

Virtual Reality-based Digital Reusable Learning Objects in Healthcare Training (ViRDIPA): 360°-Video Trainings

Leonard Meyer¹, Thies Pfeiffer²

Abstract: Training and education in Virtual Reality has become a widely discussed field in research and teaching. One decisive aspect is the efficient creation of content. Especially creating detailed virtual 3D environments and integrating specific training procedures is usually time consuming and/or expensive. Furthermore, these scenarios often cannot be created by the trainers themselves. The goal of the project is therefore to enable instructors and teachers to quickly create their own trainings using pre-created content (Digital Reusable Learning Objects) and 360°-images for easy virtual environment creation. Based on a developed and evaluated concept, an authoring tool is to be created to enable this generation of educational content in the field of healthcare. Important parts of the development are enabling of multi-user interaction and integration into existing learning management systems.

Keywords: Virtual Reality Training; Digital Reusable Learning Objects; 360°-VR; Authoring Tool

1 Motivation and Project Embedding

On the largest scale, the project 'Virtual Reality-based Digital Reusable Learning Objects in Healthcare Training' aims to develop, test and evaluate a blended learning training concept for the use of virtual reality technology in healthcare education. Accordingly, traditional class-based teaching methods should be combined with online education materials and interaction possibilities. Virtual fully immersive first-person perspective trainings promise to significantly increase the learning success in many situations due to the high level of reality reference that is possible. Nevertheless, there are still various uncertainties regarding efficiency in relation to the respective area of application and problems with the integration of such systems.

The main approach in this project is the use of digital reusable learning objects (DRLOs) to enable an efficient creation of educational VR content and thus provide a simple-to-use authoring tool for teachers. The VR learning materials created should be available online for students and enable cooperative work, possibly guided by the lecturer. Therefore, integration into existing learning management systems (LMS) is an important aspect for universal applicability. To achieve the set goals, an interdisciplinary team consisting of the departments of healthcare, didactics, computer science and innovative media will work together over a period of three years.

¹ Hochschule Emden/Leer, Abteilung E+I, Constantiaplatz 4, 26723 Emden, leonard.meyer@hs-emden-leer.de,

² Hochschule Emden/Leer, Abteilung E+I, Constantiaplatz 4, 26723 Emden, thies.pfeiffer@hs-emden-leer.de

2 Project Approach to 360°-Video-based Trainings

Building up a fully virtual 3D environment is usually a time-consuming and expensive task, especially if the results are to be on a realistic level. In comparison, the recording of 360° videos and their integration into a VR scene takes much less time. In addition, the content creation part is then primarily conducted in the real environment, which is much more approachable for the target audience. Studies investigating learning outcomes support the assumption that 360°-videos are an effective extension of learning [TL19] [Ch19]. Therefore, the planned authoring tool should enable content creators to record their own 360°-videos of procedures and use them as a basis for VR learning materials. The possibility of integrating interactive digital elements within the 360° (VR) video (similar to Augmented Reality in a real context) allows a more complex storyline to be created [Rh17], for instance using multiple choice decisions influencing the training in progress. The pure reception of information is thus extended by an interactive component.

Research questions addressed in the project are: How are the generated healthcare contents accepted by the trainees? What is the level of fidelity when trainers use the authoring tool? Does the developed Concept improve learning success as well as the integration of 360°-VR in an educational context?

3 Outlook for the Poster

The poster will give an overview of the project goals, briefly reports on results from several assessments currently underway to collect requirements from the different stakeholders involved in the context of training (administration, teachers, students) and focuses on the presentation of the first concept for the authoring workflow.

The project 'ViRDIPA' is funded by the Bundesministerium für Bildung und Forschung.

Bibliography

- [Ch19] Chang, Ching-Yi; Sung, Han-Yu; Guo, Jong-Long; Chang, Bieng-Yi; Kuo, Fan-Ray: Effects of spherical video-based virtual reality on nursing students' learning performance in childbirth education training. *Interactive Learning Environments*, pp. 1–17, 2019.
- [Rh17] Rhee, Taehyun; Petikam, Lohit; Allen, Benjamin; Chalmers, Andrew: Mr360: Mixed reality rendering for 360 panoramic videos. *IEEE transactions on visualization and computer graphics*, 23(4):1379–1388, 2017.
- [TL19] Taylor, Natasha; Layland, Adam: Comparison study of the use of 360-degree video and non-360-degree video simulation and cybersickness symptoms in undergraduate healthcare curricula. *BMJ Simulation and Technology Enhanced Learning*, 5(3):170–173, 2019.