

Chapter 23

The Development of Virtual Reality Technologies for People on the Autism Spectrum

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ABSTRACT

The role of virtual reality technologies to help people with autism has been well documented and is an area of research that continues to develop. While the evidence base is somewhat limited, there are many studies that have started to explore the potential of virtual reality technologies for people with autism. Work conducted by Strickland et al. (1996), Murray (1997), Charitos et al. (2000), Parsons and Mitchell (2002), Parsons et al. (2006, 2007), Cobb (2007), Fabri and Moore (2005), and Fabri et al. (2004) have all added to this positive picture of virtual reality technologies to support people on the autism spectrum, specifically in terms of social interaction and social skills development. This chapter uncovers the evidence base and work of others in relation to virtual reality technologies used by people with autism. This chapter concludes with a view as to what future work might pursue in this field.

INTRODUCTION

This chapter seeks to explore and present the use and role of virtual reality technologies (VRTs) for people on the autism spectrum. Although still at a very early stage of providing an evidence-base, VRTs have been used as a way to help enable people with autism to communicate, express emotion, develop social skills and test various social situations. The evidence-base for the role of VRTs has, to date, mainly been conducted in un-naturalistic environments (i.e. research labs,

technology centres,) and with small groups of participants. However, and this chapter will reveal, the evidence-base has provided a multi-faceted picture of the benefits VRTs can bring to autism user groups, and some successful outcomes have been reported. This chapter therefore seeks to outline some of the key work in the area of VRTs (including; virtual worlds, virtual environments, collaborative virtual environments and virtual reality), and will provide some analysis of studies carried out to date. Finally, the chapter will consider possible future areas of research and

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development within the context of VRTs and how the evidence-base could be reinforced; addressing some of the gaps in knowledge and work still to be done in this field.

OVERVIEW

Investigation into supporting children with autism using a variety of computer platforms and technology is growing as the evidence-base increases within research domains. While research has focused on providing evidence for the role technology can play in the lives of people with autism (i.e. social skills training, emotional recognition, developing language skills), there has been less focus or research conducted in off-the-shelf computer technology. Moreover research into the area of technology and autism tends to be measured in terms of positivist paradigms. Several studies have considered a greater level of interpretivist analysis but the views and opinions of the users of technology (in this case users with autism), is an area requiring a greater emphasis and further research. It is argued that by understanding these views and by gathering evidence through, perhaps case studies will enable designers, technologists and researchers to better develop material that is beneficial and appropriate to this specific user group.

This chapter provides an examination of the benefits and limitations of virtual environments (and more broadly computer technology) developed for and used with people with autism and ASCs. Through this review several key gaps in knowledge are identified and future directions outlined.

WHAT IS AUTISM: A BRIEF OVERVIEW

Autism is described as a “spectrum” disorder, ranging from “classic” autism, involving severe

learning difficulties, to high-functioning autism and Asperger’s syndrome, where typical levels of cognitive ability can be expected (Scott, 2002). However, all children and adults with an ASC experience difficulties with social understanding and communication skills. Baron-Cohen and Bolton (1993) state that autism is a condition that can affect children from birth or early childhood, and is a condition that leaves them unable to form typical social relationships or typical communication (Scott et al., 2002; Bolton et al., 1994). As a result of this, the child may become isolated from human contact and absorb the world in a repetitive, obsessive manner (Baron-Cohen and Bolton, 1993). Baird et al. (2003) describe autism as a “behaviorally defined disorder, characterised by qualitative impairments in social communication, social interaction and social imagination” (p1). Haswell et al. (2009, p.970) define children with autism as having “defects in motor control, imitation and social function”. Autism has a range in terms of diagnosis, and can be classified as high- or low-functioning; it can be located within the broader field of spectrum disorders (Bolton et al., 1994).

VIRTUAL REALITY TECHNOLOGY USED BY PEOPLE WITH AUTISM

In reinforcing the need to develop technological tools for people with autism, the international journal of research and practice *Autism* published a special edition in May 2010 – *Autism and Technology*, edited by Bolte et al. In this edition, the editors argue that “technological advances can potentially lead to novel and more effective treatment strategies and enhancing quality of life for people with ASD and their families” (Bolte et al., 2010, p.155). They go on to state how the lives of many have already begun to change as a result of successful computer technology initiatives. It is based on this type of statement that this work

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