

## Integration of Virtual and Augmented Reality into Online Continuing Medical Education

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**Abstract:** Many professionals such as health professionals use their private living environments for continuous education in their field. Continuous medical education (CME) comprises training measures that serve to maintain and permanently update the professional competence of the medical profession. These compulsory training activities for physicians are demanded by governmental-related organizations, such as the Accreditation Council for Continuing Medical Education (USA) or the Bundesärztekammer (Germany). One of these activities is online training. Online CME is mostly conducted using technology that is already available in the private living environments of physicians, such as common desktop PCs, tablets or smart phones. In the context of life long learning, private living environments are also expected to support modern learning methodologies such as Virtual Reality (VR) and Augmented Reality (AR).

In this paper, we investigate the integration of game-engine-based VR and AR as suitable media for online CME. Specifically, we explore how VR and MR can be integrated in an online CME system using mobile and desktop technology that physicians currently use for CME at home. Furthermore, we highlight crucial technical aspects of the integration and propose a suitable system architecture. Our system design is not limited to replace entire CME courses with VR or MR, but can extend and enrich the existing course materials. We enable physicians to access courses through an accustomed web-interface and redirect them to a mobile application that handles VR and MR functionalities when VR or MR is suitable for the course. Furthermore, we provide an app onboarding approach within our design to facilitate this transition for laypersons.

We show practice-related how a VR/MR Unity [Un] environment is incorporated in state of the art cross-platform mobile app development with Flutter [Gob] and how Firebase Dynamic Links and Realtime Database [Goa] can be used to facilitate the app onboarding process for users. Based on a prototype implementation, we report and discuss lessons learned from the implementation process. Alternative solutions are discussed and pragmatic insights in how to integrate VR and MR in online CME are given to draw conclusions on the feasibility of our system design.

### Bibliography

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