Experiencing Technology Enabled Empathy Mapping

Daniel Neubauer*†, Verena Paepcke-Hjeltness*, Pete Evans*, Betsy Barnhart*, Tor Finseth*

Iowa State University
*Corresponding author email: dann@iastate.edu

Abstract:
Designing and Understanding in the Problem Space, within the Virtual Space. How do we connect with spaces and people with limited or restricted access? How do we design for a situation we have not experienced? How do we develop empathy for challenges of unprecedented magnitude?

Virtual reality has been commonly used for final concept presentations and experiences, however, with its recent developments and additional technological improvements in cost and fidelity it can now be implemented earlier in the design process. The nature and complexity of certain design problems necessitates innovative applications of technology alongside the use of proven methodology. This workshop sought to establish a proven link between virtual reality and empathy which is a critical component within human centered design. Integrating VR into the front end of the design process to create empathy for the user and context (as seen in artist Chris Milk’s work on immersive storytelling) as well as to conceptualize in VR (Google’s Tilt Brush app for virtual reality sketching) could be the ‘next development in education’, disrupting traditional design curriculum. This research explores that integrating emergent technologies allows designers to develop a better sense of empathy for the user, the space, and the context and ultimately resulting in more validated and human or problem centered solutions to these scenarios. The emerging presence of VR as it can be used in collaborative spaces for social experiences (virtual project rooms are currently being pioneered by Facebook’s VR social environments EG Facebook Spaces), co-creation, and collaboration across disparate and international projects and teams could become the new normal.

This workshop introduced participants to VR as it can be used to create empathy and to conceptualize solutions as well as the potential to collaborate remotely. A 360° pre-recorded video scenario initially exposed participants to a design problem via Google Cardboard to test the level of empathy that can be developed from this experience. A second immersive scenario included the HTC Vive for a more in depth understanding, allowing participants to independently ‘walk’ through the VR environment. The focus of this workshop was on defining the problem space through immersive experience rather than conceptualizing a solution. We predicted that the immersive nature of the HTC Vive would contribute significantly more to...
developing empathy for the problem rather than the 360º pre-recorded video scenario. In addition, we also examined what can be achieved with a more basic device (the 360º pre-recorded video scenario). The HTC Vive limited the participants to one viewer at a time and a shorter experience, while anyone with a ‘smart-phone’ was able to view the google cardboard experience immediately. After all participants have viewed the HTC Vive immersive experience, the group was led in a discussion around framing the present problem within the scenario. After the group had come to an agreement on the defined problem space, they were led through an initial concept defining stage. This allowed the group to gather their initial thoughts on the solution(s) to the identified problem. The research team aimed at providing VR experiences to create a stronger sense of empathy for the participant(s) in the posed scenario. The workshop concluded with an open discussion evaluating the technology enabled empathy mapping experience and how the participants may use this methodology in their practice.

**Keywords:** Virtual Reality, Empathy, User Centred Design, Design Research Methodology

1. Introduction

During the design process a common problem, especially in the educational environment, is that assumptions and imaginations based on the individual’s experiences often drive insights and outcomes. This can create a bias, which can influence the solutions and may result in the users needs not being met, especially if the problem area is outside of the designers’ experiences. This research team explores possibilities to foster empathy for a better understanding of the people and context to identify more meaningful insights and outcomes.

Empathy is at the core of human centered design and design thinking. To put oneself into someone else’s shoes, immersing into the subject matter, discovering the actual issues to be solved is crucial to successful problem identification and problem solving. Educators aim to provide an educational environment that fosters empathy for diverse environments including environments where access to people and contexts is restricted, limited, or too distant. This research team proposes emerging technologies, such as virtual reality (VR), as a supportive tool for creating empathy for the users and environments people are designing for.

The goal is to empower designers with new approaches to best identify and frame problems, understand the context and situation, and find the right design solutions in a highly technological and evermore complex world.

Therefore, Virtual Reality as a Design Research Methodology was implemented in a workshop framework to provide the opportunity for a diverse group of designers to come together and test the novel role of virtual reality in the creation of empathy in the front end of the design process. The objective was to give participants an opportunity to experience virtual reality as a design research method in order to improve both the level of empathy developed for the end user, and test different types of media to be used for virtual reality experiences. These experiences might have the potential to generate research results and designs that are better honed to end user’s needs. The findings of the workshop have potentially wide ranging implications for design research and team collaboration.
Designers are continuously looking for new methodologies to develop a stronger sense of empathy with their end user (Kolko, 2011) (Kumar, 2013); ultimately designing more meaningful experiences for the users. Historically this often requires many site visits, interviews, and detailed documentation of the scenario. These data points are then relied upon throughout the design process to inform the final solution and outcomes. By utilizing Virtual Reality tools and techniques, the designer will be able to “put themselves in another’s shoes”. More closely identifying with the end user, the user’s struggles, and the problems they face. Virtual Reality is in the midst of a re-emergence in current day entertainment and experiences. As technology and materials have become more accessible, the cost and proliferation of VR capable devices has grown exponentially over the last decade. Therefore, this research team constructed an experimental design charrette (workshop) in which to test the possibilities of implementing Virtual Reality experiences in the front end stages of design and design research.

2. Workshop Design

The research team designed the workshop to be situated in an actual environment of far reach, the International Space Station. Various tools were provided to allow the participants to quickly develop empathy for the given scenario, as well as to expedite design problem framing. These tools consisted of: printed image cards of astronauts aboard the International Space Station (ISS) as well as a layout of the Space Station, a 360 degree video tour, a Virtual Reality simulation of the ISS, and a set of framework templates allowing for observations to be collected systematically. The goal was to immerse in the context using the various approaches, observe the environment and synthesize these observations into succinct problem statements as a measure for the level of empathy generated by the different experiences.

This workshop was set up to allow participants to experience a methodology for incorporating VR into the early stages of the design process. There were a total of nine participants divided in two teams. The workshop started with a short presentation in which the team covered the importance of empathy within design methodology and outcomes, as well as an introduction to the problem space (the International Space Station). The team then described how they envision technology assisting in generating empathy for situations and users that may have previously been out of reach, such as the one provided. The participants were led through various experiences related to life aboard the ISS.
Each of the participants were briefly familiarized with the context through the image cards and the layout of the entire ISS, as well as a 360-degree video tour via google cardboard. This video experience lasted approximately two minutes. The provided templates were used within the groups to gather the observations, which were made in relationship to life aboard the International Space Station. After this initial immersion the participants were introduced to the Virtual Reality simulation. As a measure to increase the level of realism and empathy, emergency sirens and smoke were implemented in the VR context. Each participant was given approximately 1 minute to get acclimated to the VR experience before the smoke and fire alarms were turned on. Participants were subjected to simulated zero gravity, navigation of the ISS, and increased stress due to finding the origin of the smoke/fire within a short amount of time. After completion of the task, the team was asked to write down any and all observations regarding life, work, and emergency situations aboard the ISS using the provided templates. Team members were making individual observations as well as discussing their experiences as a group and documenting their observations. (Figure 3)

Each team table was equipped with a number of supplies that included sticky notes, pens, and 3 worksheets. These worksheets led the participants through the abbreviated design problem framing exercise in order to expedite the process. The first worksheet allowed for a place in which to place all their initial observations (each observation on a separate sticky note) from the different experiences out in the open for the rest of the team to see. The second worksheet asked the participants to select 5 insights/observations/solutions from the previous worksheet in order to investigate those observations/solutions further. Finally, the third worksheet provided participants with two problem framing prompts. These were then filled in by referencing the insights/observations from the second
worksheet. These problem statements (some containing solutions to problems identified) were then presented to the group at large for discussion.

![Figure 3. Example of framework templates with participant observations and problem statements](image)

3. Workshop Observations

Participants first had to get accustomed to using Google Cardboard for the 360-degree immersion. Some spoke out loud while ‘having been led’ through the International Space Station through the video, while others quietly explored. Once the teams immersed into the context through the provided images and videos, the virtual environment was introduced. One participant at a time explored the virtual space, while the others observed.

The participants were encouraged to gather as many details as possible. As such they were continually making observations individually as well as within their teams writing these down on sticky notes collected on the provided framework templates (see Figure 3).

Interestingly, there were many instances in which the participants moved into solving problems for the problems they were discovering. Although this was not the original intent of the workshop (to create solutions to the problems identified) it seemed a natural progression for the participants and helped them work through the problem areas. Therefore, the research team encouraged the participants to make note of their solutions and begin to move along in the design process.

The outcomes from both teams were strikingly similar, in that they observed a problem in navigating the space station. This navigation issue was exacerbated when they were then subjected to the simulated smoke/fire. They approached the navigation issue from a perspective which was applicable and thoughtful.

When reflecting on their technology experiences the participants observed that without the VR experience in the ISS filled with smoke and alarms they would not have had the same outcomes. They would have based their solutions mainly on assumptions of what could be applicable. Participants felt the empathy level for the astronauts experiences they gained through the Virtual Reality experience led them to their outcomes and was valuable.
When asked if they felt Virtual Reality simulations could benefit them in their practice in order to increase empathy in the initial design stages they saw value from this experience and would consider to apply it in their own design methodology.

### 3.1 Participants Dispositions.

While the research team may not know the exact reason behind each of the participants’ motives for participating in the workshop, they have observed overall that there were different types of engagements which occurred. Each participant had different perspectives as they had different expectations for the workshop. The research team identified that there were four main dispositions towards participating:

1. Technology driven;
2. Context focused;
3. Empathy focus;
4. Engaged curiosity and healthy skepticism.

Those participants that were technology driven, were interested in experiencing virtual reality and how the research team was applying it within the design process. Participants that were context focused, were mainly interested in experiencing the virtual reality simulation of the international space station. Empathy focused participants were interested in experiencing empathy development within the early stages of the design process. Finally, the curious and skeptics served an important role within the workshop where they approached the experience without preconceived notions of how virtual reality experiences could help develop empathy within the design process. These four dispositions all thoroughly enjoyed the workshop, contributed to the end discussion, and validated the research team’s proposal that, new technology can be leveraged to develop empathy within the early stages of the design process.

### 4. Next Steps

Overall the research team has been very pleased with the outcomes of this research thus far. Many new questions have risen as a result of running the workshop. The research team plans to further explore each of these questions and how they could benefit the overall experience of user centered design and design research. These questions that have been identified include many related to exploring further technologies, including experience creation and capture, as well as augmented Virtual Reality scenarios. Each of these technologies poses new approaches to understanding the context in which designers familiarize themselves with the end user, and hopefully develops a deeper understanding.

The team will be conducting further workshops to quantify the level of empathy mapping through empathy scaling. They are also looking to explore different environments beyond the ISS. There are many training Virtual Reality scenarios which are not easy to recreate in real life. These can be built for users to learn to navigate a foreign and stressful event. For example: earthquakes, Ebola outbreaks, etc... Different environments should be used to evaluate best practices in engaging empathy in the initial stages of design. Throughout the development and delivery of these workshops the team has noticed that how the problem is framed can affect the level of empathy. This observation requires further research on its own to discover a better way in framing design problems that allow the designer to develop a stronger sense of empathy. Along with these topics, the research team has identified many other VR experiences that are blending the physical world.
with the VR world. Can physical attributes and artifacts improve the sense of empathy along with the VR simulations? The research team is also continuing to look for partners to develop and explore this research in the future. They look forward to continuing to explore and begin to understand the importance of empathy in design as well as tools to help the designers develop stronger senses of empathy.

References

Kolko, J. (2011). Exposing the Magic of Design. A Practitioner's Guide to the Methods and Theory of Synthesis. Oxford, NY: Oxford University Press.
Kumar, V. (2013). 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization. Hoboken, New Jersey, USA: John Wiley & Sons, Inc

About the Authors:

Daniel Neubauer is a Lecturer of Industrial Design at Iowa State University. He has a background as a furniture designer and developing ‘creative tools’ for non-designers. His research focuses on the role of emergent technology in User Centered Design and Design Research.

Verena Paepcke-Hjeltness is an Assistant Professor of Industrial Design. Her research focuses on the diffusion of design thinking practices in design and non-design oriented disciplines, with a focus on exploring visualization as a gateway to creative confidence and design-ability.

Pete Evans is a Senior Lecturer at Iowa State University and has been teaching CAD, CAM, and digital communications for 8 years, while also being a licensed and practicing architect. His research focuses on Virtual Reality and digital prototyping.

Betsy Barnhart is an Assistant Professor of Industrial Design. She has a background in design management in protective sporting goods for lacrosse and hockey. Her research focuses on the intersection between design practice and education with sponsored studios.