

POWER OF DIFFERENCE ASSESSMENT SYSTEM

**THE IMPACT OF AUGMENTED REALITY TECHNOLOGY ON PHYSICAL
REHABILITATION**

An Undergraduate Thesis Portfolio
Presented to the Faculty of the
School of Engineering and Applied Science
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Bachelor of Science in Computer Science

By

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SOCIOTECHNICAL SYNTHESIS

Physical rehabilitation is an important aspect of healthcare that affects the way people live their lives. For the technical research project, I worked on the Power of Difference Assessment for The Sum, a non-profit organization located in Charlottesville, Virginia. The reason for undertaking the project was due to my fascination with translating data values from participants who took the assessment into numerical categories that displayed the inherent demographical views of a person. Meanwhile, the STS research paper focuses on the impact of augmented reality for physical rehabilitative services. The purpose of the research is to investigate the benefits of implementing augmented reality for physical rehabilitation. Since the STS and technical projects have little overlap, the two are loosely coupled.

In order to work towards an effective implementation of the Power of Difference Assessment, many smaller requirements needed to be performed. Security features had to be created in order to avoid URL manipulation of the website. Many tasks in the existing product also involved manual labor which was time-consuming. A method to approach this problem was to try and make all processes be performed automatically, including score calculation, report generation, and the sending of emails by the system. The data that was generated by the report was also stored locally on the client's computer previously. To solve that problem, new administrative access was built into the website to allow for better storage and accessibility.

The various methods implemented created a satisfactory result in the end product. The speed that user scores are calculated and sent via email occurs in under a minute. The administrative site has access to all data with easy search and organization functionality along with other features to delegate data viewing to other employees within The Sum. The assessment now supports concurrent users taking it and is scaled to support many users of the system

through the use of Amazon Web Services. The end result of the technical project is an improved version of the Power of Difference Assessment system that contains added functionality, easier accessibility, and stronger security protocols.

The research question my STS topic focused on was: How does the implementation of augmented reality benefit patients' health and motivation when undergoing physical rehabilitation? The thesis seeks to explore the impacts of augmented reality in physical rehabilitation and the effects it has on the industry and other societal factors. The sources that were used to provide evidence included articles, published papers, and case studies. The sources were used to help provide factual data in order to support the thesis statement while also looking at its limitations. The evidence gathered were used to make counterarguments and showcase viable solutions of implementation of augmented reality that would widely benefit people during physical rehabilitation.

A major point in the STS thesis is the parallel drawn between augmented reality technology and CAT scans to support a viable cost option for future widespread usage of augmented reality. Another major point includes data percentages of user satisfaction to support positive correlation with increased business. The evidence is necessary to provide a valid reason for healthcare industries to commercially support the use of augmented reality. One key point stems from the gamification of physical rehabilitation, which connects to increased levels of user satisfaction and is the major evidence for providing a solution to the problems that patients face during rehabilitation. The conclusion drawn from the research supports the idea that augmented reality will provide health benefits to patients while providing positive commercial effects in society.

The broad conclusion that can be drawn from the research projects is to give things a chance. The STS research project currently has limited data pertaining to the topic and is reliant on future work to provide conclusive results based on the conclusions drawn from the research here. The technical is the same as people need to attempt the assessment in order to realize their hidden biases and views and use those to grow as individuals. This broad conclusion brings the two topics together despite their loose coupling.

TABLE OF CONTENTS

SOCIOTECHNICAL SYNTHESIS

POWER OF DIFFERENCE ASSESSMENT SYSTEM

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