The Impact of On-line Learning on Students with Special Needs

Literature Review for

TET-763: Applied Research in Educational Technology

Submitted by Dustin Mees

March 25, 2009

**I- Statement of the Research Question/Problem**

Does on-line learning have an impact on students with special needs? What technology tools are available to assist students with special needs?

**II – Summary of the Literature**

**Introduction**

According to the National Association for the Education of Young Children (NAEYC), technology should be used as an active part of the learning process to extend children’s abilities (Rhodes & Milby, 2007, p. 255). With technology becoming more accessible, it has become a critical learning tool that is being encouraged frequently in schools. The use of technology can be a helpful tool for teachers and students to focus on ability rather than disability. Patrone and Pettapiece (2007) state that certain technology can help to achieve four key elements: engineering the classroom environment, modifying instruction and materials to meet students needs, integrating the curriculum through theme-based learning, and incorporating assessments in each activity (para. 5). Technology has been used to help students with special needs develop social skills, stay on task, aide comprehension, and be more organized. The following sections describe how technology has impacted students with disabilities on the previous mentioned skills.

**Students with Dyslexia**

A study conducted in the United Kingdom was conducted to see if there was a relationship between the use of on-line learning tools and the success rate of students with disabilities. Researchers were trying to understand how undergraduate students, with and without disabilities, used three different on-line learning programs (Badge, Dawson, Cann, & Scott, 2008, p. 104). The three systems used for producing multi-media web-based resources were used to create the materials for user testing (Badge, Dawson, Cann, & Scott, 2008, p. 104). The material created by these three systems was then reformatted as Power-Point presentations. “Participants were asked to complete a series of questions relating to the content of the presentation. These questions enabled testing of all the features and different presentation media within each format,” (Badge, Dawson, Cann, & Scott, 2008, p. 104). The factors analyzed in this research were features used, scores, and use of search facility. While the majority of students with disabilities were dyslexic, the group also included students with visual and hearing impairments. Looking at the results of the analyzed factors, students with disabilities used more features than students without disabilities. In the area of scores and the use of search facility, statistically, there was no significant difference. “However, a note was taken of how many slides played before the subject made use of any one of these controls (navigation tools). Students with disabilities located these tools more quickly than students without disabilities and this difference was statistically significant,” (Badge, Dawson, Cann, & Scott, 2008, p. 110). In this pilot study, the case for further research on the impact of on-line learning for students with dyslexia is strongly supported because of the positive results.

**Students with Visual Impairments**

Most technology requires the user to view a computer screen of sorts; however, for students with visual impairments, other strategies are required. Especially for students under the category of total blindness, these students are unable to see the screen at all and have to rely on a device such as a screen reader. “A screen reader scans a computer screen for text and then audibly reads the text content to the user,” (Crow, 2008, p. 51). The use of this technology offers accessibility and independence. However, screen readers only read text and cannot read images such as pictures, graphics, banners, animations, movies, or navigational buttons. Students with low vision, also known as legally blind, can see images; however they cannot see them clearly (Crow, 2008, p. 52). Students with low vision can still benefit from the use of technology using screen magnifiers. Screen magnifiers are used to enlarge areas of the screen in order to make text and images more readable for the user. These students also benefit from screen readers. Students with visual impairments may also benefit by slight modifications made to technological tools such as keyboards that use high contrast, large print keys. By using a strategy of high contrast, combined with large print, students with blurred or low vision may still be able to make out letters, words, and/or phrases. Another visual impairment, color blindness, may lead to difficulties if the technology relies heavily on the use of color and color recognition.

**Students with Autism**

Many students with autistic characteristics have trouble identifying emotions, individually and with others. Students with autism have a hard time empathizing with others, understanding what others may be thinking or feeling, and explaining how they feel. In one particular study, participants from the ages of eight to eleven used a computer program known as Mind Reading to help improve emotional awareness. This program had many components: emotions library, quizzes, games zone, and a learning center (LaCava, Golan, Baron-Cohen & Myles, 2007, Instruments section). Students went through a series of pre-tests and then used the computer program for ten weeks. After the ten weeks, they were assessed using several post-tests to measure their recognition of emotion. The students improved on their post-test scores after the ten week program (LaCava, Golan, Baron-Cohen & Myles, 2007, Results section). Students were able to identify different emotions such as happiness, sadness, and anger (LaCava, Golan, Baron-Cohen & Myles, 2007, Results section). The results showed that Mind Reading can possibly be an effective tool for improving emotion recognition skills, but further research is needed due to this being a pilot study. In another study that looked at improving emotional recognition using technology, students from preschool through age thirteen were exposed to a computer program known as Alpha. This program helped the students improve in their verbal expression and enjoyment of learning (Weikle & Hadadian, 2003, p. 3).

**Students with Emotional and Behavioral Disorder**

There have also been studies that focused on how technology has had an impact on students with emotional and behavioral disorder. Students with this disability have a hard time staying on task and using appropriate behavior in school (Gulchak, 2008, p. 567). According to Gulchak (2008), “Examples of inappropriate school behavior include talking out, frequently being out of seat, not starting assigned work, and being disrespectful to teachers and peers by using profanity,” (p. 658). A particular pilot study looked at whether an eight-year old male could stay on task by keeping track of his on-task behavior through the use of a mobile handheld computer. The student used the handheld for part of the study and then had to use a self-checklist for the other part. With the handheld, an alarm went off every ten minutes. Once this alarm went off, the student had to check off whether he was on task. The computer kept all the data each day and put the results into a graph. Results showed that the student was able to use a handheld computer to monitor his own on-task behavior (Gulchak, 2008, p. 575). On-task behavior decreased 28% when the handheld was taken away from the student (Gulchak, 2008, p. 576). Although the outcomes were positive with the participant having increased on-task behavior, further research must be done with a larger sample.

**Students with Hearing Impairments**

Hearing impairment disabilities vary in type and severity. People who have a hearing impairment may have a diminished ability to hear certain frequencies (pitches), or they may have difficulty hearing at all frequency levels (Crow, 2008, p. 52). Students who have hearing impairments, or are completely deaf, need to be able to access the same audio information that is available to students without disabilities. “On-line learning materials should provide real-time text captioning for all audio, video, and multi-media presentations that are placed on learning websites,” (Crow, 2008, p. 52). Many computer programs can be used to place captions on the display screen of a computer much like the captions we are familiar with on our television sets. This same technology could be used in a distance classroom setting such as Elluminate. Other modifications that can be used to aide students with hearing impairments when using on-line learning tools are to provide a text version, as long as it does not violate copyright protection.

**Students with Motor Impairment**

On-line learners who have physical or motor impairment disabilities face a wide range of challenges as they attempt to access on-line courses and learning materials because the range of conditions associated with motor impairment disabilities is quite broad (Foley & Regan, 2002, p. 23). Different examples of motor impairment disabilities include a limited use of hands, arthritis, amputation, birth defects, cerebral palsy, loss or damage of limbs, muscular dystrophy, multiple sclerosis, spinal cord injuries, neurological conditions, paralysis, and Parkinson’s Disease (Crow, 2008, p. 52). These students commonly experience difficulties accessing computer keyboards and mice. Often they have to rely on assistive technologies in order to interact with the computer technology. These technologies can range anything from mouth-sticks to eye-tracking devices that work as mouse input. These students may have a difficult time with chat-based assignments, games and activities that require bodily movement, and assignments that have time limits.

**Students with Learning Disabilities**

Students classified as having learning disabilities account for the largest group of learners with disabilities (Crow, 2008, p. 53). These students typically have difficulties in the following areas: memory, problem solving, attention, reading, linguistics, verbal comprehension, math comprehension, and visual comprehension. Even though students with learning disabilities account for the largest group of learners with disabilities, technology designers do not attempt to incorporate modifications for these individuals. Due to the large range of disabilities that fall under this category, technology designers have not been able to figure out how to create software and user-friendly technology that would appeal to students that fall under this category. This should serve as a push to conduct more research in this area so that we can provide help to these students sooner than later. Even though there is not design specific technology available, there are several implications that can be used to make on-line learning more accessible for these students. On-line learning tools should not be cluttered or disorganized, or use unnecessary graphics or pop-up windows. They should be easy to navigate, use page titles and headings, and all text sizes should be large enough to be easily seen and distinguished (Crow, 2008, p. 52). In any case, students with learning disabilities should be allowed as much time as needed to complete assignments involving on-line learning and computer interaction.

**III – Summary and Conclusions**

“Students with disabilities often feel confident with the use of technology to support learning,” (Rhodes & Milby, 2007, p. 255). When looking at the various categories of disabilities and special needs, it is evident that the use of technology and on-line learning has had a significant impact on the learning of students with disabilities. According to Eisenwine and Hunt (2000), “Teachers can meet the needs of students of varying abilities when they exploit the unique multi-media features of computer applications and Internet sites,” (as cited in Rhodes & Milby, 2007, p. 256). The previous research and journals showed that computers and applications had a positive impact on the following disabilities. For students with dyslexia, the use of interactive reading Power-Points increased attentiveness and comprehension. Screen readers and other audio technology gave students with visual impairments the opportunity to work with on-line and computer technology. By working with visual and audio scenarios on the software, Mind Reading and Alpha, students with autism improved their ability to recognize emotions and be able to empathize with others. Technology has helped students with emotional and behavioral disorder by staying on task in the classroom with using a handheld computer with an on-task behavior checklist. Students with hearing impairments are able to continue use of technology by being provided real-time captioning for audio, video, and multi-media presentations. They may also benefit by being given transcripts of audio content, so they are able to read what they are not able to hear. By limiting the use of games and activities that require bodily movement, students with motor impairments are still able to benefit from the same technology and on-line learning tools as students without disabilities. Lastly, being critically selective with what on-line learning websites are being used in the classroom, students with learning disabilities can use and benefit from technology. For students with disabilities to be able to use technology for beneficial learning in an inclusive environment, results in the increase of self-confidence, self-motivation, and self-efficacy (Weikle & Hadadian, 2003, p. 3).

**IV – Application of the Research in a Typical School**

Teachers and parents can buy inexpensive literary tools to help with skills in all content areas. This could include listening to a tape recorder or even just watching a movie. Another example would be creating E-Books. An E-Book is created using a Power-Point presentation tool where each slide symbolizes a page in a book. E-Books can include the use of graphics such as clipart or digital photographs, audio files, and video files (Rhodes & Milby, 2007, p. 256). This teacher-created technology can be used to create a story for any subject matter in any content area. When used, along with the assistive technologies mentioned above, students with special needs will be able to develop a deeper understanding of the content through the use of on-line and computer based technology. Students with and without disabilities that have difficulty with organization, keeping time, routines can use the software Mind Reading (LaCava, Golan, Baron-Cohen & Myles, 2007, Implications section). This software is an interactive, visual tool that increases students’ motivation and learning. Because technologies such as Mind Reading and E-Books are hands-on and interactive, students can take ownership and be more independent in their own learning. Through the use of technology, paired with assistive technology in support of this research, students with disabilities can have the same access to use on-line learning tools and gain the same benefits as students without disabilities.

**V – List of References**

Badge, J. L., Dawson, E., Cann, A. J., Scott, J. (2008). Assessing the Accessibility of Online Learning. *Innovations in Education and Teaching International*, *45*(2), 103-113.

Crow, K. L. (2008). Four Types of Disabilities: Their Impact on Online Learning. *TechTrends, 52*(1), 51-55.

Foley, A., & Regan, B. (2002). Web Design for Accessibility: Policies and Practice. *Educational*

*Technoogy Review, 10*(2), 22-27.

Gulchak, D. (2008, January 1). Using a Mobile Handheld Computer to Teach a Student with an Emotional and Behavioral Disorder to Self-Monitor Attention. *Education and Treatment of Children, 31* (4), 567-581. (ERIC Document Reproduction Service No. EJ812553) Retrieved November 29, 2008, from ERIC database.

Lacava, P. G., Golan, O., Baron-Cohen, S., & Myles, B. S. (2007). Using Assistive Technology to Teach Emotion Recognition to Students With Asperger Syndrome: A Pilot Study. *Remedial and Special Education*, *28*(3), 174-181.

Patrone, G., & Pettapiece, R. (2007). Technology for Individuals With Special Needs. *Phi Delta Kappan*, *88*(7), 0-3.

Rhodes, J. A., & Milby, T. M. (2007). Teacher-Created Electronic Books: Integrating Technology to

Support Readers with Disabilitites. *The Reading Teacher, 61*(3), 255-259.

Weikle, B., & Hadadian, A. (2003). Can Assistive Technology Help Us to Not Leave Any Child

Behind? *Preventing School Failure*, *47*(4), 181.