Enhancing the Special Education Curriculum with Technology

An analysis of best practices in critical content areas: Reading, Writing, and Math

The integration of technology into the classroom curriculum is undoubtedly vital to the success of all students. Whether it comes in the form of a calculator, Interactive White Board, or computer word processor, with the use of technology, learning can be enhanced and student achievement increased. Therefore, it stands to reason that students in the special education spectrum can also benefit greatly from devices and programs designed to help students whose learning needs are different from those of a normally functioning student.

Using an Internet blog as a means of communicating ideas and synthesizing my own, I examined the field of technology and its impact and potential for students with learning disabilities. I am currently certified in Exceptional Student Education and have been teaching in a fully self-contained school for students with learning disabilities. It was my goal to increase my knowledge and understanding of effective technology integration for students with varying degrees of learning disabilities. I examined three core subject areas: reading, writing and math, making certain to address the specific challenges faced by students with learning disabilities. I also evaluated the potential effectiveness of the various computer programs and technical devices I discovered in this quest to improve the special education curriculum with technology.

The State of the Field

Currently the field of technology is viewed, to some extent, separately from the field of special education. The paths of both often cross with what is commonly known as Assistive Technology. Assistive Technology is a nonspecific term which describes any device or program which can be used to

assist a person with disabilities (Georgia Project for Assistive Technology, 2004). This can include things like wheelchairs, ramps, TDD systems, even medical equipment. However, these types of devices are outside the scope of this analysis. The form of assistive technology most useful for students with learning disabilities is often programs that could be used to benefit all students and include things like audio books, text prediction software, and multi-function calculators. These devices and programs are often discrete and can be used in conjunction with the technology found in most American classrooms. Reading disorders and dyslexia seem to be the subject of greatest focus for software engineers. There is a wide selection of programs and assistive technology tools for students with reading disabilities. Following reading is the subject of math which stakes claim on a fair share of the market for assistive programs and devices. The subject most lacking in quality assistive technology is writing. Perhaps the first two are viewed as being more vital to the success of students; however, I believe all three are of significance for all students and I find this discrepancy to be alarming and of great consequence. While there are writing tools available for students with milder disabilities, those with significant impairments are being ignored.

The Future of the Field

There are positive steps being taken to include students with learning disabilities when designing assistive software and other technical tools. However, the shortage of quality writing programs is disconcerting. Reading disabilities are being addressed through initiatives such as Response to Intervention (RTI), which is a program to provide early diagnosis and intensive treatment of reading disabilities (Fuchs & Fuchs, 2006). No such program exists for students with equally severe expressive language disorder using technology or otherwise. In searching, the programs most recommended for students with this particular disability are Kidspiration and Inspiration. I have used Kidspiration in my classroom and have seen results only with those students with milder disabilities. Those in the most

severe category are frustrated by the program even when extensive practice and assistance are provided. This leaves the door open for researchers and software developers to create a program which addresses the needs of students with all forms of writing disability.

In my assessment of resources, I believe the field of technology to enhance learning for students with learning disabilities is growing but not rapidly enough. Those conducting significant research have developed promising new programs such as the math program called TEAM. This program was created and carefully researched and evaluated by researchers at the University of Wisconsin-Madison and can be integrated into any classroom, particularly a classroom for students with math disabilities or dyscalculia. The program provides curriculum to help low achieving students accomplish mastery of more complex math skills (Wisconsin Center for Education Research, 2007). Another positive element of this program and others like it is that it is available free to teachers, suggesting that the researchers and developers are more focused on the educational value of their product than the economic value. Unfortunately, most programs come at significant cost to teachers, schools and parents who wish to obtain special devices for their students and children with learning disabilities. Research-based devices like the Quicktionary Reading Pen II provide struggling readers with an OCR pen intended to aid learners by decoding words and transmitting the sound through a discretely worn earpiece (Higgins & Raskind, 2005). The new model allows students to turn off the word defining function, making the pen permissible for use in testing situations (Manchester, 1998). This suggests that action is being taken to continuously improve devices. Regrettably, the product comes with a $275 price tag which is prohibitive for many. One specific program developed to help struggling readers and writers called Fast ForWord is so costly that the manufacturer's website does not list a price. According to The Metiri Group, a consulting firm for education, the estimated cost of computer licenses for 50 students to use the program is approximately $38,000 (The Metiri Group, 2001).

Assistive technology cannot continue to be viewed as a luxury afforded only to the wealthy. Learning disabilities do not discriminate with regard to race, culture, religion or economic status and, therefore, neither should helpful programs and tools (Learning Disabilities and Assistive Technologies, 2006). The field of technology for students with learning disabilities must improve in two areas:

- There is a need to develop programs to assist students with severe expressive language disorders to produce written or oral communication of thoughts and ideas.

- Programs and devices for students with learning disabilities need to be made available at reduced costs and/or be more universally accessible to those in need.

My Role

As stated in my blog posting from April 2, 2008, I wish to at some point work with others to develop a writing program to fill the gap I believe is currently plaguing students with disabilities. I believe there are researchers at colleges of education working to rectify this problem and I would like to be a part of finding the solution and making the programs more readily available to students.

On a professional level, I believe my role is to help educate co-workers about current trends in technology for students with learning disabilities. While I do not feel I have achieved "expert" status in this field, I do have far greater knowledge and background on this particular subject than anyone else at the school where I work. Therefore it is my duty to dispense this information and to assist the principal in making technology decisions for the school. In the past I have been unable to provide specific purchase suggestions and the school acquired fancy, expensive devices that are neither used nor particularly helpful for our population of students. All future purchases should be research based decisions. I can contribute a great deal in this area.

Without a class requirement, few teachers, if any, would spend time researching these trends or finding ways to change, enhance or improve curriculum. I am pleased to have research to back my suggested use of certain programs and I am thrilled to be able to employ new and effective techniques in my classroom. Undoubtedly, many of these programs can be used to increase student achievement and more importantly, student independence in the future.

Validation for Research

I chose to pursue this topic because it is of vital importance that all students become prepared to function in the global community. One must evaluate the goal before beginning any endeavor. What is the goal for students with learning disabilities? In my opinion it should be for a student to function independently as an adult. One must ignore, to some extent, traditional teaching methods with the hope of guiding students towards independence. In the field of reading, devices like the Quictionary Pen can be used by adults to discretely decode unknown words in the workplace, on a job application or in a newspaper (Higgins & Raskind, 2005). Audio books can help both students and adults enjoy reading and participate in thoughtful discussion of the latest best seller without feeling out of place. They can also help students achieve at the high school level and beyond when textbooks are made available for auditory consumption (Kelly, 2006). Other programs like *Natural Readers* and *Storybooks on Computers* help students gain necessary reading skills that do not come as naturally as they do to others.

In the field of writing, assistive computer programs like *Word Q* help students with mild writing disabilities evaluate sentence structure, spelling, grammar and word choice by reading back written work and providing speech feedback (Quillsoft, 2007). *Kidspiration* is also a valuable visual organizer that can help all students manage and process thoughts (Access and Productivity Tools) and *Fast ForWord* can assist students who need intensive language training master those basic skills needed to advance in the education system (Fast ForWord Language Basics). These programs are geared towards students

with mild writing disabilities and, as previously mentioned, they do not seem to be greatly effective for students with severe expressive language difficulties. When implemented with effective teaching strategies, however, they can raise the level of achievement for most students with learning disabilities.

Finally in the subject of math, students can be assisted through the use of promising research-based programs like TEAM and FASTT (Fluency and Automaticity through Systematic Teaching with Technology), a program which helps students develop "declarative fact knowledge" and "mathematical fluency" (Hasselbring & Goin, 2005). Multi-function calculators can perform tasks like calculating and reducing fractions, counting money and performing order of operations which greatly increases the potential success for students struggling in these areas. Calculator mastery is particularly vital for students with learning disabilities. As suggested by the researchers of TEAM, students do not need to master basic facts to learn more advanced math skills (Wisconsin Center for Education Research, 2007). Therefore, it stands to reason that calculators should be used any time a student is being held back from advancing to more complex tasks due to a lack of mastery of basic facts.

Far too often, assistive devices such as those listed above, particularly audio books and calculators, are viewed skeptically and with opposition from parents and teachers which leads to resistance from students who believe they are somehow cheating if they should use such devices. Work must be done to change this mentality. Students who have learning disabilities learn differently and sometimes this means they must use devices that traditional students do not. This should not be considered cheating any more than a wheelchair is considered to provide undue assistance for a person with physical impairments. When new technology becomes available to help students, it should be used for that purpose and not viewed as an unnecessary crutch. Students with disabilities do not need additional barriers to independence in the form of outside pressures against using the very same devices created for their benefit.

Students should be encouraged to learn all that they are capable of learning and when they can simply make no further gains, measures must be taken to accommodate for the gap in ability. These advances in technology help to fill that gap and increase the likelihood that students with learning disabilities can function as adults both confidently and independently.

Finally, teachers and parents must remain advocates for children with all disabilities. Often times in my searches, I discovered new programs by reading blog entries written by parents of a children with learning disabilities. Parents must be their children's greatest supporters and in doing so, they increase awareness for teachers, schools and districts. When assistive technology is not available in a school, parents must fight for it. A significant amount of new technology is available but it takes education on the part of teachers and parents to bring the technology to the forefront so it can be used in the classroom to enhance the core subject areas and in turn, increase independence and student achievement for all students with learning disabilities.

Blog Experience

I will admit I felt this task was daunting, especially when I set out with the vast Internet before me on my first search. I let the search and the material I discovered guide the direction of the blog. Initially, before the first search and creation of the blog itself, my plan was to find articles dealing with technology in general. This was obviously too broad. Then I decided to focus on special education since that is the field to which I have devoted my career. I set out to cover the three core subject areas in the first three weeks of blogging, having decided that I would figure out the second half when the time arrived. Luckily seeking further subjects was unnecessary when I discovered the wealth of information available for reading disabilities and the use of technology. The entire blog could have perhaps focused entirely on reading, however, I do not just teach reading and I wanted to maintain a more balanced perspective of the available resources for all the core subject areas. It was not until the final weeks that

my goal was clearly defined and not until now, in writing this synthesis, that I can fully evaluate and appreciate the knowledge I have acquired.

I stated in my final blog that I felt this experience was valuable. The experience of finding new technology to help my students was not the sole prize however. Reading the blogs of group mates was also fascinating. I was privileged to discover the field of Geocaching and the practical and creative uses of Interactive White Boards. I have been encouraged by the success of a group member to, at some point in the near future, make an attempt at grant writing in the hopes of obtaining Interactive White Boards for my school. The boards seem like an essential piece of my own puzzle, providing a way for students to learn with visually enhanced programs in all subject areas.

While I did not receive any outside responses, the feedback provided by my group mates was very worthwhile and effective. Having the critical perspective of other experienced teachers helped me evaluate the process for myself and it also led me to discover tools and programs I may not have found otherwise. I feel this sort of feedback is essential for learning and while I do not feel my students are mature enough to compose their own blog entries, I do see tremendous value in the search and response techniques demonstrated in this process. Additionally, I could not implement blogging into my curriculum because not all students have been granted permission to use the Internet at school and the school remains skeptical and fearful (perhaps justifiably so) of having students post information on the Internet. Students in upper grades would likely be better suited to handle a blog experience. Unfortunately at this point, my students are not ready for this type of activity.

To say that I learned from my experience is an understatement. The experience was eye-opening and led both to exhilaration over the prospective programs and frustration over the lack of school funds for technology, lack of computers capable of supporting the programs and stubbornness of co-workers, some of whom are too closed-minded to see the potential value of the programs. However,

even in the short period of time since starting the blog, I have already had the opportunity to use information I learned to justify current teaching techniques as well as implement new ones. An example happened recently when a parent was upset that her son was given permission to listen to a book on tape rather than read the book himself. I provided the parent with information from my second blog entry, describing the positive impact audio books can have on students who are struggling readers. I am thankful for having this information at my grasp.

The experience leaves me hopeful. I realize the field of technology to assist students with learning disabilities in the core subject areas has progress to make but as technology constantly advances, so will the tools created in this more specific field. I do not believe my work ends at this point. I feel it is just beginning. Now that I know what to look for, I am confident there are countless additional programs which may be of assistance to my students. Will I keep up the blog? Perhaps. Perhaps not, but I can be certain I will continue the research in an endless quest to discover the latest in the field of technology for students with learning disabilities.

Works Cited

Access and Productivity Tools. (n.d.). Retrieved April 23, 2008, from Synapse Adaptive: http://www.synapseadaptive.com/learning_disorders.html#

Fast ForWord Language Basics. (n.d.). Retrieved April 24, 2008, from Scientific Learning Corporation: http://www.scilearn.com/products/elementary-products/fast-forword-language-basics/index.php

Fuchs, D., & Fuchs, L. S. (2006). *New Directions in Research Introduction to Response to Intervention: What, Why, and How Valid Is It?* Retrieved April 21, 2008, from Internatonal Reading Association: http://www.reading.org/Library/Retrieve.cfm?D=10.1598/RRQ.41.1.4&F=RRQ-41-1-Fuchs.html

Georgia Project for Assistive Technology. (2004, September). *Definition of Assistive Technology*. Retrieved April 23, 2008, from Georgia Project for Assistive Technology: http://www.gpat.org/gpat%20resources%20documents/definition%20of%20assistive%20technology%201.pdf

Hasselbring, T. S., & Goin, L. (2005). *Research foundation and evidence of effectiveness for FASTT Math.* Retrieved April 22, 2008, from http://www.tomsnyder.com/reports/

Higgins, E. L., & Raskind, M. H. (2005, Winter). *The Compensatory Effectiveness of the Quicktionary Reading Pen II on the Reading Comprehension of Students with Learning Disabilities.* Retrieved April 23, 2008, from Journal of Special Education Technology: http://jset.unlv.edu/20/JSETv20n1.pdf

Kelly, J. (2006, January 27). *Audio Textbooks Give Students with Reading Problems Access to Curriculum.* Retrieved April 23, 2008, from Great Schools Inc: http://www.schwablearning.org/articles.aspx?r=1066

Learning Disabilities and Assistive Technologies. (2006, August 17). *What is a Learning Disability*. Retrieved April 24, 2008, from Learning Disabilities and Assistive Technologies: http://www.gatfl.org/ldguide/defin.htm

Manchester, J. R. (1998). *The Quicktionary Reading Pen*. Retrieved April 23, 2008, from LD Resources: http://www.ldresources.org/?p=561

Quillsoft. (2007). *Word Q Writing Software.* Retrieved April 23, 2008, from Quillsoft Writing Made Easier: http://www.wordq.com/

The Metiri Group. (2001). *Fast ForWord*. Retrieved April 23, 2008, from The Metiri Group: http://www.metiri.com/kentucky2001/fastforward.htm

Wisconsin Center for Education Research. (2007). *Advancing the Math Skills of Low-Achieving Adolescents in Technology Rich Learning Environments*. Retrieved April 21, 2008, from Teaching Enhanced Anchored Mathematics: http://www.wcer.wisc.edu/TEAM/index.html