Hanging out at the computer lab: How an innovative Australian program is helping young ‘Aspies’

Greg Wadley
The University of Melbourne
Parkville, Vic 3010
greg.wadley@unimelb.edu.au

Stefan Schutt
Victoria University
Footscray, Vic 3011
stefan.schutt@vu.edu.au

ABSTRACT
Technology-based interventions for young people diagnosed with autism have focused largely on individual use. Yet research into use of technology ‘in the wild’ emphasises the value of computer-mediated social interaction. In this paper we use HCI to examine the success of a program premised on the social use of technology in safe offline spaces. Participants typically go through stages of object-centred and computer-mediated communication before engaging in face-to-face interaction. We use the concepts of third place, social distance and ticket-to-talk to explain how this hybrid space helps ‘Aspies’ engage comfortably in social interaction.

Author Keywords
High-functioning autism, Asperger’s syndrome, computer-mediated communication, third place, object-centred sociality, social distance

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.
J.3 Life and Medical Sciences: Health.

INTRODUCTION
This paper explores a case of co-located technology use within The Lab, a club for young people diagnosed with Asperger’s Syndrome or high-functioning autism. A previous paper by Rizzo et al. (2012) analysed The Lab using educational theory; here we use human-computer interaction (HCI) and other theory to better understand the role of technology within the program. In so doing we respond to calls for HCI to consider the use of technology by people with autism (e.g. Dalton, 2013).

The Lab offers an out-of-school interaction space for young people aged 10 to 16 who are ‘Aspies’, the self-identifying term (Willey, 1999) we are adopting for this paper. 12 to 20 participants use computers in a safe space moderated by two paid technology mentors. Parents/carers also meet nearby. The program has expanded to nine Labs around Australia, with more planned. Each is auspiced by a local organisation and overseen by a non-profit national entity.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

Lab participants have a high degree of freedom in how they spend their time. They can choose to learn technology skills, play computer games, or socialise with others. Many struggle to engage socially at school; thus the degree of interaction at The Lab is striking, with a number of families reporting that their child’s best, or only, peer social interaction occurs at The Lab.

A recent evaluation has noted these benefits and recommends the program be expanded (Donahoo & Steele, 2013). It proposes that four success factors underpin the Lab’s success:
• the commitment of Lab founders
• the overall approach taken to The Lab
• the personal and professional characteristics of mentors
• the nature of the physical space (p. 2)

We agree that these factors play a role. However none relate specifically to the nature of autism, nor to the key activity of the Lab: interaction with and through technology. We believe that a full explanation of therapeutic outcomes will involve theories both of autism and technology use, and that particular aspects of the human-computer interactions that occur at the Lab interact with aspects of autism to create the positive outcomes observed. To make this case we first summarise the nature of high-functioning autism, and how those diagnosed with it engage in Lab activities. Then we review a number of theories with potential to explain the therapeutic effect of these activities. We conclude by acknowledging that this paper represents a first attempt at such an explanation, and propose further research that may explore these topics in greater depth.

HIGH-FUNCTIONING AUTISM AND ASPERGER’S
People diagnosed with autism have difficulty understanding the social and communicative aspects of everyday interactions with others (Baron-Cohen, 2000). They sense the world differently, and may not ascribe mental states to others in the way ‘neutypicals’ do (Bracher, 2012). At the high-functioning end of the autism spectrum, however, cognitive abilities are not impaired, and IQs are in the normal range. But Aspies exhibit marked impairment in social interaction, sensory hypersensitivity and poor motor skills. Many develop repetitive, stereotypical behaviours and may have intense preoccupations with narrow interests and activities (Baron-Cohen, 2008). Whilst sometimes facilitating the development of specialised skills, these preoccupations can lead to social isolation and disengagement.

Attwood (2005) and Baron-Cohen (2000) argue that high-functioning autism is not a disability but a different cognitive style. Attwood summarises: “The brain is wired differently, not defectively. The person prioritises the
pursuit of knowledge, perfection, truth, and understanding of the physical world above feelings and interpersonal experiences” (p. 46). Yet the life prospects of Aspies suffer because their abilities do not compensate for, and may even mask, their difficulties in social interaction (Mordre et al., 2011). Gillberg (2001) states that some characteristics of high-functioning autism may be prerequisites for certain forms of creativity, including the ability to persevere, a striving for perfection, concrete intelligence, and a disregard for social conventions. Indeed, Markram et al.’s ‘intense world’ theory (2007) suggests that those with autism have ‘super-charged’ brains, resulting in hypersensitivity to social settings and hyper-empathy with other people.

Many approaches have been proposed to enhance the life prospects of children with autism. Strategies that have proved successful and that are in use at The Lab include mentoring (Grandin, 2010), the use of peer settings (Mastergeorge et al., 2003), the harnessing of special interests and talents (Attwood, 1998) and social skills training (Reichow et al., 2012). However, relatively little research has been undertaken with those over 12 years old (Wang & Spillane, 2009), despite evidence of increasing social impairment and distress with age (Tantam, 2003).

**TECHNOLOGY USE BY ASPIES**

Aspies tend to be drawn to computers (Putnam & Chong, 2008). But although significant research has aimed to build technology for young people with autism, much has focused on single-user training software for areas such as social cue recognition and the organisation of daily life. By contrast recent HCI research has examined Aspies’ use of and preference for online, asynchronous, text-based interaction. Burke et al. (2010) found that adult Aspies strongly desire social contact, but find it difficult to initiate, and thus seek it in interest-based online community, which “provides additional time to think of a response, removes pressure for eye contact, and reduces self-consciousness about paralinguistic cues” (p. 428). Some use online connection as a stepping-stone to offline friendships; however, in the absence of mentoring, attempts at maintaining friendships often run into difficulties because of misunderstandings involving trust, disclosure, and social norms.

Other researchers have designed therapies that build upon this facility for online communication. For example Hong et al. (2013) studied a social networking therapy: however interaction was managed by parents and rarely extended beyond family. Online therapies for autism treat the problem identified by Burke et al. (2010) that social skills may not transfer to offline settings. Little research has examined use in offline settings: by contrast our research concerns a therapy that employs both online and collocated technology use and directly addresses the transfer of skills to face-to-face interaction.

**THE LAB: A NOVEL INTERVENTION FOR ASPIES**

The Lab offers weekly two-hour sessions held at third-party locations after school or on weekends. Two software developers work as mentors for 12 to 20 young people engaging with activities and technologies which can include learning programming, setting up a Minecraft server, creating a computer game, designing a comic strip, or experimenting with Arduino hardware kits. The only structured group activities are ‘maker’ competitions. The Lab is deliberately unlike school environments and offers a venue where Aspies can unwind after an (often difficult) school day, meet one another, play, swap information or learn new skills.

The Lab concept developed out of a previous project run by its co-founders that deployed individual mentoring. It was also inspired by two US-based programs: the 826 Valencia project, which combines a writing workplace with a drop-in literacy centre for local children, and the Computer Clubhouse, an international network of computer clubs for underserved young people based on constructivist principles.

**WHY THE PROGRAM IS EFFECTIVE**

Evidence suggests that the Lab has been successful, although it is not entirely clear why. An independent evaluation from late 2012 (Donahoo & Steele, 2013) outlines a range of positive impacts. Through interviews with parents, participants and staff, as well as examination of existing data from surveys and email feedback, the evaluators found that the Lab was ‘transformative’ in its impacts (p.6). Impacts on child wellbeing included development of new friendships, enhanced happiness, improvements in mental health, cessation of harmful behaviours, positive changes to medication management, development of technical skills, heightened motivation to learn, increased engagement with school, and the perception of career possibilities in IT. Impacts on family wellbeing included a new appreciation of, and pride in, children’s skills, reduced parental stress levels, expanded parental support networks, improved household function, and improved relationships with siblings of participants.

In this section we draw upon existing theory to understand participants’ enthusiasm for The Lab’s activities, and why engagement in these activities leads to the improvements cited above.

**The Lab as a social space**

Ray Oldenburg’s description of the “third place” (1989) captures much about The Lab. Like the cafes and community centres described by Oldenburg, the Lab is neither home nor work/school but is a neutral space characterised by regular attendance, a sense of play, sociality and equality, and an understanding that one’s individuality is recognised and valued. Lab participants are judged by their peers for what they bring to the space, not their social rank outside it. Technology and game skills are valued and are major topics for conversation.

The layout of the Lab space is important. It is open-plan, not tightly controlled by staff, and provides participants with a high degree of individual control over their environment. Participants can bring their own laptops, and by choosing where they sit and how they orient, can hide their on-screen activity or choose to whom it is exposed: compare this to a traditional classroom or
computer-lab in which users have no control over visibility. The importance of control is evidenced occasionally when a participant becomes anxious if someone takes their spot.

LAN cafés and parties - physical spaces where people gather to play computer games - offer a useful comparison, since they too can be seen as activity-based ‘third places’. Attendees are motivated by a range of factors including the desire to belong, to perform, to spectate (Taylor and Witkowski, 2010), to make social contact with others and to learn more about games (Jansz & Martens, 2005). In a study of school-aged gamers, Beavis et al (2005) contended that LAN cafés are “liminal spaces situated at the margins of Australian culture and located at the junctions between home, school and the street, online and offline spaces, work and play” (p.1), with managers acting as informal teachers. This closely mirrors the setup of the Lab.

At LAN events and at the Lab, online gaming involves physical co-location. At some noisier Lab sessions participants will shout across the room to each other about their online interactions. Even when not co-located, online gamers gain social benefits. Strong friendships and emotional bonds have formed within multi-user games (Griffiths et al, 2011) and evidence suggests that such bonds extend into offline social support (Trepte et al, 2012). Games “may allow players to express themselves in ways they may not feel comfortable doing in real life because of their appearance, gender, sexuality, and/or age” (Cole and Griffiths, 2007).

The Lab also provides a social space and sounding board for participants’ parents, many of whom experience significant isolation. Strategies and stories are shared in a separate but nearby room. This facility is a core element of the Lab; it is seen by managers not only as a support mechanism for parents but as a way to ensure that children can ‘hang out’ for two hours with their peers, free from parent scrutiny.

**Social distance through mediated communication**

Burke et al. (2010) point out that for Aspies who find face-to-face contact difficult and who are hypersensitive to environmental stimuli (cf. Markram et al., 2007), computer-mediated communication is an ideal way to reach out to others because it creates a safe ‘social distance’ between interlocutors.

We observe that Lab participants often converse with each other via technology even though they are co-located. A ‘social distance’ explanation would predict that as social anxiety eases, participants should shift their communication preference from mediated to face-to-face. This accords with our observations: children who are anxious because they are new to The Lab or have recently had a difficult time (such as being bullied at school) are more likely to prefer mediated communication, yet as confidence increases, face-to-face communication becomes more common. The important feature of the Lab is that, unlike school, it allows participants to control the degree of social presence they project and receive. Whilst Turkle (2012) fears that technology is making us ‘alone together’, a degree of this may be desirable when seeking to ease into social situations that are initially frightening.

**Technology as “ticket to talk”**

Theories of object-centred sociality (see e.g. Ploderer et al., 2012) suggest that Lab participants use technology as a ‘ticket to talk’ with other participants. Object-focussed activities provide ice-breakers for conversation among people who are not well-known to each other. In a room full of technology and technology fans, games and computers are a convenient source of conversation topics.

Lab staff observe that many participants, even when verbally uncommunicative at first, are highly curious about what other participants are doing on screen, especially when interests match. This leads to initial conversational approaches that are highly object-centred, with subsequent interactions becoming more wide-ranging over time. A progression can therefore be seen from human-computer interaction via computer-mediated interaction to face-to-face interaction.

Though it appears that Lab participants use mediated interaction as a prelude to face-to-face interaction, it would be wrong to regard the former as merely a substitute for the latter. Mediated interaction has become a norm for young people: Ito et al (2010) describe how children socialise through social media, learning to ‘negotiate issues of identity and belonging within peer cultures’ (p. 9). Thus mediated interaction at The Lab help participants acquire social skills that are not merely stepping-stones to “real” socialising, but embody the actual practices of their generation.

**CONCLUSION**

The activities taking place at The Lab can be framed in a number of ways: as a form of HCI, a constructivist education program, an autism intervention or a technology-mediated therapy. In other health domains researchers are investigating the use of technology to improve social connectedness for people who are isolated because of disability or stigma. Isolation contributes to negative outcomes and is a risk factor for those with autism and other conditions (Holt-Lunstad et al., 2010).

The Lab can be seen as a form of technology-based therapy, albeit one that is unusual because it inhabits a hybrid space between mediated and face-to-face communication, incorporating elements of both in complex combinations. This hybrid appears ripe for further investigation for what it may tell us about the relationships between online and face-to-face communications, and the potential of technology to make a positive difference to people’s lives, including - but not limited to - those living with autism.

**ACKNOWLEDGMENTS**

We thank Bernd Ploderer, Dale Linegar, Paul Staubli and Alberto Rizzo for their ideas and suggestions.
REFERENCES


