Installation of a Virtual Reality Research Laboratory on Bowdoin College Campus

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My summer project was focused on supporting Bowdoin's first immersive virtual reality (VR) lab. I worked with Professor Doore to learn about the hardware requirements of room positioning VR systems, as well as the tools used for software development and implementation of immersive demonstrations and experiments. My preliminary demos will serve to educate others about how the lab can help to explore research questions via VR environments. In addition, I completed my IRB training to ensure the lab operates according to current human subjects and VR lab safety guidelines. As a result of this summer experience, I am ready to help Bowdoin faculty and students learn how to develop virtual reality applications and conduct immersive human subjects research in a welcoming and innovative environment.

I spent the first four weeks of my research at the University of Maine's Virtual Environments and Multimodal Interactions (VEMI) Lab under the supervision and guidance of lab director Dr. Rick Corey. VEMI has worked for the past ten years in research and demonstrations utilizing virtual reality, and their extensive experience in the field and emphasis on collaboration made the lab an excellent environment to learn in. At VEMI I learned about the hardware necessary for a VR lab, the programs used for creating virtual environments, and the ways that VEMI ensures an efficient and safe process of research. Through the course of my time at VEMI I progressed from having never used VR software before, to having a working knowledge sufficient to create virtual environments and research demonstrations from scratch.

During my second four weeks, I applied what I learned at VEMI to the installation of our own VR lab on campus. With the help of Stephen Houser and Paul Benham in the IT department, I installed the necessary hardware to run VR in our own lab. I assembled research demonstrations from scratch using the programs Unity and Blender and the experience I gained in them at VEMI. By the conclusion of my project, our own Bowdoin College Virtual Reality lab is completely ready to be used for human subject research in immersive VR environments and to create new research demonstrations that summarize the findings of the studies. VR Environments I created include: 1) a demo of how the HMD sensors capture participant movement within the tracking space and how a lack of visual landmarks can skew directional accuracy, 2) a demo of VR immersion using illusions of spatial distortion (e.g. extreme heights), and 3) a demo about directional and positional spatial language cues that many of us take for granted because we 'fill in' missing or vague language with our vision. We are currently working on several additional demos including: 4) a recreation of the Walker Gallery in the Bowdoin Museum of Art to be used in several new projects, 5) a maze to conduct spatial cognition and navigation research, and 6) adding an elevator to the spatial distortion demo to increase VR 'real estate' in the space tracking space. The lab can now support Bowdoin faculty and students who are interested in designing and implementing human subject studies within immersive environments based on their specific study needs. Setting up Bowdoin College's own VR lab has been a tremendous experience for learning more about this emerging technology and for preparing me to work with faculty to support more immersive environments that will yield benefits the Bowdoin community of researchers.