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Master of Science: Interactive Digital Media

Title: Effect on User Experience in a Virtual Heritage Environment Comparison between AVIE360 and HMD

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Abstract:

In recent years, various types of virtual environments have been culturally embedded and developed as immersive interactive Virtual Heritage Environments (VHE). Rapid advances in digital media and Virtual Reality technologies offer new possibilities for virtual heritage. The research scope of this dissertation will be focused on offline tangible cultural heritage sites. Tangible cultural heritage refers to sites, monuments, buildings with historical, aesthetic, archaeological, scientific or anthropological value, whereas virtual heritage refers to instances of these cultural heritages within Virtual Reality (VR) environments. More precisely, this paper concentrates on 'offline' types of virtual heritage, which means there are no online, networked multi-users in the virtual environment, because this is the major representation type of virtual heritage on the current market. VHEs not only potentially help lessen the impact of tourist erosion thereby protecting overrun/damaged tangible heritage, but they also provide a realistic 3D virtually reconstructed historical experience for visitors, travelers and even residents.

These kinds of virtual heritage applications can be brought to different VR environment systems, i.e. portable devices (e.g. Head-Mounted Displays) as well as complex, large devices (e.g. CAVEs, Tiled Projection Displays). Most of these technologies aim to support an immersive environment for user. Many researcher studies have focused on comparing the performance and effectiveness between using the CAVE and HMD formats, and the 'process' or the 'product'; but, less consider the

‘users. Therefore, this paper examines how different system configurations and user engagement paradigms influence users’ experiences in virtual heritage (e.g. the amount of audience members, the viewing conditions, and the modes of interaction).

This paper focuses on comparing the Advanced Visualization and Interaction Environment (AVIE) and Head Mounted Display (HMD). While most people are already familiar with HMD experiences, the AVIE is a 360-degree virtual reality installation environment, which was invented in 2007, and has pioneered a new form of virtual heritage experience in recent years. Both systems have unique benefits and differences, and they are co-existing in the virtual heritage market at the same time.

In terms of user experience, it is hard to predict. Thus, by a thematic analysis, this thesis evaluates and describes how differences between these 2 types of VR systems impact on users’ visual conditions, behavioral interactions, feelings, sense of immersion, and sense of presence/co-presence.

Finally, this dissertation investigates the positive and negative characteristics of each system and the differences in user experience through qualitative approach. I have conducted a comparative study on using AVIE360 and HMD to explore tangible virtual heritage applications. This paper will not just analyze the impacts on user experience from a technological perspective, but also from museological, psychological and sociological aspects. The differences in user experience by viewing conditions, and modes of interactions are discussed in detail via themes and features emerging from the analysis. These results aim to guide future curators, museum managers and system-builders to make an informed decision when selecting an appropriate system display for experiencing Virtual Heritage in different conditions.