iSocial: Collaborative Distance Education for Special Needs

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Abstract: iSocial is an innovative 3D Collaborative Virtual Learning Environment (3D CVLE) to provide access to educational programming for students with special needs who live in small and rural school districts. The research reported here is part of a design research process for developing virtual learning systems to improve learning for students with special needs who live in rural/small districts. A field test of iSocial with 11 students shows promise, but also identifies challenges for distance education with 3D collaborative virtual learning.

Introduction

Distance Education (DE) is a growing phenomenon in small and rural schools (nearly 10 million students attend rural schools) as a means for meeting student needs for courses such as foreign languages and advanced placement. DE also has the potential to bring specialized curriculum and teaching to students with special needs. Unfortunately typical DE is limited in how it provides support for affective and social learning (Rice, 2006) which is often critical to addressing students with special needs. A form of DE that can be highly engaging and social is 3-dimensional collaborative virtual learning environments (3D CVLEs). With a grant from the Institute of Education Sciences, the iSocial project is developing a 3D CVLE for building social competence for youth with a diagnosis of Autism Spectrum Disorder (ASD) who do not have ready access to such interventions in their local schools and communities. iSocial is a translation of a curriculum (Social-Competence Intervention for Adolescents, SCI-A) delivered in face-to-face sessions with demonstrated efficacy for the target students into a 3D CVLE for delivery over the Internet. In the process of undertaking this translation our team has designed solutions for: (1) assuring fidelity between the 3D CVLE experience and the cognitive and behavioral processes and objectives of the face-to-face curriculum implementation, (2) encouraging, supporting and sustaining appropriate social behavior and interaction in the virtual world, especially considering that our target students have social limitations, and (3) building social competence on the part of the students in ways that will improve their social functioning in school and in their community.

3D CVLE and youth with ASD

In 3D CVLEs students represented by an avatar enter a 3D scene with objects and other avatars using a networked computer. Collaboration is supported by students being able to see each other's (and the teacher's) avatars, manipulate objects in the VLE, interact through movement and gesture via their avatars, and use voice to speak to each other. Through these mechanisms, the medium can support DE that brings students together for peer interaction, experiential learning through collaborative effort, and guidance by an expert teacher.

The iSocial VLE (Laffey et al., 2009) delivers the SCI-A curriculum over the Internet to allow youth from small and rural schools to come together with an expert teacher in a DE course. The students take 34 lessons of 45 minutes each with lessons scheduled for 2 to 3 times per week. The lessons are packaged in 5 curriculum units: facial expression, sharing ideas, turn taking, feelings and emotions, and problem solving and delivered in a series of 3D virtual worlds. Each unit is a sequence of collaborative activities to learn about and practice new social competencies. The units culminate in a naturalistic practice activity that encourages and requires the students to work together and use their new competencies to accomplish a task or solve a problem.

Methods

Three school districts worked with the iSocial team to identify qualified students, schedule an appropriate time for instruction, provide on-site personnel for supervision and technology support, and resolve technology issues such as providing sufficiently powerful computer stations and network bandwidth as well as providing access through school firewalls. Eleven students, who met the target qualifications, were enrolled in one of 3 courses (n = 4, 4 & 3). A standardized measure of social competency for youth with ASD, the *Social Responsiveness Scales* (SRS; Constantino & Gruber, 2005), was completed 2 weeks prior to instruction and 2 weeks after instruction.

Findings

The **outcomes** data for the SRS instrument are presented in Table 1 with improvement indicated by score decreases from pre to post assessment. Keeping in mind that the total sample is small for statistical comparisons, and that caution must be applied to any conclusions drawn, we find interesting variety in the distribution of

outcomes across the school sites. Schools 1 and 2 show substantial improvements in parent ratings, especially when compared to results for school 3. Schools 1 and 3 show improved teacher ratings especially when compared to school 2. The results show that social competence can manifest itself differently at school or at home. For each school, and in turn each individual, the impact of iSocial may manifest itself differently. For example one student at school 2 improved dramatically based on the parent rating but was rated more negatively by the teacher from pre to post. We find these outcomes data to be promising in that they indicate that iSocial is generally associated with improved social competence, and in some cases substantially improved outcomes. However, the data also suggest that there is more to be understood about whether it is possible and under what conditions we could expect consistently positive results.

Table 1. iSocial Field Test pre and post measures for learning outcomes.

Instrument	**School 1 - N=4**		**School 2 - N=3**		**School 3 - N=4**	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
Parent SRS Total (a)	114.50	81.25	95.00	55.00	94.00	90.50
Teacher SRS Total (a)	90.50	62.25	77.67	76.33	106.50	95.50

Discussion

The successful implementation of iSocial (11 students completed the iSocial course via DE) and student gains on measures of social competence show significant promise for using 3D VLE as DE for students in small and rural communities. Whether students would be social and whether the online teacher could manage social behavior in the VLE were substantial challenges for the project. Through a design research process we learned and subsequently implemented design features for the VLE which support the forms of social practices needed for implementing the curriculum (Schmidt, Laffey & Stichter, 2011). While results of our pilot study are promising we have also identified substantial challenges to implementing an innovative technology-based program in small and rural schools. For example technology failures, some minor such as brief audio interruptions and some major including system crashes, were frequently encountered. Each student averaged 2.3 incidences per lesson (Laffey, Stichter and Galyen, 2013). In general the incidences were fairly quickly addressed and students were able to complete lessons, but teaching and learning time was reduced, some students became frustrated with the system implementation, and vigilant attention to support was needed (approximately 1/3 of TURIs required some form of technical assistance). Some of the technology issues can be attributed to the pilot nature of our software system, but others stem from the somewhat fragile and idiosyncratic natures of technology infrastructures in schools. Each school in the pilot had a different technology profile and a different level and set of technology issues Applications like iSocial require high and consistently performing networks, graphics and processing capabilities. The potential for 3D CVLE to meet the special needs of students is impeded by the limits of and variability across technology infrastructures of schools.

More students need to participate in iSocial and be tested for outcomes before claims can be made about the significance of outcomes. However, analysis of achievement on the standardized measure of social competence shows the promise of addressing special needs through 3D CVLE using DE. The success of 3D CVLE, as resilient learning systems for DE that resonate with the social, affective and cognitive needs of the teacher and learners, however, will ultimately be determined by how well the various aspects of curriculum translation, technology innovation and school infrastructure can be integrated for meeting student needs.

References

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