

Virtual reality as a leisure activity for young adults with physical and intellectual disabilities

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Abstract

Participation in leisure activities is a fundamental human right and an important factor of quality of life. Adults with intellectual disabilities (ID) and physical disabilities often experience limited opportunities to participate in leisure activities, virtual reality (VR) technologies may serve to broaden their repertoire of accessible leisure activities. Although the use of VR in rehabilitation has grown over the past decade, few applications have been reported for people with ID. Thirty-three men and women with moderate ID and severe cerebral palsy participated in the study. Each participant in the experimental group ($n = 17$) took part in VR activity two to three times weekly for 12 weeks. Virtual games were provided via GestureTek's Gesture Xtreme video capture VR system. The VR-based activities were perceived by the participants to be enjoyable and successful. Moreover, participants demonstrated clear preferences, initiation and learning. They performed consistently and maintained a high level of interest throughout the intervention period. VR appears to provide varied and motivating opportunities for leisure activities among young adults with intellectual and physical disabilities. Its ease of use and adaptability make it a feasible option for this population.

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1. Introduction

In recent years, virtual reality (VR) technologies have begun to be used as an assessment and an intervention tool in rehabilitation (e.g., Christiansen et al., 1998; Grealy, Johnson, & Rushton, 1999; Riva et al., 1999; Rizzo, Buckwalter, & Neumann, 1997; Rizzo & Kim, 2005; Schultheis &

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Rizzo, 2001; Weiss & Jessel, 1998; Weiss, Kizony, Feintuch, & Katz, 2006). Virtual environments provide people with disabilities with safe access to interactive and realistic situations that would otherwise be inaccessible to them due to their motor, cognitive or psychological limitations (Rizzo et al., 1997; Schultheis & Rizzo, 2001). The ability to change the virtual environment relatively easily, to grade task difficulty, and to adapt it according to the user's capabilities is an important asset of VR (Rizzo & Kim, 2005). Moreover, people who have experienced the use of virtual environments have reported the activity to be enjoyable (Rose et al., 1999), and it appears that participating in such activities can increase motivation for treatment and rehabilitation (Jack et al., 2001). While rapidly developing among various clinical populations, the utilization of VR for people with intellectual disabilities (ID) has been relatively limited. Reported research had mainly concentrated upon the use of VR for promoting daily living skills among higher functioning participants (cf. a review by Standen & Brown, 2005).

In addition to the more traditional therapeutic goals, VR also provides an environment in which leisure activities may be engaged in by individuals with disabilities who would otherwise be unable to perform them in "real life" settings. There is an ever-growing awareness of the importance of participation in leisure activities as a crucial component of quality of life among people with disabilities (Dattilo & Schleien, 1994; Thomas & Rosenberg, 2003; Van Naarden Braun, Yeargin-Allsopp, & Lollar, 2006). However, the degree of participation in active leisure activities by people with severe cognitive and physical limitations is often extremely limited (Frey, Buchanan, & Rosser Sandt, 2005; Hayden, Lakin, Hill, & Bruininks, 1992; Schleien & Ray, 1988). These findings are often attributed to the limited range of adapted activities (Hayden et al., 1992), and the intensive support required by this population in order for them to participate in leisure activities (Langone, 1996). Other barriers to participation in leisure for individuals with disabilities include inaccessibility to facilities, transportation limitations, and apprehension on the part of the caregivers (Specht, King, Brown, & Foris, 2002). Opportunities are gradually increasing with the adaptation of such activities as computer games (Michel & Cunningham, 1993), swimming (Hutzler, Chachim, Bergman, & Reches, 1998; Peganoff, 1984) and horseback riding (Land, Errington-Povalac, & Paul, 2001). Although some of these activities are readily available, others are expensive, not widely available and may involve a risk to personal safety. Therefore, the majority of pastimes available to this population still tend to involve sedentary activities such as watching television and modified arts and crafts activities (Specht et al., 2002).

A review of the literature on leisure for people with disabilities highlights the need for increased exposure to augmented leisure opportunities and documents the positive correlation between life satisfaction, self-esteem, companionship, enjoyment and relaxation and leisure satisfaction (Specht et al., 2002). The pervasive lack of opportunity for a wide choice of independent leisure time activities may contribute to the development of dependent behavioral patterns, learned helplessness and depression (Brett, 1997; Bryen, Slesaransky, & Baker, 1995; Mirenda & Mathy-Laikko, 1989; Specht et al., 2002). Previous studies reveal that provision of additional leisure opportunities as well as participation in leisure activities contributes to an improvement in self-confidence and self-concept amongst individuals with cognitive limitations, an improvement in social and motor skills, increased communication abilities, greater physical fitness and weight reductions (Fine & Fine, 1996; Raz, 1998; Suto, 1998). We suggest that independent leisure experiences such as those provided within virtual environments will serve to expand the repertoire of avocational opportunities available to adults with severe intellectual and physical disabilities.

In recent years GestureTek's Gesture Xtreme video capture VR system, originally developed as an entertainment system designed to demonstrate VR in science museums, has begun to be

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