Assistive Learning Technologies - Making a Difference for Students with Learning Disabilities and Difficulties

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Students with learning disabilities and difficulties have at their disposal a range of assistive technologies to support their learning. Assistive technology is defined as "the software and technology which helps people with disabilities and special needs to overcome the additional challenges they face in communication and learning"(BECTA, 2003).

The emerging research concerning the use of these assistive technologies indicates their potential to make a difference to the learning and educational performance of students in schools, particularly in the area of literacy, where the traditional use of non-digital teaching tools have had limited success.

For students who struggle with literacy, technology is increasingly being used to remove barriers to learning and provide access to knowledge and understanding. Assistive technologies can give these students the tools to assist them with reading, writing, research, study and organisation.

> *Assistive technology..can remove barriers and enable (students) to gain more equitable access to successful learning experiences and accomplish things not thought possible before (Sitko, Laine and Sitko, 2005)*

Resources:

- Abbott, C. (2007). *E-inclusion: Learning Difficulties and Digital Technologies*. Available from www.futurelab.org.uk/download/pdfs/research/lit_reviews/futurelab_review_15.pdf
- LD Online - www.ldonline.org
- Technology for Learning Disabilities Project - http://www.cwu.edu/~setc/tld/eval_outcomes.php
- Dave Edyburn Home Page provides links to research, publications and articles - www.uwm.edu/~edyburn
- Journal of Special Education Technology - www.tamcec.org/jset/index.htm

Reading Tools

An example of an assistive technology reading tool is the ability of a software application to read the text aloud. Text-to-speech functions have the ability to read all digital formats, including Word documents, PDF, html, txt, rtf, images and photos. Reading tools may also include an integrated dictionary and thesaurus. This enables students to instantly find the meaning of unknown words and to distinguish between homophones. These words and definitions can be instantly read aloud to assist in gaining meaning from the text.

Another function of a reading tool is the capacity to convert text to an audio file. This audio file can be saved on a CD, on computer or an MP3 player. This can be an excellent study tool and is the great way to support students who have difficulty with reading. Reading tools also allow students to customize the pitch, speed, volume or type of speech. The text can either be read by word, by sentence or by paragraph. By customizing these features, students are able to make the program suit their particular learning needs or style.

Alternative electronic text formats are also becoming more readily available. Many publishers now provide text file, word document and PDFs of their publications. Vision Australia has adopted the Daisy Book format which can be accessed by people with vision impairment and visual processing disabilities. A DAISY book is a digital talking book that may contain both sound and text. DAISY stands for **D**igital **A**ccessible **I**nformation **SY**stem. The DAISY System is transforming the reading and learning experiences of people who have a print disability.

Resources:

- Accessible Book Collection - www.accessiblebookcollection.org
- Bookshare - www.bookshare.org
- Project Gutenberg Online eBook resource with over 20,000 free books - http://www.gutenberg.org/wiki/Main_Page
- Daisy Books - http://www.daisy.org
- CITEd's Learn Center showcases select resources and targeted tools to help students meet the everyday educational challenges through technology - http://www.cited.org/index.aspx?page_id=2
- Reading Software: Finding the Right Program - http://www.readingrockets.org/article/7765

Writing tools

Writing tools offer a variety of features. One of the most important features is the ability of a writing program to speak as you type, either by letter, word or sentence and so give instant feedback. Another feature is word prediction, where a list of predicted words is provided to a student as they type that supports their writing and breaks the blank page syndrome. Some word prediction programs can also enable the student to identify the meaning of the word by linking to the integrated dictionary and thesaurus.

Speech recognition in the last five years has also become a very effective writing tool. Programs allow users to create documents, reports, e-mails and much more; all by just speaking. The process is fast, easy and accurate; at least three times faster than typing. Script reading is no longer required and with effective training and support speech recognition can be up to 99% accurate.

For students whose handwriting is untidy or illegible, and who find writing with pen and paper frustrating, portable word processors or note takers help overcome these barriers and encourage students to independently take notes rather than rely on a scribe or peers. They are low cost, portable alternatives to laptops that are lightweight, sturdy and have the advantage of a long battery life. They are easy to use and can be used in conjunction with word prediction programs if the student struggles with spelling.

Resources:

- Assistive Technology Writing Tools - http://www.greatschools.net/cgi-bin/showarticle/3084
- A blog focusing on making the curriculum accessible to all learners through the provision of assistive technologies and universal design - http://www.teachingeverystudent.blogspot.com
- Accessibility features of Microsoft products - http://www.microsoft.com/enable
- Broaden Your Horizons: Assistive technology benefits to students, suppliers, freeware and shareware, resource links - http://www.imvc.com.au/broadenhorizons/index_new.asp?NavID=9&a=9&b=0

Organizational, Research and Study tools

Organizational tools are sometimes ignored by teachers and students as there is a tendency to emphasize the importance of getting words on paper rather than the process of writing. Programs that use mind mapping or idea mapping encourage students to brainstorm and structure their ideas. It generates a link between ideas and writing by forming a writing structure from the idea map.

Study and research tools found in some assistive technologies are extremely helpful in assisting students to take notes and to organize and structure information they need to use. These tools provide ways of accessing, retrieving and organizing data from a variety of sources. The first resource listed below provides details on some of these tools.

Resources:

- Inclusive Technology Resource Kit (2007) - This resource includes a range of fact sheets on a wide variety of assistive technologies including organizational, research and study tools. Contact RMIT Disability Co-ordination Office http://www.rmit.edu.au/ssg/dco for more information.
- Hall, T., & Strangman, N. (2002). *Graphic organizers*. Wakefield, MA: National Center on Accessing the General Curriculum. Available from http://www.cast.org/publications/ncac/ncac_go.html

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Many of the assistive technology tools providing support with reading, writing, research, study and organisation now include Universal Design for Learning features which seek to seamlessly embed their benefits into commonly used technologies found in the classroom. This approach ensures that digital learning environments are flexible and accommodating for all students.

Resources:

- CAST works to expand learning opportunities for all individuals through Universal Design for Learning - www.cast.org
- UDL Technology Toolkit - http://udltechtoolkit.wikispaces.com
- Universal Design for Learning Wiki - http://udl4all.pbwiki.com

Assistive Technology provides us with the opportunity to “make a difference” for students with learning disabilities and difficulties by accommodating individual learning needs, providing access to the general curriculum, developing knowledge and understanding, and enhancing quality of life. In particular in the area of literacy assistive technology can, according to Lange et

al (2006),

> *provide compensatory assistance to those with reading difficulties. In practice, these tools could be used at home or in the classroom to increase accessibility to a range of texts and to assist with reading and writing.*

The authors go on to state that assistive technology can also have a positive remedial effect on student progress. Assistive Technology, therefore, can be seen not just as a compensatory tool but also as a remedial tool for teachers and their students.

> *Extended compensatory use of the …assistive tools discussed here could have remedial effects on literacy skills in addition to the compensatory benefits described (p20).*

Using technology to assist students with learning disabilities and difficulties is no different to using technology in general education. Technology should not be seen as an add-on of something which is apart from the general curriculum. Assistive technology should be integrated into the general curriculum using a school-wide, cross curricular approach. Such technology can assist all students, not just those with learning disabilities or difficulties. In this respect, assistive technology becomes inclusive practice. Technology is not a barrier to literacy and numeracy, but in fact can be an effective assistive tool to develop these important skills and support students to compensate for their learning disabilities and difficulties.

References

Becta. (2003). *What the research says about ICT supporting special educational needs (SEN) and inclusion*. Coventry: Becta. Retrieved from http://www.becta.org.uk/page_documents/research/wtrs_ictsupport.pdf.

Lange, A. A., McPhillips, M., Mulhern, G., & Wylie, J. (2006). Assistive Software Tools for Secondary-Level Students with Literacy Difficulties. *Journal of Special Education Technology, 21*(3), 10.

Sitko, M. C., Laine, C. J., & Sitko, C. J. (2005). Writing tools: Technology and startegies for struggling writers. In D. Edyburn, K. Higgins & R. Boone (Eds.), *Handbook of Special Education Technology and Research.* Whitefish Bay, WI: Knowledge by Design, Inc.