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Introduction

Volition is often referred to as being the most important subsystem in determining an individual's engagement in occupation (Haglund & Kjellberg, 1999). Volition is defined as "a collection of dispositions and self-knowledge that predisposes and enables persons to anticipate, choose, experience, and interpret their occupational behavior" (Kielhofner, 1995, p.30). Since participation in learning is highly dependent on motivation and play is the major learning behavior of students, it is important to explore the characteristics in play environments that motivating and that engage students with intellectual disabilities as active participants.

A multi-sensory environment (MSE) is a designed space where stimulation can be controlled, manipulated, intensified, or reduced. The central concept behind the use of the rooms is the stimulation of the primary senses by utilizing a range of objects and materials (Hope, 1997). This dynamic environment allows the user to choose the stimulation of which they are in need. Pagliano (1999) stated that the MSE attributes include:1) Opportunity for affective/emotional development; 2) Stimulation for all senses; 4) Relaxation; 5)Facilitation of therapy; 6) Enhancement of communication; 7) Minimization of challenging behavior; 8) Development of self-determination; 9) Opportunity for social interaction with non-disabled children/families.

In addition, virtual reality (VR) play potentially offers students with disabilities the opportunity to participate in games otherwise inaccessible. VR is defined as immersive and interactive three-dimensional computer experience that responds to user's movements occurring in real time (Pimentel & Teixeira, 1994). VR offers a variety of people an interactive environment in which they can play, learn and develop skills.

Several studies examined the efficacy of a desktop VR a desktop VR program on the education and training of children to safe cross intersections (Lin, 2008; Lee, & Huang, 2007; & Lee, 2008; McComas, MacKay & Pivik, 2002). Participants learned safe street-crossing or way-finding within a virtual environment. Results showed significant changes in performance after trials with the VR intervention and some generalization to actual street-crossing behavior.

Pivik, McComas, Macfarlane and Laflamme (2002) conducted study where 60 children were required to manipulate a virtual wheelchair through a virtual environment where they were exposed to both environmental and attitudinal barriers. This experience resulted in increasing children's knowledge of accessibility barriers. Liu, & Lee, (2008) conducted a study comparing the effects between traditional computer games and virtual reality games on game-playing motivation of three children with cancer in homebound education. The results show that the effects of promoting game-playing motivation in virtual reality games were much better than those in traditional computer games.

The study will examine: a) whether certain VR in MSE are more motivating that others; b) the characteristics of motivation VR in MSE; c) the behavioral indicators of volition most elicited by VR in MSE.

Method

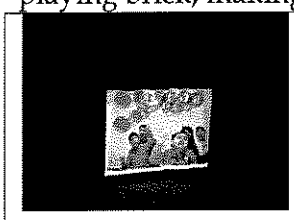
Subject

The child diagnosed with intellectual disabilities the age of 17 participate in this study.

Instruments

Virtual reality apparatus

The projected virtual system used in the current study was designed by Graduate School of Toy and Game Design at National Taipei University of Education. A video camera is used to capture and track the user placing them within a VR in MSE. When children reach with their arm or bend at the waist, they are able to score points or manipulate animations (e.g. playing balloon, playing brick, making ink painting) (see Figures 1, 2 and 3).



Figures 1 playing balloon application

Figures 2 playing brick application

Figures 3 making ink painting application

Observational assessment tool

There are 14 behavioral indicators of volition within the PVQ rated on a four-point scale.

Procedure

The participant completed three sessions of VR play intervention. Each intervention session play different game. As each game offered a new environment, the participant engaged in during a typical treatment session. All 3 VR sessions were videotaped. The research assistant controlled the computer system and facilitated the VR sessions.

Results and Discussion

The student with intellectual disabilities in the study achieved volition item rating raging from 3.0 to 4.0 with over all of the items scoring 3 or above. The results are summarized for each VR games in the MSE and are presented in Figures 3 . Graphs are compiled from data collected through PVQ behavior charts. Figure 4 shows the volitional scores of all the PVQ items.

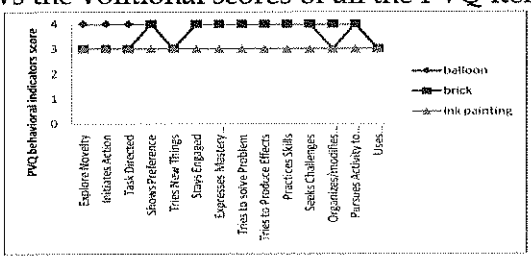


Figure 4 shows the volitional scores of all the PVQ items

The result indicates that VR play in MSE provides a good environment for fostering volition for this sample of the student intellectual disabilities (Lin, 2008; Lee, & Huang, 2007; & Lee, 2008; Liu, & Lee, 2008). According to Basu et. al. (2002) this indicates an involvement to spontaneous level of behavior. As VR is highly motivating, it facilitates active engagement of students with disabilities in play. Because the student is interacting in a space that offers relevant and optimal environment conditions, the environment is centralized to increase the student's motivation to engage in the VR activities. In addition, some VR applications offer the concept of entexturement in that they allow the student to regulated the aural or visual stimuli of the environment (e.g. rhythm, sound, light and color) in order to do the activity as if it were meant to be done, when the student was able to take the features of the environment and make them unique, their level of motivation increased as did their overall personal experience.

Conclusion

The overall volitional scores of students with intellectual disabilities in the current study indicate that VR game in multisensory environment is motivating activity and thus has potential as successful intervention tool. However, not all VR in MSE are equally motivating, it is important to explore the elements of different environments that forster motivation in students. The imformation will be useful in selecting a VR intervention activity for students with intellegent disabilities. In this study, VR in MSE offering variabilities, and challenge derived the highest scores of volition. This has implications for the the field of leisure and other professionals concerned with children's motivation it is vital for children with disabilities to have the opportunity to experience learning in a play environment. VR creates accessible for children with disabilities to engage in their learning. An accessible environment that is motivating will empower children with disabilities to take an active role in their learning.

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