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Group usability testing of virtual reality-based learning environments: A modified approach

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Abstract

Conventional usability testing is usually conducted with several individual participants. In recent years, however, group usability testing is gradually gaining attention. Such approach involves several-to-many participants performing tasks simultaneously, with one to several testers observing and interacting with the participants. This approach is able to generate many useful data within a short period of time. In light with the need to further improve the approach, this paper presents a modified version of a group usability testing and how it can be feasibly used to evaluate the usability of a non-immersive virtual reality-based learning environment. The proposed modified group approach aims to minimize the possibility of data loss during the usability testing process. The effectiveness and efficiency of this modified method was compared to the original approach of group usability testing. The results indicate that the modified group usability testing is more effective and efficient than the original approach as it can collect more critical and significant data with lesser time, cost and effort consumption.

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1. Introduction

Usability testing has been widely used as an important technique to uncover the possible usability problems of a system. Poor usability of a system could prevent its effectiveness and efficiency of use [1]. Usability testing is defined as “a process that employs participants who are representative of the target population to evaluate the degree to which a product meets specific usability criteria” [2]. Generally, usability testing involves a process of observing users while using systems, and thereby extracts the usability issues from these users. Usability testing also intends to obtain feedback from representative users of a system in order to identify usability problems. Such testing is important in discovering major usability problems that are caused by human error, which may lead to confusion or termination of interaction with the system as well as frustration.

Usability studies of virtual reality (VR), especially non-immersive VR, are still insufficient although VR is an advanced technology which is gaining widespread acceptance in various fields particularly in education [3, 4, 5]. A review of the literature has shown that some researchers have adopted traditional techniques in testing and evaluating non-immersive VR, or Desktop VR. Villanueva has evaluated the non-immersive VR, desktop, photo-

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