VIRTUAL AND IMMERSIVE LEARNING ENVIRONMENTS USING ARTSTEPS:
EXPLORATORY STUDY WITH TEACHERS

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ABSTRACT

ArtSteps is an immersive virtual exhibit tool that is attractive and versatile; the user can present objects, artefacts, and art, whether it is work they have created or found in public resources. This paper presents an exploratory study on digital teacher empowerment using ArtSteps to promote innovative pedagogical methodologies involving Virtual and Immersive Learning Environments. The study involved thirty-five professors from different subject areas. The study was a qualitative and quantitative investigation aimed at understanding how virtual and immersive learning environments such as ArtSteps can promote teachers' engagement and whether teachers are receptive to using virtual environments and immersive environments in their professional practice with students. Findings suggest that teachers are receptive to introducing virtual learning and immersive environments in their teaching practice with students. Teachers' exploration of ArtSteps involved them in a virtual and immersive learning experience that motivated them to experiment with their students. A didactic proposal promotes an immersive gallery experience where different types of work can be showcased and viewed using curriculum content.

KEYWORDS

Virtual Environments, Immersive Environments, Virtual And Immersive Learning Environments, Projects, ArtSteps.

1. INTRODUCTION

In an educational context, several digital tools have emerged that allow the use of Virtual Reality and Augmented Reality applied to education. The evolution of digital resources in Virtual Reality has improved the experience of simulation and interaction in real-time, which can be used in multiple sensory channels to facilitate learning by the student. Several technological tools have also emerged that allow students to experience Augmented Reality, putting them in contact with an interface that superimposes virtual objects on the student's physical environment. The student can interact with the virtual objects and use technological devices to visualize the mixed climate in real-time. It is, therefore, relevant to adopt different forms of teaching, attending to individuals with appropriate pedagogical interventions to raise the level of learning. Our article arises in this context and describes an in-service training course for teachers from different education levels. The training course was conducted in eLearning and involved thirty-five teachers. This training course aimed to promote innovative pedagogical methodologies involving Virtual and Immersive Learning Environments (VILEs).

The article introduces the concept of virtual and immersive learning environments and briefly introduces ArtSteps as a virtual gallery, an immersive and virtual learning tool. Then we present the methodology adopted in the exploratory study and its description. Finally, we present a brief discussion of the results, main conclusions and some proposals for future investigations.

2. VIRTUAL AND IMMERSIVE LEARNING ENVIRONMENTS

The proliferation of Virtual Worlds in different fields has also enabled their insertion into the educational field, from which new possibilities for using these computing resources emerge as an element of support and even motivation in the educational process (Voss et al., 2014). The Virtual and Immersive Learning Environments (VILEs) encapsulate all the online environments that constitute learning situations that are constructed using various techniques and software tools, including game-based learning, simulation-based learning and virtual 3D worlds. In our study, an immersive learning environment is a learning space but with forms of virtual learning. They are distinguished from other learning methods by their ability to simulate realistic scenarios and environments that allow learners to practice skills and interact in a real-life environment.

The ArtSteps virtual gallery is a web-based application for viewing and creating virtual exhibitions. It is helpful for artists and art organizations to model actual and virtual exhibits. In our study, we used ArtSteps, a freely available application that allows the development of 3D virtual learning environments (Fokides & Sfakianou, 2017). The ArtSteps is accessible through the link (http://www.artsteps.com/). Through this tool, we promote with a group of teachers the use of innovative pedagogical methodologies involving Virtual and Immersive Learning Environments. It is accessible via a web browser, and through an individual registration, the user can access their works in progress or completed without any additional software requirements. The virtual and immersive learning environments built through ArtSteps may include 2-dimensional items like photos and posters or 3-dimensional items like small installations or streaming videos. ArtSteps is an innovative, web-based application that empowers creators to build virtual exhibitions, virtual events and a virtual storytelling environment. It allows a wide range of combinations of virtual learning environments, such as (i) exploring and discovering art in 3D virtual galleries; (ii) creation and design of your 3D virtual exhibitions; (iii) embedding and distributing your digital creations on blogs or websites (Gimnazială & Turda, 2017). Using ArtSteps is relatively easy; the users can design their own spaces and rooms and add information to them through web links, text, audio and video (Fokides & Sfakianou, 2017).

3. METHOD

This study occurred during the COVID-19 pandemic, where in-service training course for teachers took distance classes through videoconferencing platforms. This work presented an intensive in-service training course for Portuguese teachers. The study has been developed using a quantitative methodology through quasi-experimental research designed around the idea of digital teacher empowerment in immersive and virtual environments with ArtSteps. The teachers answered a diagnostic questionnaire to understand their knowledge about virtual learning environments, immersive environments and their perceptions about integrating these pedagogical methodologies in an educational context.

In a subsequent phase of the training course, the teachers designed and created their pedagogical resources in Artsteps. At the end of the process, the teachers answered a questionnaire with which we intend to compare answers and understand the evolution of teachers in understanding the methodology of Virtual and immersive learning environments in education. In our study, we guided students through the following procedure: (i) teachers made a knowledge diagnosis; (ii) are involved in an activity that involves using ArtSteps as resource users; (iii) students investigated solutions to solve the problem; (iv) each teacher builds a resource, a 3D gallery on ArtSteps; (v) teachers tested resource in own students and (vi) teachers made a final reflection about the pedagogical methodology. In the first training moment, the teachers experienced ArtSteps as technology users (Figure 1).

Figure 1. Pedagogical resource created in ArtSteps in exploitation by teachers

Teachers were challenged to design and develop a pedagogical resource for their subject area in ArtSteps. The process was mediated by the Zoom platform and the ArtSteps web-based app, which supported all phases of the process described above to communicate with teachers. Different methods were applied to collect the data: (i) system logs on the platform, (ii) a diary to collect direct observations, (iii) a diagnostic and final questionnaire.

4. RESULTS

The diagnosis showed that teachers most of the teachers involved (56%) did not know and had never heard of immersive learning environments. We noticed that some of these teachers had already heard about virtual reality (44%), but few had heard about augmented reality applied to education (18%). Most teachers who claimed to have heard about immersive environments applied to education never used them in their professional practice (82%). Only a few of these teachers claim to have used virtual reality (15%) or augmented reality (6%) in their classes with students.

All teachers (100%) were receptive to using ArtSteps, and they learned how to create a project in ArtSteps from templates available in the application and how to structure and assemble a new project from scratch. In addition, each teacher designed a Virtual and immersive learning environment to implement in their students and created a pedagogical resource in ArtSteps to work on a curricular theme in their subject area.

In the final reflection, all teachers admitted that using virtual and immersive environments in an educational context can motivate students to learn. Also, all the teachers involved stated that they consider that using virtual and immersive environments can promote active learning of the contents by the students, leading them to have a more active role in their education. The use of virtual learning environments enhances understanding and, at the same time, creates opportunities for students to interact socially and apply knowledge in situations that are close to real (Vieira & Brazão, 2022). We noticed that some of the teachers involved (13%) say that they do not find a reason to start using immersive virtual learning environments in their classes. However, it is also verified that all the teachers involved (100%) intend to use virtual and immersive learning environments in future classes as a motivating factor for their students. All teachers (100%) consider that using VILEs environments can promote active learning of the contents by the students. From the teachers' answers, we also noticed that a part of the teachers (37%) had already used and showed a desire to use VILEs again in their teaching practice. Also, all teachers (100%) consider that the use of VILEs environments can promote an active learning of the contents by the students. From the teachers' answers, we also noticed that a part of the teachers (37%) had already used and desired to use VILEs again in their teaching practice.

5. DISCUSSION AND CONCLUSION

In this article, we present a pedagogical experience involving thirty-five teachers in a Virtual and immersive learning environment. It should be noted that most teachers had never heard of the term immersive learning environment or virtual learning environment. At the end of this exploratory study, teachers were excited about the idea of being able to use Virtual and immersive learning environments in their context of working with students. All teachers created a teaching resource in ArtSteps to work on content from their curricular area with their students. It should be noted that some of the teachers involved applied the pedagogical resource in their classes and managed to create virtual and immersive learning environments. In this way, our objective is to promote innovative pedagogical methodologies involving Virtual and Immersive Learning Environments among teachers.

In line with Cruz et al. (2014), we realize that technology is an ally of pedagogy through the use of devices that most teachers have at their disposal. Also, according to Vieira & Brazão (2022), we realized that virtual and immersive learning environments could play an essential role in developing dynamic, interactive, engaging, customizable learning environments that enhance the learning and application of content in a real or simulated way. From the results obtained, we realized that 50% of the teachers involved recognize that they do not know how to create and implement an immersive virtual learning environment in their professional practice. However, all teachers consider that using these environments can promote active learning of the contents by the students. Furthermore, it should be noted that many teachers who have already tried using virtual and immersive learning environments in their pedagogical practice intend to use them again to enhance student-centred teaching, allowing them to play a more active role.

Our work shows teachers' lack of technical experience and, consequently, the massive gap in reaching students with innovative applications, given the problems generated by the pandemic. Although with this exploratory study, we could understand the teachers' receptivity to the use of Virtual and Immersive Learning Environments, it seems relevant to us in future studies to understand its impact on students in a practical application of curricular contents.

The digital training of teachers has aroused the interest of researchers and governments. An attempt has been made to create conditions for teachers to integrate technologies in different curricular areas with a view to continuous improvement in the quality of learning and innovation in the educational system. In this sense, it seems relevant to us to understand in future investigations whether teachers' reflection around teaching with an immersive learning environment or virtual learning environment promotes a change in teachers' practices. It also seems relevant to understand whether an immersive or virtual learning environment promotes deeper learning of the topics covered, translating into effective teaching and learning.

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