A BRIEF REVIEW: ASSISTIVE TECHNOLOGY AND AUTISM

virtual tools for improved communication and emotional recognition

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OVERVIEW

• Introduction
• What is autism?
• AT and Virtual Spaces
• Future Directions
• Conclusions
INTRODUCTION

• AT have helped to aid communication for children and adults with autism

• VR, VE, CVE, 3D avatars (faces)

• Virtual spaces to help people with autism

• Explore, interact, understand

• Generalise social meaning and interaction
WHAT IS AUTISM?

• Spectrum: ‘classic’ to ‘high-functioning’

• Lack social understanding and communication skills

• From birth to adult life

• 1990’s = 0.03%

• 2005 = 1% (0.4%)
Assistive technology is technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible.

Can include mobility devices such as walkers and wheelchairs, as well as hardware, software, and peripherals that assist people with disabilities in accessing computers or other information technologies.

(University of Washington 2006: 1)
REVIEW OF VIRTUAL SPACES

- VR - as a learning tool to help engage children with autism

- based on: visual thought patterns, responsive to computer technology

- acceptance of this technology

- immersed themselves

- hand and head controls coordinated

- learning, interaction, immersing
More recently Wallace et al (2010) considered an Immersive Virtual Environment (IVE)

- This included a ‘Blue Room’ where participants were almost totally immersed

- Similar responses between TD and ASC groups

- Judging social situations was still poor for ASC participants

- Positive feedback from all participants and parents
REVIEW OF VIRTUAL SPACES

- CVEs

- CVEs to enhance and improve communication / emotional recognition in people with autism

- embedded a 3D face

- considered the theories of Ekman - 6 universal expressions
REVIEW OF VIRTUAL SPACES

Proposed using as a virtual head in their work (7-16 y.o):

• emotions can be visualised with limited facial features
• recognition rates (of virtual faces) are comparable to real-life images
• some expressions are easily recognisable and potentially build a basis for emotionally expressive avatars in CVEs
• 88% of the participants were able to
REVIEW OF VIRTUAL SPACES

• VEs and CVEs (Fabri and Moore) in conclusion:
  • an assistive technology
  • educational technology
  • address ToM
REVIEW OF VIRTUAL SPACES

• VE - Parsons et al / Cromby et al (15 y.o)
  • treated like a game
  • recognising changes and use
  • generalisation of skills
  • shopping task + cafe - eg.
  • teach transferable skills
  • single-user environments

  • from this body of work we know that users are able and happy to use computers as an interface
  • the first time VEs are used in a classroom context
  • involve qualitative analysis (considering ‘their’ views)
  • interviewed participants after using a VE in a cafe and on a bus - then compared to their responses in ‘real-life’
  • concluding that VEs can help to teach social skills
WHAT DOES THIS TELL US?

- People (children) on the autism spectrum are:
  - able to use VEs, CVEs, VRs
  - happy to accept them as a reality
  - able to become immersed (compared to typically developing peers)
  - able to communicate and adhere to some social conventions
WHAT DOES THIS TELL US?

• Graphics can (and should) be made as realistic as possible

• Some skills are generalisable (although only a few)

• Design should involve users (to some degree)

• Integration to school teaching is desirable - to achieve best outcomes (aligned to educational goals)

• In summary...
CONCLUSIONS

Advantages afforded by VEs:

- Increased focused attention
- Increase in-seat behaviour
- Role play
- Testing social / communication skills
- Control of input and navigation
- Secure and free from ‘social’ complications

Some possible issues:

- Agitation
- Lack of immersive behaviours
- Graphics can hinder immersion and ‘playability’
- Only off the shelf VEs available (bespoke)
- No design input from ASD users
- Unusual behaviour related to object interactions
VIRTUAL WORLDS
VIRTUAL WORLDS?

• It can be seen that virtual ‘spaces’ can contribute to expressive and immersive behaviours of people with ASCs.

• Virtual Worlds are being used by these communities, but to date no formal studies have identified how and why users with ASC interact and behave.

• I believe that the superior graphics, expressive tools, and engaging interface could offer something to the ASC community - in alignment with VEs, but offering something more (a greater number of people to interact with).
VIRTUAL WORLDS?

In a very brief correspondence Fusar-Poli et al (2008) hypothesise that Second Life could be used to “develop social and communicative skills of autistic people.”

They go on to suggest the same affordances for users with autism, as scholars such as Cobb, Parsons, Moore, Fabri, stating that:

“…it allows anonymous social interactions, and provides high levels of social interactivity but without complex linguistic and social-behavioural processing necessary for face-to-face conversations”

“levels the playing field for autistic people” in that it offers a new space to rehearse social skills
VIRTUAL WORLDS?

Some others working in this area include:

- Bignell (SL)

- DeAngelis (SL) - therapy intervention

- Gillen et al (Teen Grid) - communication, teamwork, leadership, creativity

- There are spaces/places in SL for people with ASCs (awareness centre, groups, support groups)
**FUTURE CONSIDERATIONS**

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**Monday, 8 November 2010**

*My school next year is Arthur Slate.*

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* My future school can fly and we play and eat a lot. It is 100 miles away in the future. It is a pizza school and we can eat the school. *Grace*
FUTURE CONSIDERATIONS

• **What do we not yet know:**
  • Design of avatar/s
  • Engaging tasks - group and collaborative tasks (with school facilitators)
  • Embed into the classroom - and maybe beyond?
  • What the students might like to see in VWs
  • Further qualitative information/data to support the above notions
  • Cont....

My future school can fly and we play and eat a lot. It is 100 miles away in the future. It is a pizza school and we can eat the school.
FUTURE CONSIDERATIONS

• Easy to use and access emotion tools - expressive

• Easy to navigate and locate people / places

• Provide a ‘safe’ space for children with autism - ‘structured’ and ‘same’

• There are some spaces and areas for users with autism, but no formal evaluations available
THE FUTURE OF THIS STUDY

• As a result of the research presented, a gap in knowledge is appearing

• This seems to be: the use of virtual worlds in a classroom for children with autism - exploring emotion and social interaction (communication)

• Meaning that a study has not been carried out in this area, using VWs
THE FUTURE OF THIS STUDY

1. How can virtual worlds be modified and introduced into a classroom setting, in schools for children with autism?

2. How can virtual worlds be used to encourage learning and participation in children with autism?

3. Can social skills (including emotional expression and recognition) be taught through the use of a virtual world?
QUESTIONS

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