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Abstract:

In an already fully digitalized and virtualized world like the one we live in, innovation in education increasingly involves introducing ICT into the teaching-learning process. Thus, it could be said that some of the priority challenges facing our society are digital education and the development of digital skills. Virtual reality, perhaps our newest medium, is only just becoming established in our daily lives, and yet it already offers a wealth of options for teaching a wide range of disciplines.
This article aims to explore some of the possibilities of using virtual reality in the educational context, and more specifically in the field of language and literature teaching. To this end, the RTVE and Iralta VR Cervantes VR app is presented as a case study. The aim of the app is to bring the life and work of Cervantes, and specifically his work Don Quixote, closer to the general public. It will be clear throughout these lines, therefore, how virtual reality is presented as a valuable resource for its use in active teaching methodologies such as gamification, and we will try to contribute to consolidate it as a possible effective teaching tool.

Resumen:

En un mundo ya plenamente digitalizado y virtualizado como en el que vivimos, la innovación en materia educativa pasa cada vez más a menudo por introducir en el proceso de enseñanza-aprendizaje las TIC. Así, se podría decir que algunos de los retos prioritarios de nuestra sociedad son la educación digital y el desarrollo de competencias digitales. La realidad virtual, quizás nuestro medio de más reciente nacimiento, apenas está consolidándose en nuestra vida cotidiana, y aun así son ya numerosísimas las opciones que ofrece de cara a la enseñanza de muy distintas disciplinas.
El presente artículo pretende explorar algunas de las posibilidades del uso de la realidad virtual en el contexto educativo, y más específicamente en el ámbito de la didáctica de la lengua y la literatura. Para ello, se presenta como caso de estudio la aplicación de RTVE e Iralta VR Cervantes VR, cuya voluntad es acercar la vida y obra de Cervantes, y en concreto el Quijote, al público general. Quedará patente a lo largo de estas líneas, por tanto, cómo la realidad virtual se presenta como un valioso recurso de cara a su empleo en metodologías activas de enseñanza como la gamificación o ludificación, y se intentará contribuir a consolidarla como posible herramienta eficaz de enseñanza.

Keywords:
Virtual reality; teaching-learning process; language and literature teaching; gamification; Quixote.

Palabras claves:
Realidad virtual; proceso de enseñanza-aprendizaje; didáctica de la lengua y la literatura; gamificación; Quijote.

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1. Introduction

The 21st century has ushered in significant innovations in education, including new methodologies promoting active student involvement and the integration of ICT into the teaching-learning process. While gamification is feasible without technological tools, the natural synergy between gamification and digital tools has been remarkably evident. Regarding this issue, Miguélez -Juan et al. (2019, p. 158) defend the following:

> Innovation in education is not only about introducing more technology into a greater number of classrooms (Shleicher, 2015). ICT in itself does not lead to any innovation in education and learning (Coll & Monereo, 2008) nor does it ensure effectiveness in student learning. ICT, above all, must offer the possibility of teaching and learning in a new and different way (Coll, 2019). It is its correct application and use that is vital for students to acquire the appropriate skills to face the demands of a terribly competitive globalized world. Educational centers have been configured as the main places to teach and learn (Gee, 2018), but they are no longer the primary source of learning.

In the current ICT context, the most recent revolution is arguably the emergence of virtual reality (VR), predicted to have a prosperous future. However, it is still in its experimental phase, particularly in everyday contexts. Notably, in Spain's cultural and educational realm, the RTVE Lab has been producing accessible VR content since around 2015. This includes the Cervantes VR application (2017), which will be thoroughly analyzed in this study, exploring its potential in the teaching-learning process of Don Quixote, with a focus on secondary school students.

2. Education and virtual reality

Gamification is an active teaching methodology, with the term coined by Nick Pelling in 2002. Though not widely popular until the new millennium, it wasn't fully standardized until 2011 when Deterding, Dixon, Khaled, and Nacke provided a definition. Presently, the RAE (Real Spanish Academy, hereafter RAE) recommends using the term "ludificación" (gamification) in Spanish. The Dictionary of the Spanish Language defines "ludificar" (to gamify) as applying game techniques to non-recreational environments to enhance motivation and learning (Royal Spanish Academy, n.d.). Regarding this, Martí Climent and Garcia Vidal (2021, p. 110) state:

> But gamification or ludification is not new in education. The use of games as an educational resource has always existed. Piaget (1961) and Vygotsky (1933, 1966) already defended the use of elements of play in education as a learning strategy, an instrument for the child's mental development, highlighting that it helps create worlds of imagination.

Gamification, like any other innovative methodology in education, aims to enhance learning, specifically by creating a more engaging experience for students through game-like elements. Analyzing the situation reveals that the integration of entertainment into learning has been common in traditionally considered subjects such as Physical Education, Plastic and Visual Education, or Music. While the recent pandemic has led to a proliferation of digital and virtual resources across all curriculum subjects, noteworthy examples of successful gamification-ICT integration existed even before the pandemic. Examples can be found in works such as Sánchez Rivas et al. (2017), Guardia Hernández and Pesqueira Zamora (2017), Ternero Fernández (2018), Carrión Candel (2018), Quintero González

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et al. (2018), etc. The inevitable union between ICT and gamification is reinforced by the continued global growth of the video game industry each year.

> New educational trends integrate active and participatory methodologies where students acquire a dynamic stance in their learning. In this sense, gamification emerges as a tool for educational transformation. Furthermore, current students belong to a generation that handles digital tools with great ease, knows how the world of social networks works and is used to performing several tasks simultaneously with the support of technology. As Ríos, Muñoz, Castro and Arroyo (2019) point out, several authors have shown that the way this generation learns is conditioned by their technological culture and that they want to actively participate and control their training. (Martí Climent and Garcia Vidal, 2021, p. 110)

Prensky (2010) advocates the concept of digital natives, referring to 'native speakers of the digital language of computers, video games, and the Internet' (p. 2), namely current students who 'have spent their entire lives surrounded by [...] toys and tools of the digital age' (p. 1). In contrast, Gubern (1996, p. 180) defines virtual reality as 'a perceptual illusion that acquires the status of pseudo reality within a reality eclipsed by it. [...] A simulation that includes the subject itself and its topological location in a simulated three-dimensional space.' Virtual reality has been employed for decades in military and aeronautical training, and more recently in fields like medicine. Notably, it occupies a significant space in the video game sector for high-performance equipment. In education, its integration is in its early stages, hindered by the high cost of technical productions and a lack of training among involved parties. Hence, experiences designed for more affordable cardboard-type glasses, such as Cervantes VR, are gaining traction. These glasses are cost-effective, often constructed from cardboard or inexpensive plastic, featuring two lenses corresponding to the mobile device screen division in VR mode.

In the national production of virtual experiences accessible to the general public due to ease and affordability, the work of RTVE Lab stands out. Their website features a section exclusively dedicated to virtual reality, complemented by a mobile phone application, RTVE RV 360, collecting these works. The app is described as a space hosting experiences "of an informative and entertaining nature – to be experienced in first person by looking around, moving the device, or sliding your finger on your mobile or tablet, or using your phone in "VR mode" with virtual reality glasses" (RTVE Corporation, n.d.).

Based on Janet Murray's (1999) previous categories of immersion – "the feeling of being surrounded by a completely different reality" (p. 111) –, performance – "when our actions have visible results" (p. 139) – and transformation – "it offers us countless opportunities to change" (p. 167) -, Gil González (2020, p. 322) establishes a model for classifying experiences for virtual reality as immersive ("sensory immersion in a virtual environment"), interactive ("capacity for action and interaction with fictional objects and agents") and narrative ("capacity to choose between different possibilities, paths and even narrative outcomes"). Except for a couple of complex productions aimed at higher performance equipment such as transmedia content for the television series *El Ministerio del Tiempo*, RTVE's projects are, for the most part, immersive, stereoscopic, 360º videos whose experimentation can be carried out from the usual devices such as a computer, a tablet and a mobile phone, or with

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the incorporation of the latter to a *cardboard* style viewer. This includes them mostly in the category of immersive virtual experiences (Gil González, 2020), since the users live the experience firsthand, feeling involved in the interaction, although decision-making is limited to choosing where to look or focus attention.

Cervantes VR app

Cervantes VR is a project launched on April 23, 2017, in commemoration of Book Day and the Fourth Centenary of Cervantes's Death. Developed by RTVE Lab in collaboration with Iralta VR and subsidized by the Spanish Ministry of Education, Culture, and Sports, the application allows users to access its content directly on their mobile devices or through the VR option. For the latter, users can use cardboard and download the program from the App Store and Google Play or opt for more specialized glasses like Gear VR or Gear Go through the Oculus store. This experience employs a combination of theatrical, virtual, and immersive techniques, along with animations and digital illustrations to "describe the life of Cervantes, his thoughts, works, and characters, as well as some of the mysteries surrounding his life" (Iralta VR, n.d.).

> An app with stories and characters, landscapes and cultural heritage surrounded in 360º-3D with 360º binaural sound and that you can enjoy in a virtual, immersive and interactive way. The viewer will travel inside the mind of Cervantes, to his overflowing imagination and to the very moment of the creation of his characters Don Quixote and Sancho. We will live an incredible adventure in the Spanish Golden Age. We will discover from the hand of Miguel de Cervantes some of the scenes of his life: Alcalá de Henares, the battle of Lepanto against the Turks, the prison of Algiers or his fight against the giants. Cervantes VR is an entertainment and educational App that seeks to bring the figure of Cervantes closer to the public and facilitate the reading of his work supported by the humor and humanity of his characters. (Iralta VR, sf)

After launching the application, users encounter a menu prompting them to choose their preferred viewing mode: either the standard mobile device usage or the option involving attachment to virtual reality glasses and pairing with headphones, enabling the enjoyment of stereoscopic/3D imagery and 360º holophonic sound. Once this choice is made, the immersive experience begins. The foreground features the figure of Cervantes seated at a desk, joined by actors portraying Don Quixote and Sancho Panza. The three engage in a conversation, addressing both themselves and the viewers. In an effort to enhance immersion, the characters directly interact with users through words and gaze, breaking the fourth wall and creating a shared space. After this introduction, a series of icons appear, allowing users to navigate in the order they choose through different episodes available in the application. These episodes provide insight into the life and work of the most renowned writer in our literary history.

This distinctive approach to Cervantes comprises six clearly delineated episodes in the initial menu. Starting with his house in Alcalá de Henares, the application delves into the writer's biography, provides a brief contextualization of his historical period, detailing aspects of both his contemporary society and the recognized Golden Age. Additionally, fundamental information necessary for a proper understanding of his writings is included.

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Among the episodes, the Battle of Lepanto is one of the two chapters represented with computer-generated images. It offers insights into Cervantes' participation in the battle, during which he lost the mobility of his left hand. Another segment focuses on the iconic windmills episode, featuring a narration of the relevant part of Don Quixote with character voices and digital images superimposed on an actual recording in a mill field. The recreation of Cervantes' time spent captive in Algiers involves digital images and a voice-over by the actor portraying him reflecting on freedom.

A theater scene depicts an actor rehearsing one of Cervantes' works, introducing information about other literary genres cultivated by the writer, his jealousy, and rivalry with Lope de Vega. Finally, the application explains the characteristics that define Don Quixote as the first modern novel, presenting and characterizing its two most famous characters, Don Quixote and Sancho. This elucidates the contrast between the two, exemplified through fragments of the work performed by the actors in this virtual experience. The overall duration of approximately 20 minutes is strategically designed to mitigate potential side effects of VR, such as dizziness.

Cervantes VR offers a fully immersive experience, allowing students to explore various environments on a journey with Cervantes, Don Quixote, and Sancho Panza. The dialogues often consist of fragments from both Don Quixote and other works by the author, recited by different characters. Similar to the increasing relevance of audiobooks in recent years, this represents an original and enjoyable method of introducing young individuals to the essence of literary texts. In fact, due to the natural conversations of the actors and the immersive environment facilitated by the glasses and headphones – representing the Golden Age – users may not fully realize or might overlook the explicit literariness of the experience.

Certain tactics and resources, such as incorporating fragments of Cervantes' work through dialogues, may go unnoticed, yet they showcase the attention and care invested in the application's development. Presumably, these elements will linger in the imagination of young people, forming a solid foundation for acquiring more detailed and conscious knowledge. For instance, in scenes like the one set in the writer's old house, Sancho's questions, mirroring events in Don Quixote, guide the actor portraying Cervantes in presenting information about that episode. This approach transforms the transmission of knowledge into a more playful form through dialogue.

Overall, this method effectively prepares students to immerse themselves in classic works or kindles their interest in them. Beyond the setting and dialogue style, the characters themselves contribute to the isolation from the real world, fostering a connection to the virtuality and an exploration of the life and work of Cervantes. Despite the lack of true interactivity, a characteristic not entirely absent in this work either, users have the freedom to create their own viewing layout. Although the narrative lacks objects or characters for direct interaction, users can choose the order in which they watch the episodes from the initial menu. Only after exploring the six main icons does the seventh and final one unlock, previously visible but inaccessible.

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4. Towards the teaching-learning of literature through the use of virtual experiences

At this point, the implementation of virtual reality in the classroom as a gamification resource seems a feasible fact, to say the least. This is what Miguélez -Juan et al. (2019, p. 159) present:

> The economic reason why until now this technology was out of reach of educational centers (Andolsek, 1995; Riva, 2003) and the poor design of virtual learning environments (Chen, Toh & Ismail, 2005) already belong to the past. The possibilities of VR as a useful instrument in the educational field are becoming increasingly stronger. Currently, a viewer, a smartphone, an Internet connection and applications aimed at different educational levels that are designed to improve student learning are required (Molina-Carmona et al., 2018). Various authors confirm the improvement in the assimilation of content and the rapid growth of the learning curve by applying virtual environments in education (Vera- Ocete, Ortega-Carrillo & Burgos-González, 2003). […] Students learn in various contexts and situations, even without being aware of it, in a playful and social way.

Some might consider the lack of interactivity, as discussed in previous sections and reiterated by other authors in relation to virtual experiences with viewers and mobile devices, a potential weakness. Perspectives, such as Carlos A. Scolari's (2022), argue that "after half a century of video games, any immersive digital production should incorporate this "grammar of interaction," and that "entering into an immersive world and not being able to explore it is frustrating." However, in the specific context of education, this limitation might serve as an opening for their initial integration into classrooms and individual homes.

Virtual reality in the form of videos and stereoscopic 360° content without additional motion controllers faces challenges in providing a truly interactive and participatory experience. While users can explore the virtual environment, their collaboration and dialogue with the interface remain limited. However, this simplicity works in its favor, making it more accessible and affordable for classrooms or leisure hours with 25 students.

Furthermore, gamification characteristics are not entirely lost in these environments. The lower cost of equipment and content production, along with the continued surprise factor of immersion, are favorable aspects. Despite the current limitations, this nascent technology has the potential to reinvent itself by exploring new forms, techniques, and resources that captivate users.

In general, virtual reality is a medium in its infancy, seeking foundations to establish itself, and evolving rapidly alongside technological advances. The production of less ambitious projects of this nature remains beneficial in educational contexts and for pedagogical purposes, particularly in constrained situations, at least for the present moment.

Now, in addition to the viability of virtual reality as a tool in the literature teaching-learning process, several factors support its use. The motivation and increased engagement obtained through active and participatory methodologies, along with the integration of ICT in the classroom, are indisputable. This aligns with the definition of gamification provided by the RAE, as mentioned at the beginning of this work. Indeed, this innovation facilitates significant learning, as students not only have fun experiencing it but also enjoy feeling like protagonists of discovery. Learning through exploration is encouraged.

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Furthermore, virtual reality, with its constitutive characteristic of immersion, can elicit emotional involvement in the experience, introducing feelings and emotions into the teaching-learning process. Murray (1999, p. 21) previously argued that "new technologies extend our capabilities faster than we can assimilate" and emphasized that "the computer promises to give a new form to knowledge, sometimes complementing and sometimes replacing the work of the book and the class" (p. 22). Decades later, this issue remains central to the debate.

As Moreno Martínez et al. (2018, p. 142) contend, "machines, technology, robots, are means, instruments that facilitate our work of creation, communication, interaction, discovery, problem-solving, and access to unlimited information (big data) to build our knowledge autonomously or independently, collectively in a network (connectivist model) to eradicate the digital divide." While educational innovation must be considered in the teaching profession, it is not intended to replace traditional procedures but rather to serve as a complementary support.

Projects like Cervantes VR can be invaluable aids for Spanish Language and Literature teachers. These teachers are tasked not only with transmitting the basic knowledge established in the curriculum on the History of Literature but also with encouraging text reading and promoting Literary Education through various media. As stated in the previous section, this specific application not only provides relevant and necessary information about the context and the author's work to appreciate, potentially encouraging future reading, but also introduces users to the texts themselves without requiring direct engagement with them.

Another crucial aspect of employing virtual reality in the literature classroom is noteworthy: its inevitable expansion towards transversal and interdisciplinary knowledge. Take Cervantes VR, for instance. It proves beneficial not only for teaching Spanish Language and Literature but also, through the immersive experience it offers, students acquire extensive knowledge related to the author's era. This, in turn, enhances their understanding of subjects such as Geography and History, Technology and Digitalization, Philosophy, among others.

Moreno Martínez and Leiva Olivencia (2018, p. 530) assert that "applications based on augmented reality and virtual reality [...] offer the possibility of visiting historical places, meeting characters and works from past eras, and studying objects very difficult to achieve in reality. This environment allows students to carry out their fieldwork, interacting with elements generated virtually." Although the authors initially present this idea in the context of teaching Art History, it is easily applicable and extendable to various other areas and subjects.

To successfully implement this learning method in classrooms, it is imperative to educate not only with new technologies but in new technologies. Digital natives must develop genuine digital competence, avoiding becoming technologically illiterate individuals who use the Internet through various devices without understanding the impact of their actions and the true potential of these tools for both consumption and creation.

Educating in content and skills contributes to achieving comprehensive education, preparing individuals for all aspects of life. Naturally, teachers must also be technically prepared. Digital competence is a necessary requirement in both directions, as teachers serve as role models, projecting the

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principles they hope to instill. It will be difficult to guide students if you do not have the necessary skills. This is how Espot and Nubiola (2019, p. 121) explain it:

> Investment in new technologies continues to grow in schools. It goes without saying that you have to know how to make good use of screens (laptop, tablet, mobile) in the classroom or in personal study time, it means - among other things - overcoming the temptation to give the Internet a non-academic use in those spaces of time dedicated to learning; We are referring to checking email or messaging of any kind, entertaining yourself on social networks or video games, browsing sites not related to the class subject, to give a few examples. In this sense, teachers must help students – young people and adolescents – to be hardworking and responsible in the classroom and in their individual personal study. The good use of screens seems excellent to us, if it is used for what it is: another resource for learning. It should not take over – or even displace – the wonderful and, above all, *human* teaching task of the teacher both in the classroom and outside of it.

The role of the teacher in the face of advancing ICT is indeed a key consideration. Writers such as Prensky (2011) advocate for a pedagogy of co-association in which "the teacher's job consists of acting as a counselor and guide in the use of technology for effective learning" (p. 14). The author supports the idea that, in this type of teaching-learning process, it is essential for teachers to understand 'how technology can and should be used by students to improve their own learning' (Prensky, 2011, p. 14), perhaps not so much that teachers already possess the skills to do it themselves, at least in the initial stages we find ourselves in.

Undoubtedly, not everything is an advantage when it comes to virtual reality, in the classroom and outside of it. There are a series of drawbacks that, however, should not dissuade teachers from implementing them, such as the expiration of support and software updates of the content and resources used, so little can be done other than regularly renewing the tools that are available. The case analyzed here, *Cervantes VR*, is a model in terms of the necessary costs for educational innovation in relation to ICT, since, as it has been indicated throughout these pages, it only needs a mobile phone and a virtual reality viewer, which can be more rudimentary, made with cardboard, or more technical, based on good quality plastics.

However, in the course of this article writing (October 2022), it has shown some operating problems during its testing in its versions for the last Android and iOS device models. These problems do not seem to have extended, for the moment, to the software programmed for Oculus and only time will tell if RTVE, which is committed to free access software and whose content is, therefore, easily accessible, solves the compatibility failures with new systems and devices or considers the 2017 content as obsolete. Neither now nor in the near future, at least, can we completely depend on this type of support, since they are, in essence, support for the teaching task, but never substitutes for the teacher's work as an element of transfusion and explanation of the knowledge.

5. Conclusions

In 2023, teachers must adapt to the prevailing social reality and the circumstances, situations, and characteristics of their students. The evolution of education and the emergence of new student generations necessitate innovative learning methods that incorporate active, participatory methodolo-

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gies, as well as technological resources and tools. This requires concerted efforts from various levels of the school organization, with a particular focus on faculty members. The teacher of 2023 should strive for continuous updating and curricular innovation. While adopting technologies like virtual reality is not a standalone solution, their integration supports meaningful learning, aligning with students' reality and interests. The ultimate goal is to fully educate students, providing them with the necessary tools for both academic and professional success, as well as navigating real-world challenges.

In summary, this analysis aims to demonstrate the functional and beneficial aspects of employing methods such as gamification and resources like virtual reality in and outside the classroom for the teaching-learning process. The options in 2023 are numerous and more accessible than ever. The future promises rapid advances, necessitating preparedness. It is crucial to solidify these methods and tools as effective means in the education of young people, normalizing their use and fostering education on their responsible utilization in the classroom.

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