

Assistive Technology for Students with Learning Disabilities: Perceptions of Students and their Parents

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Introduction

Assistive technology refers to “any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability” (Individuals with Disabilities Education Act, 2004). Relevant assistive technology for students with learning disabilities includes, but is not limited to, computer programs that provide text-to-speech (Kurzweil 3000), speech-to-text (Dragon Naturally Speaking), word prediction capabilities (WordQ), and graphic organizers (Inspiration).

Blackhurst (2005) suggests that assistive technology can be used to assist learning, to make learning environments more accessible, and to enhance independence amongst individuals with learning disabilities. Assistive technology can also help individuals to accomplish educational goals, and when used strategically, technology can help bypass conditions that once prevented students from obtaining higher levels of learning. The use of assistive technology may provide a compensatory alternative, and when embedded within quality writing instruction, improved achievement may ensue (MacArthur, 2009). When employed by a supportive teacher, assistive technology may also help students obtain success in reading and writing (Fasting & Halaas Lyster, 2005) and, when embedded within effective strategy instruction, assistive technology can provide the means for students to complete organized and well-written assignments that are reflective of their knowledge and skills (MacArthur, 2009).

Individualized education plans have increasingly recommended the use of assistive technology to aid the written expression of students with learning disabilities (Behrman & Marci Kinas, 2002). Although recent regulations have included technology mandates and funding to support a variety of technology training and service initiatives, assistive technology is often not utilized to its full potential because the issues surrounding assistive technology service delivery are complex and involve much more than the basic operation of the technology (QIAT, 2000).

The purpose of this paper is to present students' and their parents' perspectives on assistive technology. Twelve students and their parents were interviewed for this study. All students were identified as having a learning disability and all were attending a special provincial demonstration school in Ontario, Canada. Provincial demonstration schools provide intensive and specialized educational programs for students with learning disabilities. These schools are designed to meet the needs of students with learning disabilities, and as a result, students are provided with intensive training on the use of assistive technology. The demonstration school discussed in this study provides its students with the most up-to-date training on the use of assistive technology, its educators know how to implement the technology in accordance with the curriculum,

and students leave the school feeling confident and competent in their use of the technology (Young, 2007; 2012).

Methods

Participants

The participants in the study were 12 students who had recently graduated from a provincial demonstration school, and their parents. In order to be eligible to attend provincial demonstration schools for students with learning disabilities, students must be formally diagnosed with a learning disability, with or without attention deficit hyperactivity disorder (demonstration school website). Students must have exhausted the resources of their current school board's program and require a residential program to assist in the development of personal life and learning strategies (demonstration school website).

The demonstration school which was the focus of this study accepts students in Grades 7 to 9, and these students range from 11 to 15 years of age when they are accepted into the program. This school follows the Ontario provincial curriculum within a highly individualized setting, with class sizes ranging from five to eight students. Depending on the progress made, students may attend the demonstration school for one or two years. Each year attendance at the discussed demonstration school is between 40 and 50 students and less than half of these students are in their second year of attendance.

Data collection

Parents and students participated in semi-structured interviews in their homes and the community library. Interviews with students lasted approximately 30 minutes and parent interviews lasted slightly longer. During the interviews, I asked parents, as well students, to provide information about their or their child's use of assistive technology prior to, and while attending, the demonstration school. The general focus of the interview was to identify the benefits as well as any challenges related to the use of assistive technologies.

Data analysis

Interview transcripts (12 student interviews and 12 parent interviews) were transcribed verbatim. I reviewed the transcripts to identify and define codes and categories. In order to minimize bias, a critical peer was used to validate the emerging themes (Miles & Huberman, 1994). Transcripts were coded thematically using the qualitative data analysis software program ATLAS.ti. In order to ensure codes were applied consistently, and to check for coding drift over time, an undergraduate student independently coded 10% of the transcripts. In order to calculate inter-rater reliability, I compared the assigned codes for randomly selected portions of parent and student

transcripts from both the first and second interviews. There was a 95% agreement rate amongst coders, which is sufficient to move on to the final stages of analysis (Miles & Huberman, 1994).

Member checks are an important component of construct validity and are arguably the most important criterion in establishing credible interview data (Mertens, 2005). After analyzing the data, I sent an overview of the findings to participants for feedback. Participants were provided with group data and parents were asked to provide feedback on the degree to which the research summary and selected quotes provided an accurate portrayal of their child's use of assistive technology.

Results

Analysis of the data resulted in the identification of six themes of positive effects of assistive technologies and one category of negative effects. For each theme, I have included verbatim quotes from participants in order to provide a 'thick description' of their experiences. Pseudonyms are used.

Persistence with tasks

Assistive technology enabled students to finish tasks they would otherwise have been unable to complete. Assistive technology assisted Darren in English and history as he explained: "Because I can't read, the technology helps me read it; then I can understand it." Similarly, the technology enabled Derrick to write long exams: "If I didn't have Dragon and Kurzweil I wouldn't be able to write as fast or I wouldn't be able to check it over because I use Kuzweil to read it back."

Demonstration of academic ability

Assistive technology enabled students to demonstrate their academic ability. Derrick's mother explained as follows: "He relies on [Kurzweil] to read it so he can grasp it better... If he reads it himself he doesn't get the full meaning because he's missing words." Kurzweil assisted Sasha with test writing: "She feels much more successful knowing that she can have that read to her, rather than having to multitask by reading, and then processing, and then writing." Without technology, "[Nigel] would never be able to get it done because he wouldn't be able to get it read." His mother added, "Technology is productivity - being able to produce something that is grade equivalent... He's able to produce work that actually shows what his intellect is... He's able to do it, he's able to cope."

Improvements in writing

The assistive technology also improved student's writing. The software program Dragon Naturally Speaking was essential for Frank because "There is such disconnect between what can come out of him by hand and what is going on in his head... If he lets it out verbally it's remarkable, you get the whole picture, but if he's got to write that out, it will not come out." Nigel relied on Inspiration concept mapping software because "he can put it in the order he wants. Then he can go back, build on that, and have it flowing in an actual order." Derrick benefitted from the technology because "he doesn't have the spelling to write out the message with words he would like to use. If he doesn't use his technology it looks like a Grade 2 or 3 student did it."

Compensation

Assistive technology also enabled students to compensate for their learning difficulties. Sasha's mother commented regarding her daughter: "Her writing has increased exponentially because of Dragon... The technology has transformed her academic life. The technology has given her freedom to understand her work, express herself, feel confident, and feel like she has ability – it's invaluable." Mike's mother felt that with the technology, "his answers are lengthier and more detailed so he gets better marks" and Derrick's mother commented that, "He can pretty well do anything they give him as long as he uses the technology to do it."

Confidence

Assistive technology helped to boost students' confidence. Derrick's mother noted, "When it comes to the school work he wouldn't have the confidence in himself without it." Derrick added, "You just know I have to get my computer and I can do it... It gives you confidence - if it's sitting there you know you're fine." Sasha added, "Knowing I can use Dragon to write makes me feel a lot better because I know the quality of my work will be better." Kristine commented that "I feel way better [knowing] that I can get the same grades as other kids, knowing that I'm just learning differently."

Motivation

Assistive technology positively impacted students' motivation. Sasha, Frank, Mike, and John were motivated as the following comments illustrate: "with my technology I can do better quality work", "I can finish with a certain mark", and "I know with the technology I can actually complete it." Derrick felt his motivation came from the technology: "Everything goes back to the technology because I can go to it whenever I want and I can always help myself." Three students and three parents felt assistive technology made students "less motivated because it's a hassle... In class it takes too long to get up and going." (Nigel). Jamie and Daniel felt a stigma surrounded the use of technology.

Daniel said, "It is motivating because it helps you read, but if you're the only one in the class with it, it makes you feel different."

Frustration with assistive technology

Rhys didn't like using his technology "in school because it takes too long to set up and everyone is looking at you because you have a laptop." Three parents felt assistive technology could be frustrating and four students discussed the downfalls of the technology. Sasha's mother felt "it can be frustrating to train it and frustrating to know all that you need to know about it." While Kristine agreed it was a pain to train Dragon, she felt "It's better that we have it because it takes less time on tests and you don't have spelling mistakes."

Conclusions, limitations and implications

Perceptions of students and their parents confirmed that students were positively impacted by the use of assistive technology at the demonstration school. These results suggest that students who have learning disabilities, as well as students who are English language learners or students who are motivated by technology, may benefit from the use of technology to support learning.

The students in this study were selected to attend the demonstration school because they had very weak academic achievement, particularly in reading, with mostly grade equivalents of 1 to 3 on standardized tests. At elementary school, student's learning disabilities prevented them from experiencing academic success; and as a result, one would expect that the use of assistive technology would have a positive impact on their academic achievement. The demonstration school was known for its implementation of assistive technology. Its educators understood the technology and provided students with the most up-to-date use. Given these conditions and given that all the participants for this study came from the same school, the technology may not have the same positive impact in other school settings.

Only a few researchers are conducting systematic, well-designed research that can lead to confident conclusions on how the use of assistive technology affects learning (MacArthur, Ferretti, Okolo, & Cavalier, 2001). In addition, little research has been conducted on the use of assistive technology in inclusive schools (Watson, Ito, Smith, & Andersen, 2010). The demonstration school provided an ideal environment for assistive technology use as teachers were familiar with these programs and knew how to facilitate their use within the general education curriculum. In order to make informed decisions about the selection and use of assistive technology, additional research could investigate strategies to better support students in their use of assistive technology in the general education classroom. Edyburn (2009) argued that much remains to be done to improve the quality of special education technology research. However, if future studies are longitudinal in nature and students are provided with sufficient support to

ensure they are proficient in their use of assistive technology, results may be found that are congruent with those presented in the study reported on in this paper. In terms of implications for practitioners, general educators and special educators need to become more familiar with assistive and instructional technology so that they can embed this technology within their instruction to meet the needs of all their students (Chmiliar, 2007; Chmiliar & Cheung, 2007; McGhie-Richmond, Specht, Young, & Katz, 2011).

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