mediplan

Hochschule für Angewandte Wissenschaften Hamburg
Hamburg University of Applied Sciences

Bachelor Thesis

Concept Analysis: Virtual Reality Combined with Building Information Modeling for Medical Equipment Planning Projects

Faculty of Life Sciences
Department of Biomedical Engineering

Abstract

The key to a smooth collaboration and communication between project stakeholders is visualization. With increasing access to Virtual Reality (VR) technologies, more and more contractors are using this technology to provide users with better design visualization. For medical equipment planning, this plays an important role in knowing how efficient the movement areas and the location of the devices are so that all employees, patients, and visitors can feel at ease. The planners, as well as the other stakeholders in the user coordination meeting, can benefit from VR-experience because the technology enables interactive and realistic visualization on a true scale. This visualization method is easier for users to understand than by using 2D plans, and it can also prevent errors from misunderstandings in the planning process.

This thesis aims to conduct a concept analysis and feasibility study for the implementation of VR combined with Building Information Modelling (BIM) method in user coordination meetings, specifically for medical equipment planning projects. A survey for the planners and project leaders in mediplan is first conducted and evaluated, with the analysis result of the survey determined as requirements from the company's side. Information about the technical requirements from the VR-software and hardware is collected and adjusted according to the company's requirements. In search of a suitable VR-concept for the company, the fulfillment of these requirements is taken into consideration. Running tests of the selected VR-hardware are carried out with BIM-data converted into the VR-system using VR-application. In this thesis, two concepts using two different VR-hardware (PC-based and stand-alone) are analyzed and compared based on the performances, the prices, and the supported VR-applications. The supported VR-applications are also compared with an evaluation method using criteria catalogs, which are generated accordingly for each concept. The running tests result with each application's advantages, disadvantages, and scores are presented in the criteria catalog. In the end, recommendations were given on which VR-concept is best to be implemented for the company mediplan. The study also concludes that good collaboration between BIM-software and the final selected VR-concept (hardware and application) highlights the ability to implement VR in user coordination meetings of a medical equipment planning project, which could potentially maximize productivity and good communication between project stakeholders. Whether it would be better to work with a VR-studio instead of the VR-headset, and how satisfied the users are with the system, must be determined in further studies.