

Co-creation of Virtual Reality Re-Usable Learning objectives for 360° video scenarios for the surgical excision of skin lesion

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Abstract—This short paper describes an educational scenario using a 360° video for the surgical excision of a skin lesion. This scenario, developed in the context of the CoViRR Erasmus+ project, offering new insights for the digital integration in learning and teaching.

Index Terms—Virtual Reality, eLearning, Healthcare Curricula

I. INTRODUCTION

The increasing need to learn and practice or even design modern and technology-rich clinical environments has created nowadays a challenge for healthcare educators teaching at either the undergraduate or postgraduate levels. Even more challenges are encountered by healthcare professionals who are responsible for “real patients” and must make critical decisions, often under high pressure. In this short paper, we propose Virtual Reality (VR) and 360° videos as a reusable e-resource for complementing the curricula of medical schools.

II. EDUCATIONAL VR AND 360 VIDEOS IN MEDICAL SCHOOLS

Multiple resources on clinical skills training currently exist. However, only a few attempts were made to provide immersive virtual reality reusable e-resources, embedded in healthcare curricula [1]. Immersive VR technologies are ideal for educational purposes and for scientific data visualization, providing a variety of benefits beyond the traditional “desktop” approaches [2]. Depth cues and the 360° views offered by VR allow for more didactic possibilities than a 2D desktop screen, especially by non-trained individuals. For example, a recent study, has shown that VR interventions increased motivation with students being excited and thrilled to use the technology much more than getting the same information from traditional means [3].

Computer-generated graphics and capture of high-quality spherical images and video (i.e., 4K or 8K 360° video), allows for creating immersive experiences that rely both on video and graphics. This provides the opportunity to use VR and remotely contribute to meeting learning objectives that could only be accomplished with the physical presence of students in controlled environments. One such example is the observation of a surgical excision through an immersive 360° video setup that allows the user to interact and control the flow of the educational content as described below.

III. 360° VIDEO SCENARIOS FOR THE SURGICAL EXCISION OF A SKIN LESION

The objective is to identify and develop small and reusable learning objectives, that together can form a

comprehensive educational tool. One example explored within the context of the CoViRR project is the surgical excision of a skin lesion such as a sebaceous cyst (which can be extended for use in similar scenarios such as skin naevus excision or skin abscess drainage). For this scenario, smaller re-usable components are being developed such as familiarization of using surgical instruments (like scissors, needle-holder or forceps), aseptic techniques, practice of skin incisions, wound suturing, local anesthesia using subcutaneous injection and other. These components are used to populate a database of re-usable learning objectives. The database is expected to offer educators the capabilities to build new scenarios and communicate their learning objectives in a technologically novel and more pleasant manner.

IV. CONCLUDING REMARKS

VR applications can produce innovative experiences when used for improving the understanding of students in the healthcare field. In this short paper, we propose the development of a VR educational application in the surgical excision of a skin lesion. The proposed methodology is based on a re-usable learning objective paradigm that encourages learning, confidence, and competence about digital learning, while providing for a safe and completely controlled environment and allowing for multiple repeatability. The latter feature i.e. that of repeatability, is of paramount importance, especially in severe and life-threatening cases as it is critical as postgraduate medical students generally have no opportunities for exposure to critical clinical cases/scenarios.

ACKNOWLEDGMENT

The work described here is funded by the Erasmus + programme, Action Strategic Partnerships for higher education (2018-1-UK01-KA203-048215), Co-creation of Virtual Reality reusable e-resources for European Healthcare Education (CoViRR).

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