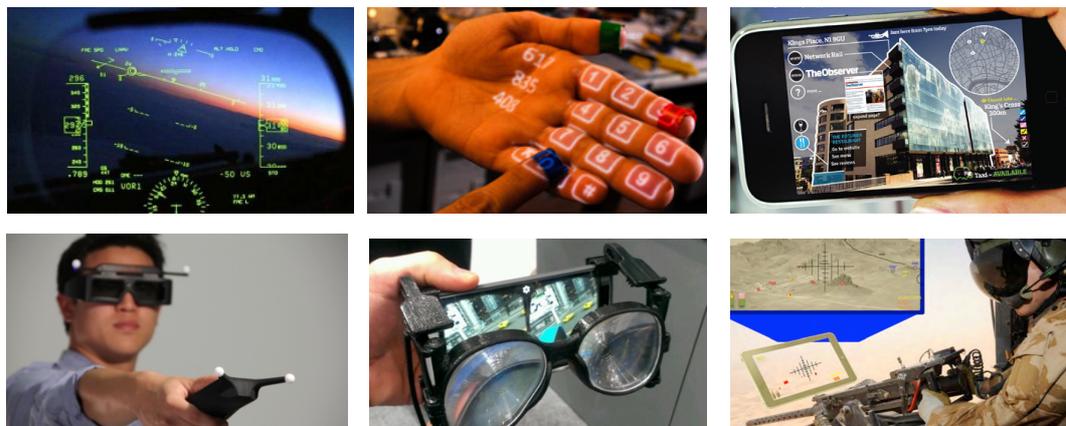# Suggestion for Master thesis project on Virtual reality

Introduction

This is a project for a master thesis or two. It is a part of a research project funded by Office of Naval Research Global, US. There is thus some funds to support travel and absorb expenses. Despite the description starting with the Background and below, there is a great deal of freedom when it comes to the design of the study both when it comes to what to study and how. The main concern is to find a fruitful angle to address training, learning, and generalization using VR/AR.

Domain

At the moment the aim is to estimate training effects from an existing training program which are focusing on teaching prehospital medical personnel to prioritize at mass casualty scenes. See news flash here. Something that is both hard and diligent (costly) to do in live exercises. During spring 2019 there is a large set of participants that are undertaking this training in VR. Contacts have been made and evaluation of a third part is very welcome.

There is also some hardware in place to start with. There are two sets of Oculus Rift, different VR environments (Virtual Battle Space III and others).

Background

Depending on the epistemic viewpoint taken teaching and learning will be designed and implemented differently. A number of different perspectives on learning can be identified: the rational, the empirical (behaviorism), the constructivist and the cultural. Behaviorism is a view of knowledge acquisition where the knowledge is equal to the sum of the parts. Learning according to behaviorism is organized by breaking down complex issues into smaller parts that are taught and the greater understanding is a result of all the pieces put together. Knowledge is thus objective, observable and is built up through drill and practice and are often referred to as goal-based training. The rational perspective suggests that it is the process of thinking that is central in learning. It too has a mechanistic viewpoint as the human mind is described as an information processing system. The constructivist perspective emphases learning as an internal activity within the individual. Knowledge is thus something people are creating from within. The perspective on knowledge presented by Vygotsky is contrasting the constructivist perspective by claiming that knowledge is situated. Knowledge is thus a product of the context and the interaction with others. Knowledge defined by Vygotsky is a socio-cultural product.

Efforts to create knowledge using a digital simulated context that is supposed to be of use, in reality, is critically dependent on the mechanism of generalization from one context to another. In this sense, the constructivist perspective is in conflict with Vygotsky. It is therefore of interest to investigate how modern teaching using modern simulator technology performs and how well learning in a simulated environment translates to reality.

The first purpose of this study is to investigate what general model of knowledge that underpins training and simulator technology using Virtual Reality (VR) and Augmented Reality (AR) and what model serves as a foundation for the pedagogical implementations using these technologies. The second purpose is to estimate the occurrence of the generalization effect from the simulated training environment to reality. The aim is to make a basic research contribution to the knowledge of training and underpinning theories and assess those by estimating effects.

Suggested Method

This study consists of two parts, a review of the software and an estimation of training outcomes. First, a review of how training using VR/AR is constructed and implemented will be undertaken. The review aims to discover the underpinning theoretical model of knowledge built into the tool. It also aims to investigate the theoretical foundation of the training paradigms used with VR/AR. Second, an experiment that estimates training outcome between training in a simulated environment with training, in reality, will be conducted.

Result

The result will be a review of VR/AR tools that outlines the theoretical models that underpin the technology and pedagogy used in conjunction. With the review as a base, training effects will be estimated both from the simulator trainer perspective and compared with training effects from live training.

Discussion

In conclusion, the basic research contribution will be an attempt to challenge the conflicting theories of knowledge taking the perspective of Vygotsky and contrasting it with constructivism. This can aid in suggestion how to increase effectiveness in the use of modern interactive, 3D gaming/simulation technologies for learning.

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