

A Modified Group Usability Evaluation for Non-Immersive Virtual Reality (VR) System

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Abstract - Usability testing plays an important role in system development. Conventionally, usability testing is often conducted with many individual participants. Cooperative usability testing, co-discovery, and remote usability testing are examples of usability testing techniques based on this individual approach. Recently, a group approach for usability testing, namely group usability testing was introduced. This approach involves several-to-many participants performing tasks simultaneously, with one to several testers observing and interacting with the participants. As such, group usability testing is able to produce a lot of useful data within a limited time. This paper discusses a modified version of a group usability testing and explains how it can be used to evaluate the usability of a non-immersive VR system. The proposed modified group approach aims to minimise the possibility of data loss during the usability evaluation process.

Keywords: Group Usability Testing, Non-Immersive Virtual Reality

1 Introduction

Usability testing is an important phase in a system development process as it aims to ensure the usability of the system. Studies have shown that computer systems of poor usability could prevent the effective and efficient use of the systems [1]. However, the usability studies of Virtual Reality (VR), especially non-immersive VR, also known as Desktop VR, are still not prominent; despite the fact that VR is an advanced technology which is gaining widespread acceptance [2, 3, 4]. Besides, the limited usability studies of non-immersive VR have shown that most of these studies employ individual approaches where an evaluator deals with an individual participant at any one time [2, 5, 6, 7].

Realising the need for research on usability evaluation of non-immersive VR, this paper proposes a modified version of the group usability testing which is originally suggested by Downey [8]. The proposed modifications are anticipated to produce a more effective and efficient usability testing procedure. The paper also elaborates on

how this modified group approach can be used in evaluating the usability of non-immersive VR. It also discusses the benefits and drawbacks of such usability testing approach.

1.1 Usability

Usability is defined as

“The extent to which a product can be used by specified users to achieve specified goals in a specified context of use with effectiveness, efficiency, and satisfaction” [9]

“‘Ease of use’ plus ‘usefulness’, including such quantifiable characteristics as learnability, speed and accuracy of user task performance, user error rate and subjective user satisfaction” [10]

Jacob Nielsen, a usability specialist, has identified five major components of usability, which are learnability, efficiency, memorability, errors and satisfaction [11]. The usability of a system depends on the user’s perception of the quality of the system, ease of use, ease of learning and relearning, the system intuitiveness, and appreciation of the usefulness of a system [1].

1.2 Usability Testing

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” [12]. Generally, usability testing involves observing the users while using the products or systems, and thereby extracts the usability issues from the users. Usability testing aims to obtain feedback from representative users of a product or system in order to identify significant usability problems. Such testing is user-centered as it focuses on users.

Usability testing is crucial as it is considered as an essential activity in the process of system or application design, implementation, testing, acceptance, and revision [13, 14]. Usability testing is also important in discovering major usability problems that are caused by human error, which may lead to confusion or termination of interaction