

I Wouldn't Buy an Ice Cream On the Way Out...

Preliminary Results of User Studies Evaluating technology use in Museums

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Project Overview

This Project, as part of the ARC Linkage Project 'Photogrammetric Reconstruction for Underwater Virtual Heritage Experiences' (LP180100284), aims to evaluate the use of immersive technology in underwater cultural heritage museum exhibits. The end goal of the research is to provide insight and advice to museums when designing virtual underwater heritage experiences. The focus of this study is on the design of these exhibits, including differing priorities of various groups, effects on narrative and user experience with a focus on emotional connection.

Project Design

This project has two data collection phases: User experience and Expert Perspectives.

User Experience:

This portion focuses on the user experience. It is not within the scope of this project to look at the end user usefulness of the immersive technology, but does look at the larger user experience, how museum goers feel about using immersive technology being used, how it helps them connect to the material and their expectations. To gain insight in this area surveys and focus groups were used. Three experiences were chosen with different types of technology use: traditional panels with no technology, a 3D film, and a VR experience. All three experiences used the same case study as the subject matter: the HMAS Sydney (II) and HSK Komoran.

Traditional Panels:

The Panels were copies of the panels used at the Museum of Geraldton in the exhibit 'From Great Depths'. The panels provide a detailed overview of the story of the two ships and their meeting. Several photographs are included showing the vessels both before the battle and their current state. A large timeline shows the history of the ships leading up to and including their encounter.

3D Film:

The 3D film also comes from the 'From Great Depths' exhibit at the Museum of Geraldton. This film takes viewers through the history of both vessels using 3D video and still imagery, including photos of sailors alongside quotes from letters between sailors and loved ones, video from research expeditions to find and record the wreck sites, and a recreation of the routes each ship took before during and after the encounter.

VR Experience:

The VR experience takes viewers on a short tour around the HSK Komoran Engine room, as it sits *in situ*. The engine room is reconstructed using photogrammetry, programmed by the HIVE. The experience has a voice over that walks participants through what they are seeing, paired with dimensions, facts and interesting landmarks.

Surveys:

Surveys focused on participants perceptions of their own knowledge and connection and how that changed after each experience, as well as how they felt about the use of each type of technology. Each participant was asked to answer 25 questions, starting with questions to establish a baseline of connection and knowledge, moving through how participants felt about each experience, and ending with basic demographic questions. Surveys allow for easy comparison, both between participants and how answers change as users go through each experience.

Focus Groups:

After participants have finished the three experiences and the survey they take part in a guided focus group. This group discussion allows participants to expand on their answers to the surveys. There were nine questions that aimed to guide the participants in their discussion about the three experiences. These questions focused on how the use of technology impacted their experiences and what their preferences are. The format of the focus groups allowed participants to expand and focus on topics that they found important or interested them.

Expert Perspectives:

This portion focuses on the back end of exhibit design. Experts with various roles in the creation of virtual underwater heritage experiences can provide insight into different perspectives and priorities regarding the use of immersive technology. Participants will take part in a semi structured interview.

Interviews:

Semi-Structured interviews will take place with various experts. The interview will give insight into the design process from different points of view. The interviews have nine questions to guide the discussion, focusing on the participants experience with immersive technology in exhibits.

Completed Work

Focus Groups:

Two series of focus groups have taken place.

Curtin HIVE

User studies at the Curtin HIVE took place over 9 nonconsecutive days, with up to 3 sessions per day. A total of 73 participants took part in the study over that time with one to nine participants per session. At this location, the traditional panels of the 'From Great Depths' exhibit were set up in a hallway space outside of the HIVE. The 'From Great Depths' 3D film was shown on location using 3D glasses, and the Kormoran Engine room experience was shown using a 180° cylinder display Using 3D glasses. Participants filled out a physical survey and stayed in the HIVE to take part in the guided focus group.

Museum of Geraldton

User studies at the Museum of Geraldton took place over 7 consecutive days. At this location, the traditional panels and film are part of a permanent exhibition, with the panel lining the hall leading to the screening room for the 3D film. Participants were primarily recruited on a walk-up basis rather than a booking system. This recruitment method paired well with the digital surveys as it allowed museum visitors to self pace the first two experiences and account for the set times that the film plays. After completing the survey and going through the panels and film, participants would return to the meeting point and take part in the last experience. For this round of user trials, the Kormoran Engine room experience was showing using VR Headsets with built in headphones. Due to the availability of the VR headsets, each VR session could only accommodate up to 4 participants at a time. After the Kormoran Engine Room experience participants would take part in the guided focus group.



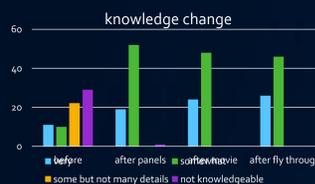
HIVE 180°-cylinder display showing a 3D VR reconstruction. Image courtesy of Curtin HIVE

Early Results

Several trends have become apparent early in the analysis of the data.

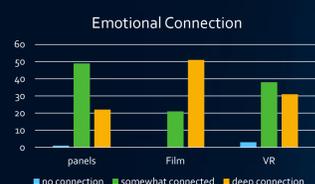
Learning Order

The order of the experiences was heavily mentioned in the focus groups. Many participants enjoyed experiencing the informational display first, the emotional experience second, and lastly a focused experience. Participants often stated that each experience was made better by having gone through the previous one. There is a consistent move towards feeling more knowledgeable after each experience, with the largest jump being after the panel exhibit, matching the responses that the panels are the most informative of the experiences.



Emotional Connection:

The emotional connection was the highest with the 3D film. There was consistent high praise for many aspects of the film, from the sense of presence the immersive nature provided to the imagery and music. Overwhelmingly, participants responded that the film provided the highest amount of emotion out of the three experiences. The primary reasons for the emotional response had little to do with the immersive features of the film; the factors mentioned most often included: photos of the sailors aboard the vessel, excerpts from letters, and the music. The 3D was mentioned primarily in regard to presence, that it made participants have a better understanding of the juxtaposition between images of the working vessels and the ships as they are now. Many participants highlighted how emotional the entire experience was. One participant commented that due to the sombre nature of the experiences, had they been in a museum, they wouldn't want to buy an ice cream on the way out as they were too sad.



Feelings towards immersive technology

Most participants responded very favourably towards the use of technology. Survey answers show that some found the use of technology in both the film and VR experience somewhat distracting from the narrative, however the focus groups showed that many participants found it distracting in an exciting and positive way. There were several instances where participants would try to duck out of the way of a passing gun barrel or try to reach out to touch an anemone. Most of the participants responded that the use of technology enhanced their experiences and was an appropriate way to tell the story.

There were some negative responses towards the use of technology, such as feelings of motion sickness and generally not enjoying 3D or VR experiences. There was a noticeable increase in the amount and severity of motion sickness with the VR headsets over the 180°-cylinder display. Many participants also found that the 180° display provided little emotional connection, however the reason provided was primarily the information provided by the voiceover being more informative than emotional.