

**Seminar 3: From Socio-cognitive research to
information technology for autism spectrum disorders**

Friday 11th November, 2005

Moray House School of Education, University of Edinburgh
Paterson's Land, Room G21

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| 09.00 | Registration (G21) |
| 09.30 | Thusha Rajendran
<i>School of Education, University of Edinburgh</i>
Computer-mediated communication in autism |
| 10.15 | Tomas Tjus
<i>Department of Psychology, University of Goteborg, Sweden</i>
Improving reading and communication in children with autism
using a specific multimedia strategy |
| 11.00 | Coffee – in ‘Chapters’ |
| 11.30 | Miriam Silver
<i>Child Psychology Department, Northampton General Hospital</i>
Developing and piloting a computer programme to teach children with ASD about
emotion: the Emotion Trainer |
| 12.15 | Sarah Parsons
<i>School of Education, University of Birmingham</i>
Context and representational understanding in the use of virtual environments
by adolescents with ASD |
| 13.00 | Lunch – in ‘Chapters’ |
| 14.00 | Aline-Wendy Dunlop (University of Strathclyde) Scottish Autism Service Network |
| 14.15 | David Moore
<i>School of Computing, Leeds Metropolitan University</i>
Collaborative virtual environment technology for people with autism |
| 15.00 | Ben Robins
<i>Adaptive Systems Research Group, The University of Hertfordshire</i>
Robots as assistive technology - can we encourage basic social interaction skills
in children with autism? |
| 15.45 | Coffee – in ‘Chapters’ |
| 16.15 | Discussant: Tommy MacKay
<i>Psychology Consultancy Services / University of Strathclyde</i> |
| 16.45 | Close of seminar |

Selection of Abstracts

Please note that these abstracts relate to seminar presentations, rather than to formal publications and, as such, should not be cited without the permission of the author

Computer-mediated communication in autism

Thusa Rajendran

School of Education, University of Edinburgh

I will describe two computer-based studies. Firstly, computer-mediated communication in individuals with Asperger syndrome (AS), Tourette syndrome and Neurotypicals was explored. Two scenarios, based on Happé (1994), were adapted to investigate understanding of figure of speech and sarcasm, and a third looked at responses to inappropriate requests (lending money and disclosing home address on a first meeting). Dialogue transcripts were assessed by raters who were blind to the clinical diagnoses. Analysis revealed a complicated relation between AS, verbal ability and executive abilities with respect to communication and social cognition.

Secondly, referential communication individuals with AS and Neurotypicals was compared between text chat and telephone, using a route-solving task. Generally, individuals with AS were equally competent in solving the task in both media, but less efficient than the typically developing comparison group. Individuals with AS who had higher measured executive ability adopted a similar approach to the comparison group, asking about landmarks on the map to deduce the route taken. In contrast, AS participants with lower executive ability used an inefficient left/right questioning strategy, which occupied more time, required more conversational turns and was associated with a higher rate of error.

Improving reading and communication in children with autism using a specific multimedia strategy

Tomas Tjus

Department of Psychology, University of Goteborg, Sweden

On the basis of several field studies it is concluded that a focused multimedia strategy might boost literacy and communicative development in children with autism. An educational strategy that combines motivating multimedia material in combination with good teacher support and recasting technique leads to both better language and communication skills (Heimann et al, 1995; Tjus, 1998; Tjus et al, 1998, 2001, 2004). The aim of the strategy was to maximise the opportunities for exploring literacy and language structures through different modes (text, speech and animations). All children used the program in addition to their ordinary reading and language training. Children with autism are unique in their needs but they also share many abilities and needs with other children with or without disabilities e.g. their need for feeling comfortable and having fun when learning. This presentation will show that factors like students' enjoyment and interaction with their teachers might play an important role for language learning for children with autism in addition to well known factors such as their level of language and cognitive development.

Context and representational understanding in the use of virtual environments by adolescents with ASD

Sarah Parsons

School of Education, University of Birmingham

There has been increasing interest over recent years in the application of virtual reality (VR) technology to facilitating skills and understanding for children with autistic spectrum disorders (ASDs). This paper presents a summary of a series of studies that sought to investigate three main research questions; would adolescents with ASDs be able to: (1) Use Virtual environments (VEs) appropriately? (2) Understand them as representational devices? (3) Learn new information from VEs about social skills? Overall findings suggest that some adolescents with ASDs can use, understand and learn social skills/conventions presented in VEs although some students with lower verbal IQ and weak executive skills benefited less from this kind of intervention. The main challenge now is to reflect on these findings in order to shape future work.

It is an exciting time for VR researchers because the potential for creating beneficial outcomes for children with ASDs is a distinct possibility but there is also a need for researchers to be clear about their aims and why participants with clinical diagnoses (including autism) are involved in studies. There are a number of possible ways in which this work could be taken forward and each raises its own set of ethical, practical and conceptual issues. A brief discussion of some of these (including issues of generalisation, ‘veridicality’ of representations, the role of scaffolding and the involvement of less able children with ASDs) aims to highlight the complexity of the challenges ahead.

Collaborative Virtual Environment Technology for People with Autism

David Moore

School of Computing, Leeds Metropolitan University

We present a case for the use of collaborative virtual environments (CVE) as a potentially valuable technology for people with autism. We argue that CVE technology can potentially benefit people with autism in three ways – as an assistive technology, as an educational technology and as a means of helping address any Theory of Mind impairment. This potential has, however, been subject to very little empirical work, and this provides the motivation for our exploratory studies of CVE for people with autism. In our talk we will briefly outline these studies. We will also refer briefly to our work involving the development of a “story builder shell” – a system designed to help parents and carers of children with autism to create individualised computer based learning material for their children.

Robots as assistive technology - can we encourage basic social interaction skills in children with autism?

Ben Robins & Kerstin Dautenhahn

Adaptive Systems Research Group, The University of Hertfordshire

The work presented in this talk is part of the Aurora project (www.aurora-project.com) which investigates the potential use of robots as therapeutic or educational ‘toys’ encouraging social interaction skills specifically in children with autism. The talk focuses on ways in which a humanoid robot can engage autistic children in simple interactive activities such as turn-taking and imitation games, and how the robot can assume the role of social mediator, encouraging the children to interact with the robot, with each other and with co-present adults.

Based on the video material documenting the interactions, several quantitative and qualitative analyses were conducted. Qualitative analyses in the form of case-study evaluations of segments of trials are presented, observing the children’s activities in their interactional context. The analyses revealed aspects of social interaction skills (such as imitation, turn-taking, role-switch, body-orientation) and communicative competence that the children showed, in a spontaneous, proactive and playful interactions. The results show how children exhibited interaction skills where the robot, assuming the role of a social mediator, served as a salient object mediating joint attention with other people (adults and children).

Selected references:

Aurora project: <http://www.aurora-project.com>

B. Robins, P. Dickerson, K. Dautenhahn (2005) Robots as embodied beings - Interactionally sensitive body movements in interactions among autistic children and a robot. *Proc. IEEE Ro-man 2005*, 14th IEEE International Workshop on Robot and Human Interactive Communication, Nashville, USA, 13-15 August 2005, pp. 54-59.

B. Robins, P. Dickerson, P. Stribling and K. Dautenhahn (2004) Robot-mediated joint attention in children with autism: A case study in robot-human interaction, *Interaction Studies: Social Behaviour and Communication in Biological and Artificial Systems*, 5:2, pp. 161–198.

B. Robins, K. Dautenhahn, R. te Boekhorst, and A. Billard (2005), Robotic Assistants in Therapy and Education of Children with Autism: Can a Small Humanoid Robot Help Encourage Social Interaction Skills? *Journal Universal Access in the Information Society (UAIS)*, Springer-Verlag, in press

B. Robins, K. Dautenhahn, R. te Boekhorst, A. Billard (2004), Robots as Assistive Technology - Does Appearance Matter? , *Proc. IEEE Ro-man 2004*, 13th IEEE International Workshop on Robot and Human Interactive Communication September 20-22, 2004 Kurashiki, Okayama Japan, IEEE Press, pp. 277-282.

Ben Robins, Kerstin Dautenhahn, Janek Dubowski (2004), Investigating Autistic Children's Attitudes Towards Strangers with the Theatrical Robot - A New Experimental Paradigm in Human-Robot Interaction Studies , *Proc. IEEE Ro-man 2004*, 13th IEEE International Workshop on Robot and Human Interactive Communication September 20-22, 2004 Kurashiki, Okayama Japan, IEEE Press, pp. 557-562.

K. Dautenhahn, I. Werry (2004) Towards Interactive Robots in Autism Therapy: Background, Motivation and Challenges. *Pragmatics and Cognition* 12(1), pp. 1–35.

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