

**APPLICATION OF VIRTUAL REALITY IN DISASTER RESPONSE TRAINING**

**FAUSTIAN BARGAIN OF VIRTUAL REALITY TECHNOLOGY**

An Undergraduate Thesis Portfolio  
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## **SOCIOTECHNICAL SYNTHESIS**

Virtual Reality (VR) technology is no longer a technology of the future. In recent years, the VR market as well as the technology itself has been developing rapidly and the increase in availability and the level of immersion has extended its usage in multiple new fields. The technical research aims to utilize VR in one such new field by proposing VR technology as a new tool for implementing the training models for disaster response professionals. Through the creation of a step by step disaster environment virtual reality implementation (DEVRI) process, the disaster response professionals with little computer science knowledge can more easily adopt VR technology in their training. However, as with all new pieces of technology, there is a tradeoff between what is gained and given, a Faustian bargain. The science, technology, and society (STS) research focuses on the concerns of using VR technology by analyzing the different social groups that use it and organizing the most critical issues shared by the groups to increase public awareness and ultimately push for social and legal reforms to mitigate those issues. The tightly coupled technical and STS research are based on the increased availability and effectiveness of VR technology and creates a process for adopting it for implementation, while also considering the social groups that are affected by the risk of using VR technology.

In the field of disaster response, creating an effective training model is difficult due to the issue of cost, safety, and details. The increase in availability and effectiveness for VR technology in recent years makes it a viable alternative to the traditional training models used in disaster response. However, the process of implementing VR technology for training is difficult for users with little computer science knowledge and experience, while market vendor provided packages are often costly. The technical report outlines the development of a step by step process called the DEVRI process that can help these new users to implement VR technology for their training

models. The requirements of an effective training model for disaster environment was outlined then the requirements were grouped into critical factors that were then translated into each step of the process with guidelines on what software to use for each steps.

The requirements analysis found four factors that were then translated into four steps process with each process specified with software for implementation. While this process cannot be used to create VR training models for users of disaster response fields with no computer science background due to technicality of step two and three, it can help break the concept of adapting VR technology for training models into individual steps. The process can minimize overall cost by allowing users to hire developers for certain steps, and users can also get a grasp of how the implementation can be done so they can consider VR technology for training models.

The general public view on VR was mostly positive with its image of futuristic technology with endless possibilities for its usage, but there are physical, psychological, and ethical concerns with VR technology that the public isn't well aware of. The research then asks the question of how to increase the public awareness of these issues so that the technology can be used more safely in the future. Pinch and Bijker's Social Construction of Technology (SCOT) theory was used on VR technology to understand how different social groups interact with VR technology artefact under the concept of interpretive flexibility. Each social group's usage and purpose for VR technology is different, and thus the concerns will also differ in some ways as well. The social groups were found by case studies and personal observations of different uses of VR technology, and the concerns of each group was analyzed by a collection of journals, studies, and articles.

Through research, six different social groups were identified, with each group encompassing similar use cases for VR technology. These groups all shared certain usage factors

that led to physical and psychological drawbacks for the users in all the social groups. The analysis clearly showed shared concerns amongst the groups that must be addressed first before tackling the individual group issues. By the use of SCOT theory, the increase in awareness of these issues by the society will in turn shape the development of VR technology to mitigate these issues. The research itself does not create a solution to tackle the issues of VR technology, but rather bring the most critical issues to light so that the public can understand these issues more clearly and bring about social change that affect the development of VR technology in the future.

VR technology is still new and versatile with potential for uses in new fields such as the disaster response training. However, it is important to note the potential drawbacks of VR technology as well, especially when it has such a wide range of usage. VR technology is not a perfect futuristic tool without any faults, so it is important for the society to closely observe its development and concerns for its potential to shape the society in the future.

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