Thesis Project Portfolio

Improving Patient Experience During In-Office Procedures Using PARVA – Patient Augmented Reality Vibroacoustic Array

(Technical Report)

The Effects of Virtual Reality Applications in Mental Health

(STS Research Paper)

An Undergraduate Thesis

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Chaeyeon Chloe Kim

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Department of Biomedical Engineering

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Sociotechnical Synthesis

Virtual Reality (VR) has been widely used in health industry by being a powerful diagnostic tool for education, training systems and therapies. The technical project, Patient Augmented Reality Vibroacoustic Array (PARVA), was completed with the intention of aiding patients undergoing a medical procedure by distracting them from the pain and fear associated with the procedure. While conducting research for PARVA, a major issue discovered was the lack of framework available for the use of VR in the medical setting. The STS research was conducted in order to better understand this issue of lack in a solidified structure.

The technical component adapted PARVA, a two-pronged solution to a better patient experience during in-office procedures. PARVA has been implemented to provide Augmented Reality (AR) immersion and localized vibratory stimulation to help with pain management. My capstone group and I were successful in accomplishing the aims of creating an integrated, multisensory approach pain-distraction device by modifying the circuits, 3D CAD designs, and making iterations to AR games. The technical portion of this project will be continued in the following yearly capstone projects to participate in full patient study including the testing of feasibility of using the device, customized experience, and the integrated multisensory device. Additionally, the future steps of technical part would include incorporating music and landscapes in the device.

The STS component explored the benefits and framework of VR. Currently, there are distinct benefits of VR application in the health system such as providing additional comfort to patients undergoing procedures which induce psychological and physical stresses. However, due to VR's recent entrance to the healthcare scene, the guidelines and protocols of usage have not yet reached a standard that would support usage in many settings. The STS portion of this project can be expanded in the future by researching deeply into the concepts of improvement, such as efficacy, practicality, and safety.

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