iSocial: A 3D VLE for Youth with Autism

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Abstract: This poster provides an introduction and brief illustration of iSocial, a 3D-Virtual Learning Environment to support social competence development for youth with Autism Spectrum Disorders. We report the results of a field test of a partial implementation of iSocial in the Fall of 2008. Of note are some key lessons learned in how to adapt a successful clinic-based approach to the new medium, as well as lessons in the identification of needed social orthotics and identity representation for supporting social interaction for this special population. Despite numerous challenges in the implementation, the learners and guides were highly engaged in their virtual learning and responded positively to the experience.

Introduction

According to the Center for Disease Control (2007), from 1994 to 2005 the number of children and youth ages 6–21 years receiving services for Autism Spectrum Disorders (ASD) increased from approximately 20,000 to 200,000. Children identified with ASD have deficits in social competence that can lead to problematic social behavior and social isolation (Stichter et al., 2007). Specifically, children identified with high functioning autism (HFA) or Asperger’s Syndrome (AS) are typically characterized as having a desire to be social (Myles & Simpson, 2002), but lacking the social skills to do so. The outcomes of these deficits, if untreated, can lead to a lower quality of life as well as deficits in other developmental areas such as language and cognition. Identification of, and intervention for, these social skill deficits must be a focus of instruction if students are expected to achieve increased success and independence (Office of Special Education Programs, 2003; Rogers, 2000). To date there is an extensive body of research that supports cognitive behavioral strategies for social skills training that are typically implemented in structured face-to-face instruction for individuals with ASD (Rogers, 2000). However, access to evidence-based interventions for social skill instruction is limited. New technologies, such as internet-based 3D-Virtual Learning Environments (3D-VLEs) have potential to provide access to intervention, qualified guides and social cohorts while maintaining fidelity to core features of the programs.

Virtual Learning Environments for Social Skills Training

Virtual environments offer many advantages for individuals with ASD in that learners can proceed at an appropriate pace, have repetition of training, be given gradual increases in challenge levels, learn about constructs via multi-media rather than simply text and be engaged interactively in tasks. Standen & Brown (2006) note three key areas in which VLEs are well suited to youth with ASD. First, VLEs allow users to learn by making mistakes but without suffering real consequences and without trying the patience of their peers or teachers. Youth with ASD are often denied real world experiences because their caregivers are afraid of the consequences of allowing them to do things on their own. Secondly, VLEs are endlessly plastic in that they can be manipulated in ways the real world cannot. For example, scaffolding in the form of suggestions that may appear in the interface or highlighting of certain features in the scene can be provided at the beginning of a task and then withdrawn as the user proceeds. Thus, VLEs can be customized to each user and their needs. Thirdly, rules and constructs can be conveyed through experience, not simply words or models of what others can do. For example, rules for how to greet a person or interpret facial expressions can be experienced and practiced in contexts that offer high fidelity to natural settings.

iSocial: a 3D-VLE for curriculum activity

iSocial is a 3D-VLE-based intervention for social and behavioral outcomes for youth with Autism Spectrum Disorders. iSocial seeks to adapt and implement in a 3D-VLE a clinic-based curriculum with demonstrated impact for improving social competence. The 10-week curriculum, Social Competence Intervention based on a framework of Cognitive Behavioral Intervention (SCI-CBI), challenges thinking patterns and includes the following key components: use of meta-cognitive strategies, self-monitoring and self-regulation and exposure and response situations. In each unit, the lesson plan follows a consistent structure of learning and rehearsing skills. Initial results from work to develop SCI-CBI indicate promising trends for growth (across pre- and post-intervention assessments) among youth with ASD.

Adapting SCI-CBI into a 3D virtual space requires that all physical aspects of the curriculum be modeled and all activity as well as how the space responds to activity be programmed. We have chosen to
develop a new environment rather than working within existing VLE, such as Second Life, to ensure that we can implement the full range of features we envision, guarantee privacy and security for our participants, be responsive to potential school-based requirements and develop within an open source framework. iSocial is being developed using Sun Microsystems’ Project Wonderland (https://lg3d-wonderland.dev.java.net/) as a toolkit for creating collaborative 3D virtual worlds. Project Wonderland is an open source project offering a client server architecture and set of technologies to support the development of virtual and mixed reality environments. In Fall, 2008, using a grant from the Thompson Center for Autism and Neurodevelopmental Disorders and a grant from our university research board, we developed a pilot implementation of one of the five units of the SCI-CBI curriculum and undertook a field test with four youth. An award from AutismSpeaks will enable us to extend our design and development work over the next two years.

For a brief introduction to what the iSocial experience might be like, imagine a youth, John, sitting at a computer in his school classroom or lab. A local teacher-facilitator is nearby, but she has already sat with our youth during orientation and earlier lessons and allows our youth to work with minimal supervision. Upon login our youth sees that others are already online and is greeted by the online guide (a teacher trained in the SCI-CBI curriculum and undertook a field test with four youth. An award from AutismSpeaks and a grant from our university research board, we developed a pilot implementation of one of the five units of the SCI-CBI curriculum and undertook a field test with four youth. An award from AutismSpeaks will enable us to extend our design and development work over the next two years.

Lessons learned from early results of the field test
The unit on “conversational turn taking” from the five-unit SCI-CBI curriculum was developed for delivery in the iSocial VLE. Two separate virtual groups undertook the unit and consisted of two youths (boys on the autism spectrum, ages 11-14), an online guide, as well as a technical “helper” in the VLE, and a facilitator for each youth who sat physically at the youth’s computers as the lesson was carried out. For each group, the unit consisted of two training sessions of one hour and then four one-hour lessons delivered bi-weekly. The key purposes of the field test were to (1) assess the efficacy of design decisions for adapting the clinic-based curriculum into the new medium, (2) identify issues with system usage and (3) generate ideas for needed social orthotics. Data collected during the field test consisted of a technology competency survey administered at the beginning of the study, social presence surveys, adapted from Bailenson, Beal et al (2001), administered at the end of each session, screen and audio recordings of all participants’ sessions within the VLE and videotaped recordings of participants with their facilitators physically using computers for each session.

Figure 1. Sample screen shots of youth and guide interaction in iSocial.
When learners worked through this activity they exhibited little motivation, were easily distracted, engaged in off-task activity and showed little cooperation or spontaneous conversation. An unsuccessful example was an activity in which learners were to plan a hypothetical trip to Los Angeles. In the classroom, this activity is supported by handouts and worksheets. When we replaced handouts and worksheets with static posters and images, the interactivity of the classroom activity was lost in translation. Our findings for system usage show iSocial to be easy to use and enjoyable. However we also found many challenges for the coordination of activity. The online guide sometimes had trouble managing instruction in the VLE, due to the lack of nonverbal and paralinguistic prompts. For example in the classroom the guide notices subtle cues from students as they are starting to drift from instruction, and she can use those cues to start processes to bring the student back to attention. This was form of control was more difficult to exert online. Further, communication with the facilitators who physically oversaw learners was limited. Facilitators could hear and see what was happening in the VLE but could not communicate with the online guide. Hence, when learners would engage in undesirable behavior such as gazing out the window or excessively clicking mouse buttons or keyboard keys, the online guide lacked effective tools to coordinate with physical facilitators to bring learners back on task both physically and virtually. In addition, the prototype environment was built with minimal tools to control what learners could and could not do within the environment. As a result, learners had the same control over many functions of the environment that the online guide had. This became problematic when learners chose to explore the limits of the VLE and inadvertently caused problems such as closing shared windows, taking control of a collaborative application when it was not their turn or stopping a video. Such issues were distracting, which typically slowed the rate of instruction and impeded the flow of the lessons. Consequentially, the online guide was unable to address the same amount of instruction in one hour in the VLE as is typical in a face-to-face class, causing instruction to be sometimes rushed. It may well be the case that virtual instruction proceeds at a different pace than face-to-face; however, reducing distractions with control and coordination mechanisms is an obvious target for future iterations of iSocial. The early findings outlined above provide numerous points of departure for further design, development and research into utilization of 3D-VLE technologies for facilitation of collaborative virtual social competence instruction for individuals with ASD. Perhaps most encouraging is the observation that, despite shortcomings, learners’ experiences in iSocial were enjoyable and their perceptions were positive. Generally speaking, learners were able to operate within the environment with minimal difficulty, engage in instruction, follow directions and interact with others. Upon completion of the field test, all participants expressed dismay that they would not be participating in more lessons and indicated a desire to continue using iSocial. Participants also asked that they be invited to participate in future studies. We believe that the lessons learned from the field test provide a foundation upon which to build and improve virtual technologies for individuals with ASD.

References