



Investigating therapists' intention to use serious games for acquired brain injury cognitive rehabilitation



Ahmed Mohammed Elakloun, Nor Azan Mat Zin *, Azrulhizam Shapii

Software Technology and Management Research Centre (SOFTAM), Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM BANGI, Selangor, Malaysia

Received 23 May 2013; revised 14 January 2014; accepted 13 March 2014
Available online 21 March 2015

KEYWORDS

Serious games;
Rehabilitation;
Game design;
Brain damage;
Technology acceptance;
Perceptions

Abstract Acquired brain injury is one cause of long-term disability. Serious games can assist in cognitive rehabilitation. However, therapists' perception and feedback will determine game adoption. The objective of this study is to investigate therapists' intention to use serious games for cognitive rehabilitation and identify underlying factors that may affect their acceptance. The respondents are 41 therapists who evaluated a "Ship Game" prototype. Data were collected using survey questionnaire and interview. A seven-point Likert scale was used for items in the questionnaire ranging from (1) "strongly disagree" to (7) "strongly agree". Results indicate that the game is easy to use (Mean = 5.83), useful (Mean = 5.62), and enjoyable (Mean = 5.90). However intention to use is slightly low (Mean = 4.60). Significant factors that can affect therapists' intention to use the game were gathered from interviews. Game-based intervention should reflect therapists' needs in order to achieve various rehabilitation goals, providing suitable and meaningful training. Hence, facilities to tailor the game to the patient's ability, needs and constraints are important factors that can increase therapists' intention to use and help to deliver game experience that can motivate patients to undergo the practices needed. Moreover, therapists' supervision, database functionality and quantitative measures regarding a patient's progress also represent crucial factors. © 2015 The Authors. Production and hosting by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Acquired brain injury (ABI) is one of the main causes of long-term disability in most countries. ABI refers to brain damage after birth resulting from traumatic or non-traumatic brain injury. Traumatic brain injury (TBI) results from trauma to the brain through various ways including traffic accidents, assaults etc., whereas non-traumatic brain injury stems from medical conditions like stroke, brain tumor or poisoning

* Corresponding author. Tel.: +60 019 250 2420.

E-mail addresses: a.akloun@ftsm.ukm.my (A.M. Elakloun), azan@ukm.edu.my (N.A. Mat Zin), azrul@ukm.edu.my (A. Shapii).
Peer review under responsibility of King Saud University.



Production and hosting by Elsevier

(Ciuffreda et al., 2012). TBI and stroke (Cerebrovascular Accident) are the two major sources of acquired brain injuries that result in disabilities in adults (Cicerone et al., 2000). The category of abilities impacted depends on the location, type and size of the brain damage. Hence, patients have their own specific impairment ranging from cognitive dysfunction to motor disability that adversely impacts the patients' daily lives and confine their ability to go through their daily activities (Włodarczyk, 2012).

Patients suffering from brain damage often claim that conventional rehabilitation exercises entail boring activities that are repetitive in nature and hence lead them to ignore these exercises. Today, most patients are familiar with the digital environment characterized by computers and handheld technology. According to studies, most patients (75%) with brain injuries are younger than 35 years of age (Tagliaferri et al., 2006), are relatively skillful in using computers and handheld devices. This resulted in a significant interest among health professionals concerning the use of computer games for the purpose of rehabilitation, where motivation is fostered during rehabilitation and hence the rehabilitation outcomes are ascertained (Macleane et al., 2002).

Additionally, conventional rehabilitation is not sufficient to facilitate the required level of therapy to meet patient's rehabilitation needs (Burdea, 2003). There is an increasing number of patients suffering from brain damage (Langlois et al., 2006; Aditya Widjana, 2011), particularly those who are involved in serious accidents. This led to the limitation in human resources, facilities and the burdening of health-care systems wherein the popular treatment is the conventional rehabilitation system that is monitored and controlled by the therapists in one-on-one patient sessions (Burdea, 2003). Moreover, the location of the rehabilitation centers are more in cities so patients living in rural areas have to travel far and spend a significant amount of money in order to get treatment. This is especially challenging for those with restricted mobility who eventually fail to get the rehabilitation treatment (Burdea, 2003). This explains why the delivery of rehabilitation programs, their scenarios and organization should be designed keeping the patient's needs and expectations in consideration.

Information and Communication Technologies (ICT) can play a crucial role in supporting rehabilitation for individuals with disabilities (Laabidi et al., 2014). For example, the use of serious games in cognitive and/or physical rehabilitation would be invaluable to the rehabilitation process and provides advantages that are lacking in conventional techniques, and more importantly it would increase the effectiveness and efficiency of rehabilitation.

A serious game is used for training and education purposes as compared with traditional (off-the-shelf) games, whose primary purpose is to entertain. Rego et al. (2010), define serious games as "computer games that allow the player to achieve a specific non entertainment purpose using the entertainment and engagement component provided by the experience of the game".

Research on serious games for cognitive rehabilitation is still in its infancy, compared to other types of disabilities (Torrente et al., 2012). Review of the current literature on the use of games for rehabilitation indicates some shortcomings, such as small sample size, limited time invested in usability and acceptance testing done on volunteers, able-bodied and healthy users, and lack of regard for the therapist who is one of

the principal end-users of the technology intervention (Fok, 2009; Burke et al., 2010; Jaeggi et al., 2011; Broeren et al., 2008; Rego et al., 2011). For example, Fok (2009) developed an Internet-enabled exercise program which integrates virtual telephone as well as computer-interfaced prosthesis allowing people with memory impairment to exercise at home. However, the testing was carried out on 40 healthy adults between the ages of 20–30. In addition, Rego et al. (2011) highlighted the impact of using new forms of interaction in serious games for cognitive rehabilitation and proposed a game prototype that players can play in three interaction inputs namely mouse, sound or motion. However, a small sample sized usability study was conducted involving 20 healthy users to evaluate the game. Furthermore, Broeren et al. (2008) studied the effects of virtual reality and games on patients with cognitive and physical deficiencies and the intervention involved only five brain-damaged patients.

Therefore, the requirements for the design of therapeutic games are not clear. There is a lack of knowledge regarding the actual requirements as most of the studies avoid the true end users. The question arises on whether such interventions will be accepted by the target group (i.e. patient and therapist). Jennifer et al. (2002) argues that users may not tell what they want, but if you show them something which they can see and interact with, they soon realize what they want. Hence, to capture the actual requirements and perception of users, Elaklounk and Zin (2012) determined principles of game design that are critical for brain damage rehabilitation and developed a game prototype called "Ship Game" based on these principles. The "Ship Game" was deployed for four weeks in one of the Palestine rehabilitation centers as intervention for cognitive rehabilitation. Twenty patients were involved in this study. Positive comments were received concerning the playability and usability of the "Ship Game" by the patients.

However, considering the patient as the sole end-user is an aberration as the therapist is the one who primarily motivates, guides, and assesses the patient. Therefore, therapist has a key role in the recovery of the patient and in the development of an effective rehabilitation system. Hence, the objective of this study is to investigate therapists' acceptance and examine the determinants affecting their intention to use serious games for acquired brain injury cognitive rehabilitation. To achieve this objective, we test our game prototype "Ship Game" with a large sample of therapists ($N = 41$). The therapists' acceptance and intention to use the game were measured through a questionnaire and later validated through interviews.

2. Technology acceptance

Technology acceptance refers to the inclination of the user to use the technology and how they perceive, accept and adopt it for the purposes it is designed to support (Louho et al., 2006). In an attempt to predict and explain individual's acceptance and intention to use technology, many theoretical models have been suggested, such as the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Innovation Diffusion Theory (IDT) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). Moreover, the Technology Acceptance Model (TAM) is among the leading models widely used to bring about the understanding of factors impacting the acceptance

Download English Version:

<https://daneshyari.com/en/article/483884>

Download Persian Version:

<https://daneshyari.com/article/483884>

[Daneshyari.com](https://daneshyari.com)