SIDPDF: Articles

The Online Lab: Piloting video-based digital participation for isolated young people with high functioning autism

Stefan Schutt

Director, Whittlesea Tech School,
Melbourne Polytechnic, Australia
stefanschutt@melbournepolytechnic.edu.au
Corresponding Author

This article reports on a 2016 pilot of a video-based technology mentoring program undertaken with young Australians with high functioning autism who are socially and geographically isolated. Many young people with autism live with deep social isolation due to their difficulties in mixing easily with others; this is further exacerbated for those living in geographically remote areas. These young people are subject to acute forms of exclusion, yet have long tended to be highly adept at the use of technology. The Online Lab *is based on The Lab, a national network of face-to-face technology and social clubs for young people with high functioning autism. The pilot involved 25 remote or regional young people from three states. Synchronous weekly online sessions were led by expert mentors, with up to six young people participating via the Zoom video conferencing platform.*

The evaluation combined qualitative methods that could be administered remotely with local methods and de-identified usage statistics. It drew on the notion of 'differentiated spaces' as devised by Lye Ee Ng in her doctoral work at The Lab, which recognises that online, offline and personal spaces interact to facilitate different forms of social interaction. The evaluation concluded that the pilot was a

Schutt, S. (2018). The Online-Lab: piloting video-based digital participation for isolated young people with high functioning autism. *The Journal of Community Informatics*, 14(1), 120–-138.

Date submitted: 2018-10-01. Date accepted: 2018-10-15.

'qualified success'; The Online-only format working effectively for some types of participants with high functioning autism, but less so for others. A number of related findings and recommendations will be outlined in this article. This article will also outline how these findings have been incorporated into the rollout of The Online Lab *by The Lab organisation in 2017 and 2018, and how the program's subsequent activities are, in turn, feeding back into The Lab's understanding of how to effectively use technology for mitigating social isolation.*

Introduction

Understanding everyday social interaction is difficult for people diagnosed with autism (Baron-Cohen, 2000) because they process the world differently to 'neurotypicals' (Bracher, 2012). This can lead to significant social isolation, even for those on the so-called 'high functioning' end of the autism spectrum whose cognitive functions are unimpaired. Attwood summarises the different cognitive style of those with high functioning autism: 'The brain is wired differently, not defectively. The person prioritises the understanding of the physical world above feelings and interpersonal experiences' (2005, p. 46). Strategies to address the social issues encountered by young people with autism have included mentoring (Grandin, 2010), the use of peer settings (Mastergeorge Rogers, Corbett & Solomon, 2003), the harnessing of special interests and talents (Attwood, 1998) and social skills training (Reichow, Steiner & Volkmar, 2012).

For young people with autism living in remote areas, the potential for isolation is even more pronounced. However, the internet era has generated new possibilities for mediating this isolation, especially given that people with autism have long tended to be drawn to computers (Putnam & Chong, 2008) and technology-based social skills programs have shown to be effective with children with autism (Walsh, Holloway, McCoy & Lydon, 2017; Nojavanasghari, Hughes & Morency, 2017; Grynszpan, Weiss, Perez-Diaz & Gal, 2013). Indeed, as Burke, Kraut and Williams (2010) found, adults with high functioning autism strongly desire social contact but find it difficult to initiate, and so gravitate towards interest-based online communities. Some researchers have designed therapies that leverage online communication, such as Hong et al.'s 2013 examination of a family-based social networking therapy. Online therapies for autism, however, risk the problem identified by Burke et al. in 2010 that social skills may not transfer to offline settings. This problem was observed in text-based interaction, whereas real-time online video conferencing may offer new ways to develop social skills as well as mitigate isolation. Indeed, video modelling has long been used to teach social skills to children with autism (Haydon et al., 2016; Reed, Hyman & Hirst, 2011). This was the premise behind *The Online Lab* pilot program, which was in turn based on The Lab, a face-to-face social and technology skills program for 10- to 16-year-old young people with high functioning autism.

The Lab (www.thelab.org.au) was founded in 2011 to provide a weekly social space where young people with high functioning autism can meet, make friends and learn technology skills from expert IT mentors (Schutt, Staubli & Rizzo, 2015; Wadley & Schutt, 2013). Beginning with one location in inner-western Melbourne, The Lab has since grown into a national network of 22 sites overseen by a not-for-profit company that runs approximately 300 two-hour sessions per school term.

Face-to-face Labs are ideally predicated on two spaces: a flexible space where participants and mentors interact, and another where parents and guardians gather while their children are taking part in Lab sessions. Locations are generally sourced for no cost or low cost from community organisations, governments or businesses that have a desire to 'give back' to the community. When The Lab started in 2011 it did not seek out spaces from local schools; the conclusion at the time, based on advice received from The Lab's advisors (young people with autism), was that The Lab needed to be as 'unlike school' as possible. The typical school classroom with its rows of desks was said to both remind participants of their frequently problematic school lives, and limit opportunities for social interaction. However, since then, the movement towards more open and flexible learning spaces has meant that Labs are now increasingly likely to be housed in amenable school-based spaces.

Regardless of the kind of physical space, however, issues related to accessibility and equity arise when physical spaces are at the core of program delivery. Firstly, isolated young people living in remote or regional areas, or those living far from existing Labs, are not able to access the opportunities afforded to others who are more centrally located. Already parents and guardians of Lab participants have been known to travel significant distances (2-3 hours' drive each way) to attend sessions. Secondly, Labs are not always located at places of greatest demand. The Lab is founded on low-cost access for participants and so spaces are sourced on the basis of availability and the willingness of local organisations to donate spaces or rent them at low cost. A further factor is the location of groups or parents who have the determination and wherewithal to set up a local Lab. Lastly, existing Labs are not always able to cater even for local demand, with waiting lists common.

The Online Lab

As early as 2014, Lab mentors raised the possibility of running an 'online only' version of The Lab. As this article's section on Differentiated Spaces outlines, Lab participants' patterns of social interaction involve complex and nuanced combinations of online and face-to-face activity. We wondered whether an online-only adaptation of The Lab could replicate some or all of its previously evidenced positive impacts (Donahoo & Steele, 2013) – notwithstanding that The Lab had previously been based on face-to-face contact – and in the process produce new opportunities for young people who might otherwise have no access to the kinds of social interaction and skills development offered at The Lab.

In 2015, *The Online Lab* project team secured funding from the Lord Mayor's Charitable Foundation, a philanthropic body based in Melbourne, Australia, to run a six-month Online Lab pilot in 2016 with up to 20 young people. The pilot took place from July to December 2016, with human ethics approval received from Victoria University in July 2016. This pilot included a mixed-method evaluation with data collection taking place throughout the pilot and analysis undertaken in early 2017. This article reports on these evaluation findings, as well as the subsequent rollout of a weekly Online Lab program by The Lab.

Planning The Online Lab

The Online Lab rollout plan consisted of five stages:

Table 1: Online Lab Rollout

Stage	When?	What?
Stage 1: Scope	October – December 2015	● Conduct a Best Practice technology review/report involving gathering ideas/solutions from a range of listed experts and organisations and producing recommendations ● Source project staff (mentors and developers)
Stage 2: Build	January – February 2016	● Develop *The Online Lab* web portal ● Finalise research methods and tools ● Source, create and upload project ideas to The Online portal
Stage 3: Test	March – April 2016	● Trial *The Online Lab* web portal with coordinator, mentors and participants ● Hire mentors ● Write Victoria University Human Research Ethics application
Stage 4: Release	July – December 2016	● Release *The Online Lab* web portal ● Finalise participant selection, including liaising with parents and participants ● Write and collect field notes, comments, feedback ● Undertake iterative improvements to The Online Lab system
Stage 5: Research	December 2016 onwards	• Collect, analyse and report on data

Below we expand on what we believe are the most noteworthy aspects of these five stages in terms of this article.

Practice Review

The Online Lab project began with a documented 'practice review' of other online technology projects working in aligned areas. This practice review examined the technologies deployed by other distributed online projects working with groups of young people, and was undertaken by *The Online Lab*'s coordinator who was also The Lab's part-time national coordinator.

The review focused on identifying the kinds of 'hands-on' technology solutions and approaches that might work best to underpin the rollout of *The Online Lab*. The reviewer concluded that the closest match was the successful Games Net project[1] run by the Australian Centre for the Moving Image in Melbourne. Games Net ran computer games workshops for 9- to 15-year-old school students, both in person and online. As a project also based in Melbourne, the team was fortunate to access the expertise of Games Net manager Vincent Trundle in person. As a result of these consultations and the review of other available options, the team opted for a similar combination of communication technologies to those deployed by Games Net: Zoom video conferencing and Slack text messaging. This choice was made for a number of reasons, a number of which had also been considered by Games Net. These included:

- ease of use;
- security: Zoom was encrypted and recognised by USA insurers as a safe communications channel;
- availability to young people under 13 years of age;
- licensing models and cost;
- features that allowed participants to retain control over how they communicate (e.g. turning off video or voice);
- ability to record text conversations;
- ability to record video sessions.

The project team also decided to commission a selection of online video project tutorials from existing Lab mentors on topics likely to be of interest to participants. The Lab had previously developed a series of online technology tutorials – largely text-based and collated from other online resources – which had proved popular with participants and others, but were now out-of-date. In thinking through the implementation, the team tried to anticipate the needs of participants in online-only Labs, as opposed to face-to-face Labs, which introduced IT learning resources gradually in a social environment. *The Online Lab* practice review suggested that some pre-existing tutorials would be useful to include in sessions in order to help provide structure and focus.

After discussion with the mentors recruited to create the video tutorials, these videos took the form of four series of short instructional videos covering games programming, the Unity 3D program, advanced HTML and the creation of light-enhanced clothing and

1 https://www.acmi.net.au/events/games-net/

accessories using conductible thread. Mentors were paid to produce these videos. A total of 31 completed video tutorials were then uploaded to *The Online Lab*'s YouTube channel, plus/or mentors' own YouTube video channels. These online videos, together with other relevant information, were also collated via 'project pages' within a customised online portal – see below for more details.

The initial plan for *The Online Lab* was to run weekly after-school sessions run by one mentor with up to six participants and moderated by *The Online Lab* coordinator, who is also an experienced educational manager. These sessions would consist of:

- one after-school 30-minute video conference tutorial session using the Zoom video conferencing platform;
- two after-school 60 minute 'drop in' sessions using the Slack messaging service: these sessions would be optional for participants.

However, after further discussion both with the mentors and families of potential participants, the team decided that *The Online Lab* would instead run three separate weekly sessions of 2-3 hours each, which would allow scope for participants from different states (and therefore time zones) to join in or leave the session when it suited them. Each session would be based on specific areas of participant interest, matched by mentor expertise. Participants could choose the session (or sessions) that most appealed to them.

Recruiting mentors and participants

The Online Lab project was predicated on responding to the needs of young people with autism who could not access a face-to-face Lab or similar, and who were geographically isolated. To that end, the project team secured in-kind support from the Brisbane School of Distance Education, which circulated information about *The Online Lab*, including the link to an online application form with details of the project, through its networks. The project's press release also generated a number of local media stories in newspapers and on radio in regional Queensland, plus one media newspaper story in Victoria. Additionally, the project accessed The Lab's existing networks within regional Victoria, particularly Geelong and Bendigo. As a result, interest was strong and the project was able to start with a full contingent of 20 young people in July 2016, with five more joining progressively as some dropped out.

In terms of recruiting mentors, the project's original plan was for the mentors who developed the video content to also undertake the weekly online mentoring. The project team's preference was to retain the same mentors throughout the two school terms of the pilot, based on the importance of developing rapport and trust between mentors and participants – one of the identified factors for the success of the face-to-face Lab (Donahoo & Steele, 2013). However, a six-month weekly mentoring commitment was only possible for one of the original content creators. The other two mentors were then sourced through digital media teaching networks and existing Lab mentors. As shown in evaluation data from participants, parents and the coordinator, the recruitment of the right mentors was identified as one of the project's most important success factors,

especially the mentors' abilities to build rapport and navigate a complex mediated social environment during online sessions.

Developing *The Online Lab* web portal

The Online Lab web portal was built from January to April 2016 using the Wordpress platform by a Victoria University web developer, then tested by mentors, administrators and Lab participants. The completed portal allowed tutorial videos to be either uploaded to the portal or linked from *The Online Lab*'s public YouTube channel, to be collated via 'project pages' within the portal.

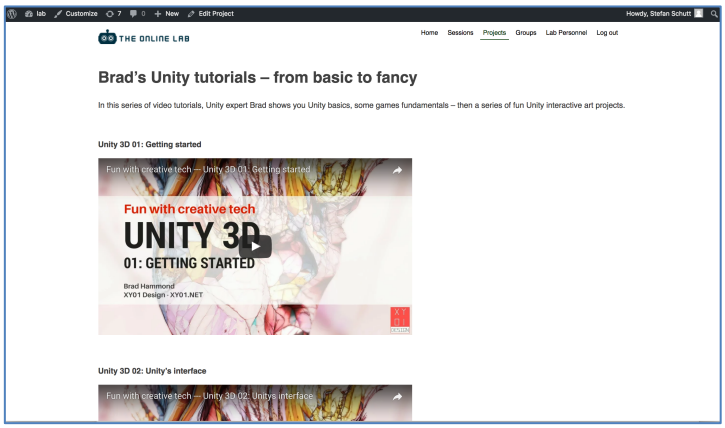

Figure 1: Example of Online Lab tutorial page

Participants were required to log onto this portal when attending sessions.

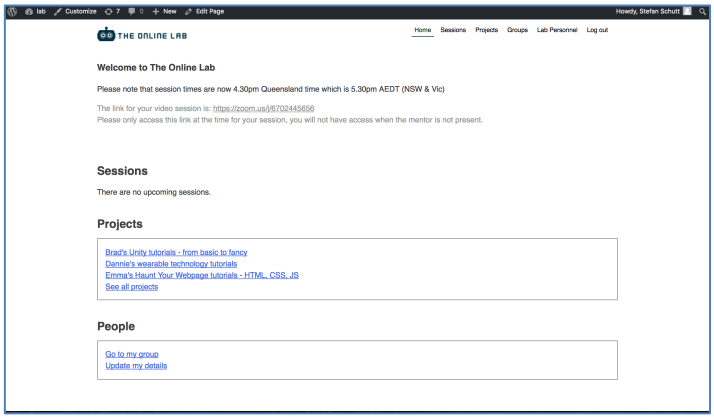

Figure 2: Online Lab portal login page

The portal was also designed to allow mentors and administrators to upload notes on participants and sessions, and to record who had logged in and for how long. This recording of attendance information was important in terms of assessing participation levels.

The Evaluation

The Online Lab evaluation reflected the context: a small-scale technology program pilot funded by a philanthropic small grants scheme. As such, the evaluation focused primarily on questions of impact, with a view to establishing whether the model of *The Online Lab* was sufficiently effective for The Lab to consider extending the project beyond December 2016.

The project's three impact-focused objectives were defined in the project scoping document as:

1. *To enhance the social connectedness of young people with autism via online sharing and development of technology interests and projects.*
2. *To develop a thriving national online platform for the exchange of technology project ideas and experiments.*
3. *To improve the life prospects and wellbeing of young people with autism through a mentored, personalised approach to IT skills development, conducted via the internet.*

Evaluation methodology

The evaluation was undertaken using a cross-sectional qualitative design (Pope & Mays, 2003) involving participants, mentors and parents. It took place at the conclusion of the pilot in late 2016. These data were combined with quantitative data consisting of de-identified web statistics on user activity and numbers over time, gathered via *The Online Lab* platform.

Qualitative evaluation methods consisted of the following, with the aim of collecting data from as many kinds of project stakeholders as possible, including families living in remote and regional areas:

- online posts and comments by participants, written throughout the pilot and collected at the conclusion of the pilot;
- mentors' and coordinator's field notes, written throughout the pilot and collected at the conclusion of the pilot;
- online questionnaires with Online Lab participants, undertaken at the conclusion of the pilot;
- semi-structured telephone interviews with participants' parents/guardians, undertaken at the conclusion of the pilot;
- two Online Lab mentor focus groups, undertaken at the conclusion of the pilot.

Families were emailed in December 2016 with an invitation to take part in the project evaluation. These emails were followed up by telephone calls. It was emphasised at every stage that involvement in the evaluation research was voluntary.

A total of 23 families were invited to take part in the evaluation. These represented all 25 participants enrolled in *The Online Lab* pilot, since two families had two children involved in the pilot. This total also includes participants who continued until the end of the pilot (13) and those who dropped out throughout (12).

Nine parents/guardians responded to requests for involvement in the evaluation. Of these, seven agreed to undertake telephone interviews, and two said they were on holidays and were not able to take part, but would pass on the online survey link to their children. Of the participants, five completed the online survey as sent on by their parents/guardians. All three weekly mentors took part in the two focus group sessions.

By February 2017 all research surveys, interviews and focus groups had been completed.

Evaluation findings

With the caveat in mind that this was a limited project with a small number of evaluation respondents, the qualitative evidence suggests that *The Online Lab* pilot was a qualified or partial success, and also points to major areas for improvement and refinement.

Table 2 below outlines involvement of participants throughout the pilot. Of the 25 young people who took part, 13 stayed for the entirety of the pilot and 12 dropped out before completion. The 13 who stayed tended to come back consistently on a weekly basis throughout the six-month pilot period. These young people seemed largely to be engaged and interested, as represented in the following comments by parents:

> *He's so far ahead already with school work, particularly with maths and science. He gets bored witless. He stays on track more when doing The Online Lab with school stuff. He doesn't get distracted as easily, goes into Steam or YouTube. It keeps his attention a little longer. He can't wait to get home to do Online Lab.*
>
> *We set him the task of logging into The Online lab. He now does it from his own drive. We tell him. We've looked at his pixel art…it's really good. It's a way to generate conversation and interaction with him.*

Of the 12 participants who dropped out, interviews with parents, survey results and field notes suggest a number of reasons: anxiety about interacting with others, frustration with other participants during online sessions (especially younger children who had differing or less advanced interests), technical difficulties such as logging on, internet lag or background noise, an inability to take part due to conflicting commitments, or, as reported by one parent, *The Online Lab* just didn't suit them despite its perceived worthiness. In one or two cases the young person appears not to have wanted to take part, but was made to by a parent/guardian. A final factor was changing Daylight Saving differences between states. This affected some Queensland participants' ability to take

part in the latter stages of the pilot, and is worth noting for other projects seeking to run online projects over multiple time zones.

Overall, the data suggest that an online group mentoring program, at least in the form provided by this pilot, suits some young people with autism much better than others, with the division between the two being starker than in face-to-face Labs.

Table 2: Participant involvement summary

	Victoria	Queensland	NSW	Total
Expressions of interest:	11	13	2	26
Enrolled at beginning of pilot	7	12	1	20
Enrolled during project	3	1	1	5
Total enrolled:	10	13	2	25
Stayed to conclusion:	4	9	0	13
Dropped out after 1-2 sessions	1	2	1	4
Dropped out after 3 or more sessions	4	3	1	8
Total dropped out:	5	5	2	12

The following section explores the evaluation findings in terms of the three main project objectives.

Were the project objectives met?

Objective #1: To enhance the social connectedness of young people with autism via online sharing and development of technology interests and projects

In this regard, the pilot appeared to have worked well for some young people with autism, but not for others. Although parents/guardians and participants responded positively overall to their involvement in *The Online Lab*, the data were mixed on whether *The Online Lab* specifically enhanced social connectedness. Two out of seven parents/guardians interviewed stated that the project had increased their children's connections with other young people, in this case, online given that participants did not

meet in person. Of the five participants who completed the survey, two agreed and two disagreed that *The Online Lab* helped them make new friends.

In terms of connectedness within families, some change was noted in terms of changes to family dynamics, with two respondents noting that the regular sessions had helped create a sense of structure in daily family life, and had provided a context for more family interaction.

It should also be noted, however, that the 2013 evaluation of The Lab, which reported significant family impacts, was undertaken after two years of weekly face-to-face Lab activities. Participants in *The Online Lab* had been involved for up to six months, with many involved for less time due to starting later and/or dropping out. As a next step, it would be useful to compare reported family impact after a more extended period of Online Lab operations.

Objective #2: To develop a thriving national online platform for the exchange of technology project ideas and experiments

This was perhaps the most ambitious objective given the short timeframe of the pilot and the fact that the young people were geographically dispersed throughout three states (Queensland, New South Wales, and Victoria). Feedback from the mentors indicate that the 'project area' of The Online portal was not used as much as hoped, and that ad-hoc solutions developed by the mentors, based on participants' existing technology use (for example other YouTube channels and session-based blogs), were more effective. This points to a central finding of the evaluation that is also backed by the overall experience at The Lab: the role of the mentor as a facilitator of effective and responsive engagement and learning is crucial, and the recruitment of the right mentors/facilitators is one of the most important factors in determining the efficacy of online video conferencing-based projects.

The data also tell us that social and project interaction could be enhanced by introducing all participants to one another, especially across sessions, and for mentors to have the technical ability and time to communicate one-on-one with both parents/guardians and participants. This was reflected in parent/guardian interview responses such as:

> *I would like them to get a real network going. Create a community. Commit and communicate. Develop friendships that are well monitored, where people are who they say they are. Security and safety. These kids are semi isolated or totally isolated.*
>
> *Spend regular one on one time with child on phone. A ten-minute talk. Find out what they want to do.*
>
> *I would have liked to talk to the mentor a bit – a ten-minute chat – so I could find out how to support her.*

Parents/guardians also noted the importance of formal and informal encouragement, including the issuing of Certificates of Participation. Again, the importance of the mentor was highlighted in these responses, as well as in the highly positive evaluation of the mentors by all five participants who filled in the survey.

Objective #3: To improve the life prospects and wellbeing of young people with autism through a mentored, personalised approach to IT skills development, conducted via the internet

The comments above also relate to this objective. They suggest that *The Online Lab* pilot's mentoring approach was working to some degree, but that could have done more to develop individual engagement with participants. Responses to questions about skill development and enjoyment/fun by both parents/guardians and participants were overwhelmingly positive, with few negative effects of involvement noted. However, the comments above suggest that *The Online Lab* could further develop individual participants' engagement and sense of personal achievement by developing personalised strategies. This is where the issue of resourcing arises, in terms of the amount of paid time available to mentors to do additional work.

Overall, the biggest specific benefits noted by participants were that they saw themselves learning new skills which they clearly valued – this was evident in both the multiple-choice questions (see Table 3 below) and free text responses. Of the five respondents, four had continued to the end of the project, and one had dropped out. Similar results were also reported by parents in interviews. Given that online surveys were filled out by only five of 25 participants, it is worth mentioning the mentors' session notes, which noted that a majority of participants were motivated and engaged throughout the pilot sessions. This view is backed by the online moderator. The results of the first five (ie non free text) participant survey questions are summarised in the following table:

Table 3: first five survey questions

Question:	Strongly disagree	Somewhat disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
Q1: I liked being involved in *The Online Lab*			1	2	2
Q2: *The Online Lab* helped me to develop new computer skills		1			4
Q3: *The Online Lab* helped me make new friends	1	1	1		2

Q4: *The Online Lab* was fun			1	1	3
Q5: *The Online Lab* mentors were helpful					5
Q6. I would like to continue with *The Online Lab* if it is offered in 2017	1	1		2	1

The central role of technology

Evaluation feedback from participants, mentors and the coordinator suggests that, in an online-only environment, the affordances of the chosen technologies play a central role in determining levels of engagement. Later in this article we provide a list of factors worth considering when choosing technology platforms for video-based online mentoring.

As stated previously, the notion that *The Online Lab* suits some young people with autism, but others less so, has also been the case for our face-to-face Labs. However, with *The Online Lab* the divide appears to be more dramatic: a number of participants were enthusiastically involved throughout, whereas others 'lurked' and some dropped out. This, we propose, may be due largely to the centrality of the technology used in mediating the experience for both participants and mentors.

In a face-to-face Lab it is easy for participants to chat with each other, ask for help, show their work to others, or move/leave the room if they are feeling frustrated (and for mentors to guide them to do so). *The Online Lab* evaluation data showed that this is harder to do in an online-only environment where attention is focused on one central screen and voice at one time. Some young people appeared to find this easier to cope with than others. In a video-conferencing environment, frustrations can arise, especially for some young people with autism for whom the technology is not working well, or who find it hard to engage in conversation. Another issue, also identified in the mentor focus group data, is the range of ages present during sessions and their differing interests and levels of maturity, as per these comments:

> *The other children were quite immature and most barely understood how a computer processed information this made the sessions go at a crawling pace as well as the teleconferencing programs.*
>
> *Some of the people I don't have the same interests as them, it's not their fault. The classes sometimes tended to move off the actual subject into sometimes irrelevant things. Its okay to talk about them, but you start ask yourself, why am i here, what am i doing*

As stated, conferencing technologies designed to focus attention on one speaker at a time may limit the number of parallel social interactions that might otherwise occur

within physical spaces during face-to-face Lab sessions. The ability to share multiple screens would help here. To date, mentors have also highlighted that other improved features would help to facilitate online-only sessions. These include stereo rendering of voices and push-to-talk features that would reduce distracting background noise – a concern both for mentors and young people with autism, some of whom can be very sensitive to noise.

Mentors also observed that Online Lab participants tended to prefer operating within one technology platform rather than switching between them. Participants generally opted to use Zoom's chat facility, even though the Slack messaging tool initially chosen offered more advanced features. Mentors then tended to follow suit in order to continue effectively communicating with participants.

Another factor noted by mentors was the need to stay alert to the tools already used by participants, and to be adaptable enough to change their delivery at short notice when needed. As stated previously, the project page area of the online portal was underutilised by participants. Noticing this, mentors responded by opting for other forms of online project curation that more accurately reflected participants' existing technology usage. One mentor made extensive use of a YouTube channel and related comments facilities. Another created a project blog site, and the third mentor, who specialised in advanced games coding, created an environment in Google Projects to pass on project details and tips.

Discussion

In this section we discuss operational and theoretical considerations generated by this pilot project. We have chosen to include practical tips in the interests of helping to inform the design and operations other projects seeking to use video conferencing technologies for online group mentoring.

We also discuss how *The Online Lab* pilot is contributing to our theoretical understanding of autism, technology, and space through the concept of 'differentiated spaces' as defined by Lab-based PhD scholar Lye Ee Ng. This work recognises online, offline, and personal spaces as unique in their own right and capable of facilitating particular forms of communication. In an online-only environment, however, the affordances of technologies take on greater significance.

Operational considerations

Technology affordances and choices

Below is a summary of the advice suggested by *The Online Lab* evaluation data, particularly in the mentor focus groups. Here, we note that the points below reflect our observations about technology affordances at a particular point in time (early 2017, revised mid-2018), and that technologies such as video conferencing platforms constantly change and develop. The dynamic nature of the technology industry may

render some of these points redundant in the near future. However, we believe they still deserve to be highlighted, because of their impact on *The Online Lab*'s operations. The points are as follows:

- *Video chat functionality* is a central component of engagement. However, the chat tool provided by the Zoom platform had limitations that affected the smooth running of Online Lab sessions. Ideal chat functionality would include:
    - '*Push to talk' functionality* rather than 'push to mute'. This would eliminate background noise. Mentors noted, however, that their ability to mute participants' microphones was still crucial.
    - *Stereo rendering of voices* to allow better differentiation
    - *Multiple screen sharing capability*. This would allow participants to chat in pairs or small groups. Currently, video conferencing platforms are largely based on one central screen being shared at a time. This proved frustrating for some participants, who wanted to talk about their interests with other participants. It also meant that one participant can easily disrupt sessions – this occurred with one participant in the early stages of the pilot.

- Projects should aim to operate within *one online platform wherever possible*; otherwise participants and mentors may become confused and distracted. The mentors' advice also included working with only browser-based tools (as opposed to downloaded client software) when working with younger and less advanced participants, for the same reasons.
- Projects should create an initial *set of minimum requirements* for participants including:
    - Good quality headset microphone
    - Headphones
    - Laptop/computer with minimum specifications
    - Reasonable internet connection as determined by an online speed test
    - If possible, have a second screen plugged in
    - A reminder for participants not to interrupt other participants during sessions, and not to let relatives do so either (many families were not familiar with online video conferencing)

Session structure

Within the mentor focus groups, a number of suggestions related to how to better structure online video mentoring sessions with young people:

- Run sessions as basic or advanced (not age-based) so participants are less likely to get frustrated by other participants;
- Incorporate fixed break times, especially with longer sessions. This applies more to advanced topics than graphics and basic web sessions that do not need software installs;
- Work with six participants at the most if using current video tools (ie Zoom). However, multiple screen sharing capabilities would allow for more participants;
- Aim for activities that are short and manageable but still lead to outcomes in 10-15 minutes. Tools such as Codepen work well.

Theoretical considerations: differentiated spaces

Oldenburg's pre-World Wide Web concept of the 'third place' (1989) captures much about the face-to-face Lab. Neither home nor work/school, The Lab is not unlike the cafés and community centres described by Oldenburg: a neutral and equalising space where people attend regularly to socialise and play, and where their individuality is recognised and valued.

Example of 'third places' that, like The Lab, explicitly leverage technology to connect people, are physical spaces dedicated to the playing of computer games (Wadley & Schutt, 2013). Such spaces can be permanent as in gaming lounges, or temporary as in LAN parties. People gather in these locations to play games, motivated by factors including the desire to belong and meet others, to showcase their skills, to watch others (Taylor & Witkowski, 2010) and to learn more about games (Jansz & Martens, 2005). Although online gaming takes place in these spaces, physical co-location and personal exchange are a major part of their appeal, much like the face-to-face Lab. What happens, then, when physical co-location is replaced by virtual co-location mediated by a specific video conferencing technology? This question has driven *The Online Lab* experiment.

The term 'differentiated spaces', devised by Ng through her doctoral work at The Lab (Ng, Schutt & Corcoran, 2015), recognises online, offline, and personal spaces as unique in their own right and capable of facilitating particular forms of communication. However, these spaces do not exist in isolation. In an environment like a face-to-face Lab, or indeed *The Online Lab*, they overlap and interconnect to form distinct cultures of socialisation that extend beyond mainstream narratives of sociality (Ng et al., 2015). This notion draws on notions of space as multidimensional (Gores, 2000), involving personal interaction and the effects of proxemics, as well as technology-facilitated forms of interaction. No two environments are likely to be the same.

In an online-only environment, the affordances of chosen communication technologies take on far greater significance because they are not mediated by, or combined with, physical proxemics, choice of location and embodied interaction. In the case of *The Online Lab*, we found that a participant's behaviour can be more disruptive to others in an online-only environment, especially when the technology allows them to dominate

through the use of tools such as the activation of screen-sharing – the virtual equivalent of invading others' 'personal space'. Further, the likelihood of such behaviour may increase in online-only environments, due to frustration caused by technical aspects of the communication not working effectively. Potential technical issues are many and include faulty or ineffective hardware (e.g. microphones, computer graphics cards), mentor management of the technology during sessions, software limitations or internet lag. Additionally, conferencing technologies designed to focus attention on one speaker at a time may limit the number of parallel social interactions that might otherwise occur within physical spaces during face-to-face Lab sessions. At the time of writing, there are moves by some software vendors to introduce multiple screen sharing capabilities: this would be likely to have a significant impact on social dynamics within online-only projects.

Conclusion

The Online Lab pilot has generated reasonably encouraging results. Indications are that it, and other similar online initiatives, could make a positive difference to the quality of the lives of isolated people, including those with autism. Indeed, as a result of the pilot, The Lab Network decided to continue *The Online Lab*, albeit with adjustments in implementation such as session times and structure. At the time of writing (June 2018), The Lab organisation now runs one weekly mentored video conferencing session with six remote/regional young people from Queensland and Victoria, with plans to expand the program further through publicity campaigns. The Lab's coordinator reports that the somewhat polarised response to the pilot program has continued, noticing that some participants drop out quickly, but that those who remain tend to remain in the program for the long term. The program still employs the Zoom platform, and some of the issues identified in the pilot remain, which may explain the continued polarised reactions by participants. The Zoom platform continues to be used for pragmatic reasons such as cost, the features identified in the practice review, and the perceived lack of viable alternatives. This, of course, may change at any moment.

In a very real sense, video conferencing technologies like Zoom control the experiences of the people who use them; they have personalities and agency, and are never neutral (Latour, 1992). What may look like a small matter of functionality in a communications technology can have a major impact in determining or shaping the flow and coherence of human interactions. The importance of specific technological affordances can sometimes be downplayed by commentators, with the word 'technology' used as a catch-all that sometimes hides what is really a universe of differing tools, processes, approaches, assumptions and affordances. This is understandable given that we have been warned about the dangers of giving too much agency to the word 'technology' (Marx, 2010), and that technological change occurs at breathtaking speed. However, in a distributed online project like *The Online Lab* that relies heavily on technology's affordances, it is important to recognise their impact, learn from the experience, communicate that learning, and thereby help to influence the future development of online tools to help to better mitigate social isolation.

References

Attwood, T. (1998). *Asperger's Syndrome: A Guide for Parents and Professionals*. London: Jessica Kingsley Publications.

Attwood, T. (2005). Diagnosis in Adults. In D. Murray (Ed), *Coming Out Asperger: Diagnosis, Disclosure and Self-Confidence*. (pp. 32-51). London: Jessica Kingsley Publications.

Baron-Cohen, S. (2000). Is Asperger's syndrome/High-Functioning Autism necessarily a disability? Reflecting on the past and planning for the future of developmental psychopathology. *Developmental Psychopathology*, 12, 489-500.

Bracher, M. (2012). Investigating Autism: History, Culture and Embodied Difference. *Sociology*, 46, 759-766.

Burke, M., Kraut, R., & Williams, D. (2010). Social use of computer-mediated communication by adults on the autism spectrum. In *Proceedings of the 2010 ACM conference on Computer supported cooperative work*, (pp. 425-434). ACM.

Donahoo, D., & Steele, E. (2013). *Evaluation of The Lab: A technology club for young people with Asperger's Syndrome*. Melbourne: Young and Well Cooperative Research Centre.

Gores, S. J. (2000). *Psychosocial spaces: verbal and visual readings of British culture 1750-1820*. Detroit, Michigan: Wayne State University Press.

Grandin, T. (2010). *Dr. Temple Grandin talks about mentoring, phone interview with Jeffrey Colton*. [Video file]. Retrieved from http://www.youtube.com/watch?v=_2ySP4yo92M

Grynszpan, O., Weiss P. L., Perez-Diaz, F., & Gal, E. (2013). Innovative technology-based interventions for autism spectrum disorders: A meta-analysis. *Autism*, (18) 4, 346-361.

Haydon, T., Musti-Rao, S., McCune, A., Clouse, D. E., McCoy, D. M., Kalra, H. D., & Hawkins, R. O. (2017). Using Video Modeling and Mobile Technology to Teach Social Skills. *Intervention in School and Clinic*, (52)3, 154-162.

Hong, H., Yarosh, S., Kim, J. G., Abowd, G. D., & Arriaga, R. I. (2013, April). Investigating the use of circles in social networks to support independence of individuals with autism. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 3207-3216). ACM.

Jansz, J., & Martens, L. (2005). Gaming at a LAN event: the social context of playing video games. *New Media and Society* 7, 333-355.

Latour, B. (1992). Where are the missing masses? The sociology of a few mundane artifacts. In W. E. Bijker & J. Law (Eds.) *Shaping technology/building society: studies in sociotechnical change* (pp. 225–258). Cambridge, Massachusetts: MIT Press.

Mastergeorge, A. M., Rogers, S. J., Corbett, B. A., & Solomon, M. (2003). Nonmedical intervention for autism spectrum disorders. In S. Ozonoff et al. (Eds.) *Autism Spectrum Disorders: A Research Review for Practitioners* (pp. 133-160). Washington DC: American Psychiatric Publishing.

Marx. L. (2010). Technology The Emergence of a Hazardous Concept. *Technology and Culture* (51) 3, 561-577.

Ng, L. E., Schutt, S., & Corcoran, T. (2015). Technology use and teenagers diagnosed with high functioning autism: in and across differentiated spaces. In T. Corcoran, J. White & B. Whitburn (Eds.), *Disability Studies: Educating for Inclusion*. (pp.167-180) Rotterdam: Sense Publishers.

Nojavanasghari, B., Hughes, C. E., & Morency, L. P. (2017, May). Exceptionally social: Design of an avatar-mediated interactive system for promoting social skills in children with

autism. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 1932-1939). ACM.

Oldenburg, R. (1989). *The Great Good Place: Cafes, coffee shops, community centers, beauty parlors, general stores, bars, hangouts, and how they get you through the day*. New York: Paragon House.

Pope, C., & Mays, N. (2006). *Qualitative research in health care*. London: BMJ Publishing Group.

Putnam, C., & Chong, L. (2008, October). Software and technologies designed for people with autism: what do users want?. In *Proceedings of the 10th international ACM SIGACCESS conference on Computers and accessibility* (pp. 3-10). ACM.

Reed, F. D. D., Hyman, S. R., & Hirst, J. M. (2011). Applications of technology to teach social skills to children with autism. *Research in Autism Spectrum Disorders*, 5 (3), 1003-1010.

Reichow, B., Steiner A. M., & Volkmar, F. (2012). *Cochrane Review: Social skills groups for people aged 6 to 21 with autism spectrum disorders* (ASD) (Review), Hoboken: John Wiley and Sons.

Schutt, S., Staubli, P., & Rizzo, A. (2015). Seeing the world differently: Supporting autism spectrum expression and creativity through the use of technology in social spaces, *UNESCO Observatory Multidisciplinary Research in the Arts e-journal,* (5)1, 1-28.

Taylor, T. L., & Witkowski, E. (2010, June). This is how we play it: what a mega-LAN can teach us about games. In *Proceedings of the fifth international conference on the foundations of digital games* (pp. 195-202). ACM.

Wadley, G., & Schutt, S. (2013, November). Hanging out at the computer lab: how an innovative Australian program is helping young 'Aspies'. In *Proceedings of the 25th Australian Computer-Human Interaction Conference: Augmentation, Application, Innovation, Collaboration* (pp. 535-538). ACM.

Walsh, E., Holloway, J., McCoy, A., & Lydon, H. (2017). Technology-Aided Interventions for Employment Skills in Adults with Autism Spectrum Disorder: A Systematic Review. *Review Journal of Autism and Developmental Disorders*, (4)1, 12-25.