Section 7

Using technology to support students

The use of information and communication technology must begin with the teacher and the teacher's assessment of the learning needs of his or her students. Not only can technology be applied as a tool in the process of communication (such as through assistive technology) but it can also be used to explore and to act as a tutor, with the added advantage of potentially immediate feedback.

In this section, the following aspects of technology in the classroom will be considered:

- assistive technology software, including speech synthesis and word prediction programs
- organisational software
- voice recognition software
- specialised hardware
- networks to foster effective writing and spelling.

Assistive technology: supporting students to read and write

Problems with reading can vary but most students experiencing difficulties display slow and laborious decoding skills that can lead to poor comprehension.

Students' learning can be hindered by difficulties with writing, especially in the middle years and high school. Students may have problems with basic skills, such as spelling and grammar, as well as higher skills, such as planning and organising and revising a piece of writing. Mechanical difficulties, including difficulties with handwriting, can mean that students with learning difficulties produce less written work and work that is lower in quality than that of their typically achieving peers.

New assistive technology can support students to complete tasks more efficiently and independently, resulting in improved performance in a variety of reading and writing tasks.

Note: No single software solution will support all difficulties; for example, spelling or reading difficulties, word retrieval or phonic deficits. It is essentially a matter of matching learning need with software to ensure that difficulties are lessened and learning enhanced. There is no simple match of software with particular disabilities. Software options will depend on the specific needs of the user: access, age, literacy level and so on. It is also important to consider the context in which the technology is being used.

Disclaimer: The listing of a product in this document in no way implies any form of endorsement of that product by the NSW Department of Education and Training.

Speech synthesis (text to speech) and word prediction technology

Word recognition plays a key role in reading comprehension. When errors occur in reading, the student receives less information from the text and so comprehension is affected. As well, the cognitive resources that could otherwise be applied to higher level processing are used instead to decode words.

Speech synthesis programs work by translating text that appears on the computer screen into computerised speech. Text can either be entered by typing directly into the speech synthesis software program or into another word processing program that is compatible with the speech synthesis software. Text can also be entered by using a scanner and optical character recognition software.

Students can instruct the speech synthesis programs to read only selected words, whole lines or an entire text selection. The immediate speech feedback allows students to correct their reading errors by clicking on a word they do not know in order to hear the correct pronunciation. Research has shown that the use of this software is not only assistive but also has remedial benefits. (Higgins & Raskind, 2000)

Word prediction software includes a text reading feature with synthetic speech so that the user can re-check what he or she has written by having it read aloud. Students can use word prediction software to enhance the rate at which they input text into the computer word processor.

Word prediction software attempts to predict the target word, based on the first letters typed by the user. Word prediction can be useful to support spelling as well as to increase the rate of text produced and this combination can help build students' confidence. More recent software versions also include a semantic prediction feature which attempts to predict not only on the basis of letters typed, but also on the basis of grammar or syntax used. So, for example, after the user has typed the word 'We', the word prediction feature will include in its list of predicted word options: 'are', 'were', etc. but will not predict grammatically incorrect solutions such as 'is' or 'was'.

Software

Read&Write (Version 8) GOLD

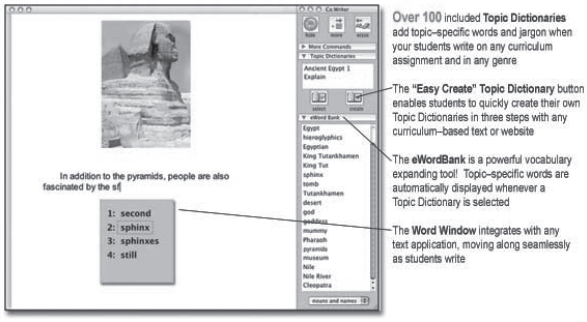
A fully comprehensive toolbar that provides literacy support in any Windows application, *Read&Write* is essentially a toolbar that 'floats' on top of any open Windows application. Assistance can then be called upon as a student works on a reading or writing task. It is designed to assist students to work independently in an inclusive environment ensuring they keep up with their peers in the same classroom.

As well as word prediction when typing, additional support provided includes:

- ability to scan printed text into the computer ready to be read aloud and edited in Microsoft Word
- ability to convert printed text to sound files for MP3 players and similar to support auditory learners and aid revision away from the computer
- ability to convert speech to text, with UK English spelling
- additional tools for collating study materials and retrieving information for students who struggle with their organisation of study materials and research for assignments
- ability to read PDF documents.

For more information visit http://www.spectronicsinoz.com/

Co:Writer 4000



Co:Writer 4000 has word prediction which can be used with any word processor or e-mail program. The word prediction takes a number of different approaches to recognising words: phonetics, the dictionary, context clues and grammar rules. From the first letter input by the user, the program generates possibilities for the user to select from. This allows the user to concentrate on conveying an idea or concept rather than being distracted by spelling and grammar. There is also a speech output function which can read out the suggested vocabulary for the user to choose from.

For more information visit http://www.donjohnston.com or http://www.spectronicsinoz.com/

WYNN Wizard

Scanning and reading software. It includes optical character recognition (OCR), the ability to scan printed pages and convert them into electronic text. Speech synthesis enables this scanned text to be read aloud. Additionally, WYNN Wizard can read word processing documents, Adobe Acrobat PDF files, text files, and the Internet.

For more information visit http://www.freedomscientific.com/LSG/products/wynn.asp

TestTalker

A software solution designed to help individuals be more successful with test taking, worksheet completion, and study materials. It also aids completion of electronic forms. TestTalker provides a computerised version of a test, worksheet, or other form that can talk. TestTalker has two modules:

- Teacher Edition, a test-creating product designed for teachers. It scans pre-printed tests and allows teachers to configure them to enable students to take tests electronically.
- Student Edition, a test-taking product. It reads the test aloud and allows students to answer the questions.

For more information visit http://www.quantech.com.au/products/index.htm

Penfriend

Penfriend word prediction can be used with any word processor. It has a number of other features which include speech feedback, reading aloud the words on the screen, abbreviation expansion, smart punctuation and on-screen keyboard.

For more information visit http://www.penfriend.ltd.uk

BookReader 4.0

This text reader is free software. It allows the user to have text read aloud directly from their screen and allows the user to change the appearance or display of the text to their own user preferences, such as text enlargement, colour preferences or page dimensions. It also has an autoscroll feature which means the user has nothing to do except to listen to the text being read aloud.

For more information visit http://www.rudenko.com

ReadPlease 2003

ReadPlease, available as a free download, is an all-purpose text-to-speech software which can read anything on the screen. It has a number of useful features, including low vision colour option and adjustable voice speed. ReadPlease 2003 Plus is a more advanced version of ReadPlease 2003. It must be purchased but it includes features such as text highlighting when reading, fast forward and backward, adding your own words and pronunciations, and adjustable pause between paragraphs.

For more information visit http://www.readplease.com

Microsoft Reader

This is another free piece of software which is designed specifically to help people read eBooks (on desktop or laptop computers only). There is a text-to-speech component available with Reader now which gives full speech output using a synthetic speech engine (available in three languages: English, French and German). While there are literally thousands of eBooks available in the text-to-speech format of Microsoft Reader, it should be noted that eBooks published in copy-protected (level 5) format, the highest level of security protection, will not work with this feature. Microsoft has its own catalogue of Microsoft Reader compatible eBooks and can be viewed from its own website (www.microsoft.com/reader) but they are also available through most of the well known publishers and distributors online including:

http://www.amazon.co.uk
http://www.powells.com/ebookstore/ebooks.html
http://www.cyberread.com (eBooks are available in two formats: Microsoft Reader and Mobipocket Reader for PDAs)
http://www.ebooks.com

Organisational software

Students experiencing difficulties writing often have problems with the mechanics of writing, such as handwriting and the use of spelling and grammar rules. Focusing on these low level writing skills interferes with a student's ability to engage in higher order processes, such as writing organisation and revision.

Organisational software such as Inspiration or Spark-Space helps students to organise information and ideas through a variety of webs or concept maps on the computer screen. Brainstormed ideas can be entered as visual organisers which are then translated into outlines for the students to follow while writing. This type of software can be used to gather information before writing; students can add new information which is automatically rearranged to present the information in a logical way. Information can be in the form of text, images or Internet hyperlinks. Once a structure is provided to organise their writing, students can use the outline to write. This type of software can also be used to help students summarise information they have read.

Helpful hint:
One possible disadvantage of this type of software is that students may spend more time playing with the graphics than on organising and writing. Teachers need to monitor how students are using the software to maximise the benefits, with explicit demonstrations on how to use the software effectively.

Some examples

Inspiration

A tool students can use to plan, research and complete projects. With the integrated Diagram and Outline Views, they create graphic organisers and can expand topics into writing. With this visual support students can gain and retain a better understanding of concepts and demonstrate their knowledge. Drag-and-drop actions and hyperlinks make it easy to gather research and connect to files and web resources. As students develop their projects, they use AutoArrange to automatically format their diagrams.

Kidspiration®

Created for K-5 learners, this software provides ways to apply the proven principles of visual learning. Students build graphic organisers by combining pictures, text and spoken words to represent thoughts and information. Younger learners can be supported to develop early literacy skills, and more advanced students may be supported to improve their comprehension skills and to better organise ideas for writing.

K-5 learners can use Kidspiration to:

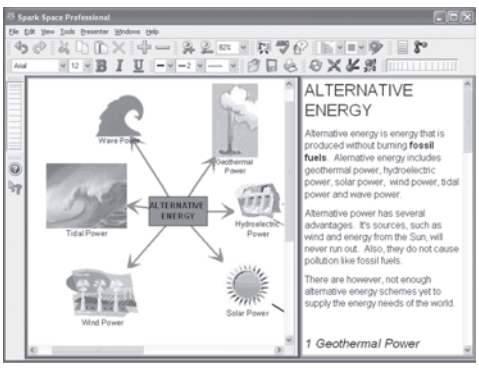
- categorise and group ideas
- express and organise thoughts
- comprehend and communicate.

For more information visit http://www.inspiration.com

Spark-Space in Education

This program comes in three different editions.

Spark Learner bridges the gap between ideas and the production of a structured piece of writing. It is for students with a conceptual learning style such as those with hidden dyslexia. Spark-Space allows students to structure their thoughts at speed and then turn those ideas into a structured document in one program. Independent working is also encouraged as built in text-to-speech allows them to review and correct their own work.



Kidspark is a simplified version of the program for children up to the age of 10.

Spark Educator for the Teacher is a content-free piece of software for use with an interactive whiteboard which allows users to create, link and annotate ideas into headings and sub-headings, allowing teachers to combine and present text, graphics and animation. These ideas are represented visually and can be moved around the screen or re-ordered to create a mind map. Although it is content-free, sample files are supplied, and can be used to organise thoughts in any curriculum area.

For more information visit http://www.spark-space.com/education.htm

Voice recognition software

Voice recognition software can help students bypass their problems with lower order writing skills by dictating their written work. When students use voice recognition software they wear a headset and operate the computer by voice commands. Speech-to-text software allows students to get their ideas down before they are forgotten.

Studies have also found this type of technology can have remedial benefits because students must attend carefully to what is being written on the screen as they dictate their work. For example, when an error is made, the students must instruct the computer to 'correct this'. The computer posts a list of alternatives; the student must read and choose the correct one.

Helpful hint:
There are disadvantages to using voice recognition software. Training the program to recognise students' voices can be difficult and time consuming. Students must learn the special commands needed to operate the program. Coughing, laughing and other noises are interpreted as nonsense words and will be added to the text. Students may need extensive instruction and monitoring for voice recognition software to be an effective tool but when students realise that it allows them to produce neat work within a relatively short period of time their motivation to write will increase. For those students whose oral communication skills are far superior to their writing abilities, voice recognition software has great potential.

Dragon NaturallySpeaking 8 allows the user to talk to the computer and the words instantly appear in Microsoft Word and Excel, and virtually all Windows-based applications. It allows the user to listen to incoming e-mail as well as documents read aloud. The user can dictate directly into a PC or any approved handheld digital recorder after which the recorded text can be directly relayed to the PC and the word processor program as written text. A feature of the software is dictation shortcuts that enable the user to insert blocks of texts with a single voice command.

For more information visit http://www.voicerecognition.com.au/

Specialised hardware

Text entry devices

A range of text entry devices are available that support students to write. The AlphaSmart range offers compatibility with regular computers and printers as well as mobility and durability on a full size keyboard. All AlpahSmart text entry devices can be battery powered or use an AC adapter.

The AlphaSmart 3000

For students who may need spelling support, struggle with note taking and writing first drafts, become frustrated with paper and pencil writing tasks or have trouble keeping assignments organised.

Students can be supported by using AlphaSmart to overcome these writing barriers. By loading additional text prediction software such as Co:Writer, struggling writers can be supported to type, edit and electronically store their text (reports, essays, e-mail messages or notes), and to practise keyboarding, without having to be at a computer. Text typed on the AlphaSmart 3000 can be transferred to any computer (PC or Macintosh) for formatting, or directly to a printer. Its portability allows students to use it anywhere and anytime.

The AlphaSmart Dana

Another alternative to the laptop. It is lightweight, travel tough and easy to transport, weighing less than one kilo. It offers up to 30 hours uninterrupted work with a single battery charge. Dana features Palm(tm) OS giving access to more than 10,000 Palm applications. The user can type or enter data using the keyboard or by writing with the Dana stylus directly onto the screen.

For more information visit http://www.spectronicsinoz.com/

Portable Spellcheckers

Children's Talking Dictionary & Spell Corrector

This highly portable device has over 40,000 easy-to-understand definitions that are pronounced to support vocabulary learning. The automatic phonetic spell corrector can turn words such as 'nolij' into 'knowledge'. The device includes a rhyme finder, five word-building games, and a vocabulary word list that can be created by the user. The Talking Dictionary works with headphones (sold separately) for privacy.

Spelling Ace & Thesaurus

This device has 110,000 word phonetic spell corrections and 500,000 synonyms and antonyms. The student can be supported to learn new words with a preloaded list or develop a personal word list of their own. The portable device includes eight interactive word building exercises, a crossword solver, a homophone guide, a calculator, and a Rolodex databank.

For more information visit http://www.franklin.com/

Exploratory learning environments

Information and communication technology now offers teachers and students powerful and accessible 'exploratory learning environments' (Florian, 2001). The Internet provides opportunities across curriculum areas for students not only to research field knowledge for their writing tasks but also to use some of the 'authoritative sources' referred to in earlier sections of this book; for example, dictionaries, thesauruses and rules of grammar and spelling. Through the Internet, students gain access to other individuals and groups through e-mails and special interest groups. Research indicates that students with or without writing difficulties can achieve positive results in improving written communication skills when they participate in e-mail penfriend correspondence, particularly when they are paired with good writing models (Stanford & Siders, 2001).

E-mail penfriend writing

Purpose

The purpose of this strategy is to:

- enable students to acquire effective written communication skills
- provide students with encouragement and models of appropriate writing within a social context.

Description

E-mail penfriend letters offer students an opportunity to write in a setting that involves a genuine audience.

The use of technology minimises the concerns that some students have about the mechanics and appearance of their writing and encourages them to focus more attention on the process of communicating thoughts, ideas and opinions.

Implementation

Setting up a successful e-mail penfriend project involves attention to several important factors, as highlighted in the research of Stanford and Siders.

- Classroom students need to be paired with penfriends who have good writing skills. The model penfriend should, through correspondence, model good writing and provide guidance (not criticism).
- Appropriate and accessible technology needs to be readily available. Often both teachers and students can become frustrated if an activity is planned and then not implemented because of poor technology.
- Adequate time must be made for developing writers to show growth. Although e-pals (the term used in the Stanford and Siders' research) can provide instant feedback, this does not necessarily mean instant positive results. Improvement occurs over time. For example, the Stanford and Siders research project allocated 20 minutes twice a week over eight weeks for friendly pen-pal letter writing. This study paired university teacher education students and school students in pen-pal, e-pal and control groups(Stanford & Siders, 2001).

- Assessment measures for e-pal writing need to be clearly established. It is important to provide guidance and feedback for learners, teachers, and parents regarding student progress and the benefits of the activity. The selection of specific criteria for assessment will depend on the particular learning experiences preceding the written task and will need to include criteria that are related to the purpose of the set task; namely, composing the friendly e-mail. The assessment criteria should also be linked to and contribute evidence of the achievement of the English K-6 Syllabus outcomes. See one example of assessment criteria below.

Positive growth in writing skills can be achieved once the learners have samples of the text they are producing to work with. 'To use the ideas of Frank Smith (1985): "The more you write, the better you write; the better you write, the more you write.'" (Stanford & Siders, 2001)

An example of assessment criteria for e-pal writing

Attempt
An attempt to correspond was made.

Eager attempt	Good attempt	Little attempt	No attempt	

Purpose
An attempt to correspond was made.

Purpose achieved	Purpose mostly achieved	Some evidence of achievement	Purpose not achieved	

Organisation
The letter is well organised and easy to follow.

Well organised	Good organisation	Occasionally off track	Not appropriate	

Language
The overall language is appropriate for the task.

Appropriate	Mostly appropriate	Some use of appropriate language	Not appropriate	

Paragraphs

Paragraphs are used properly	Paragraphs mostly correct	Some paragraphs correct	No paragraphs used	

Grammar

The grammar is correct	The grammar is mostly correct	Some evidence of correct grammar	Many grammatical errors	

Punctuation

Punctuation is correct	Punctuation is mostly correct	Some evidence of correct punctuation	Punctuation not correct	

Spelling

Spelling correct	Spelling mostly correct	Simple words mostly correct	Many errors in spelling simple words	

Linked to Syllabus outcomes WS2.9, WS2.10, WS2.11, WS2.12, WS2.13.
ESL Scales Level 4/5 Writing.