A FORMATIVE EXPERIENCE IN REALITY AUGMENTED WITH PHYSIOTHERAPY DEGREE STUDENTS


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Abstract

New accessible learning methods delivered through mobile mixed reality are becoming possible in education, shifting pedagogy from the use of two dimensional images and videos to facilitating learning via interactive mobile environments. Augmented reality (AR) is a technology that allows incorporating virtual data (text, links, audio, video, multimedia, etc.) from an object in the real world.

For this, we need a device (mobile, tablet, laptop, etc.) with a camera, a software that processes the information, augmented reality activators and a screen where to show the real image together with the recovered data. This is especially important in medical and health education, where the required knowledge acquisition is typically much more experiential, self-directed, and hands-on than in many other disciplines.

This project intends to apply the AR with videos to develop appropriate materials for Physiotherapy Degree students of Cadiz University. For this, we will take advantage of the videos about the procedures explained in class that were carried out in the courses 2016-17 and 2017-18 in the teacher innovation projects (sol-201500054614-tra y sol-201700083802-tra). The videos that are most interesting were used to create practice sheets for the subject, so that students can see the video during practice as many times as they want and they can even continue to consult the material after classes to improve their manual ability with physical therapy modalities. The idea is to create some cards of the subject to be able to compare the sensations and the abilities of the students in the techniques learned with AR and in which those cards have not been developed.

Finally, students will be surveyed to find out their satisfaction with the learning method included in the subject. The number of students who participated in the research was 45. The questionnaire used to assess student satisfaction was Teaching Satisfaction Questionnaire (CSD) framed in the evaluation tool 'eValÚa', designed by the Continuing Professional Development Project of the Andalusian Agency for Healthcare Quality (Spain). The CSD is presented as a reliable and valid tool for measuring satisfaction with continuing education in health. The global valuation with the activity obtained a value of 8.62, considered very high. After the analysis, we can confirm how the use of emerging technologies could be an appropriate and useful practice for students to play an active role in their education and being able to develop higher order skills and digital competences for the implementation of AR tools from an educational and didactic perspective.

Keywords: augmented reality, University education, Physiotherapy, video.

1 INTRODUCTION

Education, increasingly, is influenced by the changes coming from the development and implementation of new technologies and the digitization of contents. As Prensky [1] postulated, nowadays we speak of "digital native" to refer to people who have been born within the current technological and information society. Therefore, the current students of the universities are (mostly) in an age range in which the use of new technologies is done continuously.

The augmented reality (AR) is a technology that allows incorporating virtual data (text, hyperlinks, audio, video, multimedia) from an object in the real world. For this, we need a device (mobile, tablet, laptop) with a camera, a software that processes information, augmented reality activators and a screen where to show the real image together with the recovered data [2].

We must distinguish between Virtual Reality (VR) and Augmented Reality (AR), while in the first case we immerse ourselves in a virtual world that generates a computer, in augmented reality we use the virtual world to expand the information of the real world, interacting with her.
Regarding its applications are multiple, it is usually used in books with AR as for example [3,4]. In the field of medicine, the GISMOC group of the Engineering School of Antioquia in Colombia created the "System for Rehabilitation of the Ghost Member Syndrome using Brain-Computer Interface and Augmented Reality", which allows the user to manipulate their phantom limb in a virtual way, by using socks as markers that the system with AR recognizes, providing visual information of the amputated limb. This tool provides a possible treatment for phantom limb pain in people with amputations [5].

In the field of higher education AR is being integrated as a teaching methodology, with good acceptance by teachers and students [6]. We apply the AR with videos to develop appropriate materials for Physiotherapy Degree students of Cadiz University. For this, we will take advantage of the videos about the procedures explained in class that were carried out in the courses 2016-17 and 2017-18 in the teacher innovation projects (sol-201500054614-tra y sol-201700083802-tra) [7]. The videos that are most interesting were used to create practice sheets for the subject, so that students can see the video during practice as many times as they want and they can even continue to consult the material after classes to improve their manual ability with physical therapy modalities. The idea is to create some cards of the subject to be able to compare the sensations and the abilities of the students in the techniques learned with AR and in which those cards have not been developed.

2 METHODOLOGY

2.1 Procedure

The teachers designed sheets with the contents of the practical sessions of the subject that included augmented reality. Through electronic devices, students could watch videos already developed in previous courses that we consider more appropriate. In order for students to use this material in practical sessions, the Aurasma / HP Reveal program [8] will be used as a repository to recognize the AR marks. Groups of 4 students were created who had to visualize the video through the sheet and later describe in writing document the phases of the physiotherapy procedures shown. A debate was presented, exposing the results of each group. The didactic material created was shared in the virtual campus of the subject. All the students were able to use the material to prepare the practical exam.

2.2 Participants

The components of the project were 7 professors of the Faculty of Nursing and Physiotherapy and 45 students of 4th year of the Degree in Physiotherapy. All of them participated voluntarily. The subject is called "Specific Methods of intervention in Physiotherapy III", whose contents are interventions of Physiotherapy in rheumatic pathologies and cardiovascular system.

2.3 Students´ satisfaction

Finally, students will be surveyed to find out their satisfaction with the learning method included in the subject. The questionnaire used to assess student satisfaction was Teaching Satisfaction Questionnaire ("Cuestionario de Satisfaccion del Discente-CSD) framed in the evaluation tool 'eValúa', designed by the Continuing Professional Development Project of the Andalusian Agency for Healthcare Quality (Spain) [9]. The CSD is presented as a reliable and valid tool for measuring satisfaction with continuing education in health. The CSD was highly reliable with an overall Cronbach’s α of 0.979. The dimensions of the questionnaire showed high factor loadings (Utility: R = 85.9; α = 0.91. Methodology: R = 77.4; α = 0.95. Organization and resources: R = 73.25; α = 0.92. Teaching capacity: R = 90; α = 0.97. Global satisfaction: R = 96.6; α = 0.96). The students completed the questionnaire through the tool "google forms" with the link provided in the virtual campus of the subject. The data were downloaded in an excel sheet and analyzed.

3 RESULTS

Then the results of the questionnaire, according to the item, are presented. In Figure 1 we can observe the answers obtained by the students to questions referred to the utility module. In the 3 cases the results are above 7. This is also supported by the average on the first question "The expectations I had have been met" provides a value of 7.9, the second question "The contents developed have been useful" Has an average of 8.09 and the last question gets an average
of 8.38. All these data indicate that the surveyed students consider the application of the AR and the activity developed is useful.

Regarding the second group of questions (ORGANIZATION AND RESOURCES- see figure 2), as in the previous case, most of the answers provide values greater than 7. In this case, the questions refer to 1- The didactic resources have been adapted to the optimal development of the activity, which has had an average value of 8.38 and 2- The duration of the activity has been adequate to acquire the objective, which has an average value of 7.98. Therefore, according to the answers provided by the students, both the resources and the time spent have been adequate for the activity of AR.

The questions analysed in this module refer to: 1- the teaching methods used by the teachers have been adequate for optimal development of the activity, and 2- the evaluation system used allowed me to know my level of proficiency after the development of the activity. The average data obtained in these two questions exceeds an average of 8 points. For what the students consider that the AR method is suitable to be used in their learning and evaluation. The opinions contributed by the students indicated the interest is mainly because they can continue working at home with the developed AR sheets and not only in the practical classes where previously he had to follow the teacher's instructions, now he can use the AR sheets to continue studying and training at home, so his understanding of the techniques explained in class is more appropriate.
Finally, the results of the final items of questionnaire in figure 4 about global satisfaction of the students and if they would recommend the techniques used in class to other professionals have obtained an average value higher than 8.5 points in both cases considered very high. Which indicates that the students are very satisfied with the AR cards used in the subject and precisely indicated their interest in having similar records for all the practical techniques used in the subject.

According to the answers of the students to this question (see figure 5) the vast majority consider that the use of this tool has favoured the acquisition of competences and student learning.
4 CONCLUSIONS

The implementation of augmented reality in the subject "Specific Methods of Intervention in Physiotherapy III" at the University of Cadiz presents a high level of satisfaction on the part of students. The faculty observed that the students had better integrated the physiotherapy procedures after the use of this learning methodology.

After the experience, the application of AR in other subjects for the learning of the practical content is proposed.

REFERENCES