), natural sciences, physics and chemistry (Baek and Touati, 2017), geology (Sharp, 2017) or social sciences (García-Fernández and Medeiros, 2019) and the improvement of memory (Jiménez and Díez, 2018) or attention and reasoning (Green and Seitz, 2015).

In this line, the so-called "serious games" are used because they have an educational purpose (Michael and Chen, 2006) that is characterized by contributing to the acquisition of curricular and attitudinal content (Del Moral et al., 2012). Likewise, the appearance in recent years of tools for the development of video games such as Game Maker, Torque Game Builder, Golden T Game Engine, The Game Creators or 3D Game Studio, among others, have allowed people not to create video games. professionals (Denner et al., 2012), that is, it allows them to perform the functions of designer, scriptwriter and programmer (Robertson and Howells, 2008).

Also the studies by Robertson and Howells (2008) and Vos, Van der Meijden and Denessen (2011) point out the benefits it has in the development of computational and creative thinking, expressive capacity, imagination, complex and systematic thinking, design skills, programming and digital storytelling, In the school, research such as Maloney, Peppler, Kafai, Resnick and Rusk (2008) or Wilson, Connolly, Hainey and Moffat (2011) in which students have used the Scratch software and the software developed by Kahn (2004) stand out. with the ToonTalk app.

This contribution collects an experience of creating a "serious game" video game in a multilevel classroom of a rural school located in the province of Malaga (Spain) during the 2018/19 school year. We have used a qualitative methodology with the objective of knowing the limitations, weaknesses and potentialities inherent to a project of this complexity and to analyze the perceptions, learning and educational experiences of the students,

Methodology, Methods, Research Instruments or Sources Used
In order to answer the research questions and establish a logical link between the aims and the procedure we have proposed a qualitative evaluation based on a case study. To specify this, we have used interviews, documentary review, participant observation and focus groups discussion with the purpose of using multiple methods to collect information -method triangulation-.

Considering this research approach, the aims of the present study are:

- Know the limitations, weaknesses and strengths that the teaching staff pose to develop an educational video game in a Primary Education classroom in Andalusia.
- Analyze the perceptions, learning and educational experiences of the students.
- Evaluate the role of external agents in the development of video game design and making experience in the mentioned primary school.

Throughout the 2018/19 school year, we conducted in-depth interviews, focus groups discussion and meetings with the participants (teachers and students), with the aim of having in-depth information from all the agents involved. The research was developed in two phases, in which a total of 12 interviews and six discussion and reflection groups were carried out. We used audio recorders and making field notes during observations as data collection instruments.

During the first phase, we visited the primary school five times (October and December 2018-, February, March and April 2019). During these meetings (1) the students were observed working on the video game; (2) in-depth interviews were conducted with the teaching staff; (3) focus group discussions were held with the students.

In a second phase, and once the field work was completed -May and June 2019-, we went to the school three times again, with the aim of conducting (1) an in-depth interview with each of the students and teaching staff; (2) a focus groups discussion with the teaching staff (3), a final feedback session and focus groups discussion with the students and the teaching staff.

Once the fieldwork-transcription-return process was completed (October 2019), and with the Nvivo software in its

version 11.0, both researchers have categorized the texts into thematic blocks (November-December 2019) following a deductive process- inductive (Strauss and Corbin, 2002) for the construction of emerging and common analysis categories -descriptive-

Conclusions, Expected Outcomes or Findings
Considering (a) the proposed aims, (b) the analysis and interpretations derived from this work, and, (c) the linking from the research questions with the research conclusions, we think that it is necessary: (1) to expand the offer and improve the quality training of teachers -initial and continuous- in relation to the use of educational technology in general, and videogame design and programming tools in particular; (2) to increase educational actions that promote the design and programming of video games in schools; and, (3) promote the development of projects that promote the participation of agents in and outside the school and multidisciplinary professionals.

In accordance with the objectives set out in this research, these three axes show us some of the limitations, potentialities and challenges of developing a project as complex as the design and development of an educational video game in a Primary Education classroom.

Considering these dimensions and despite the fact that tools such as Game Maker, Torque Game Builder, Golden T Game Engine, The Game Creators or 3D Game Studio allow students to create their own video games, the main conclusion of our study is that we need programming tools with virtual work environments adapted to the capacities of primary school students.

However, and according to the results, the educational innovation and transformation process requires pragmatic, expanded, shared, active, flexible, holistic and transversal educational micro-actions that allow us to overcome an educational model anchored in the curriculum and in more traditional teaching. The creation of the video game "Las prehistóricas aventuras de Daniela" responds to a particular educational experience that challenges the school to be a space permeable to other experiences, and other actors, in which knowledge is also, and must be constructed and shared under an integrating logic, cooperative and transdisciplinary platform.

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