

Dyslexia and Information and Communication Technology

Introduction

The term Information and Communication Technology (ICT) refers to computers and associated equipment such as printers, software, the internet and World Wide Web, as well as less common technologies like videoconferencing, personal digital assistants and so on.

ICT can be a valuable tool to support pupils with special needs including those with dyslexia. Pupils with learning difficulties can benefit from the visual and auditory nature of ICT. It can be used to develop skills and reinforce learning in a meaningful and non-threatening manner. ICT can also be used as a personal support tool to empower pupils to achieve greater independence and allow for greater participation in a mainstream environment. However, it is important that ICT is not seen as a panacea. It is one of many teaching tools and should be used when it can support pupils in a meaningful and purposeful way.

The focus on this section is on using ICT to meet the needs of pupils with dyslexia. This section is geared mostly for teachers and will cover the following:

- Matching technology and pupils
- Overview of software
- Overview of hardware
- Using ICT to support pupils
- Using ICT to assist teachers
- Assisting parents with ICT use

Matching Technology and Pupils

Process

There are many types of technology (educational software and hardware) available for pupils with learning difficulties. Due to the abundance of such technology, it is often difficult to decide what to use with these pupils. Whether selecting software or hardware, there are certain issues that need to be taken into consideration. The SETT model developed by Joy Zabala focuses on four critical areas:

- Pupil
- Environment

- Tasks
- Tools

Pupil

When matching technology and pupils, it is crucial that the process be pupil-driven rather than technology-driven. The initial focus should be on the pupil's needs and the purpose for using ICT, rather than the technology itself.

Environment

Consider the many environments where the pupil will be using the ICT, as well as how the use of ICT will be accommodated within these environments. Consider also what support is available to the pupil in the various environments.

Tasks

It is also important to keep curricular requirements as well as instructional tasks in mind. Carefully examine what is actually being taught and the tasks that pupils are expected to perform in order to determine where ICT can best be used to support learning.

Tools

After first considering who is going to use the technology, where it will be used and what it will be used for, the next step should then be to look at the available tools. Tools refer not only to the technology itself, but also strategies for using the technology. By looking first at the pupil, the environment and the tasks, the team can then make an informed decision when selecting the technology.

Data should be gathered in these four areas by a team of relevant people who are involved in the pupil's education (e.g., special needs teacher, learning support teacher, mainstream teacher, pupil, parents, classroom assistants, and any other educational or related service providers).

Overview of Software

There are several features of software to be aware of that can be particularly useful to support pupils with dyslexia.

Features of software

- **Ease of use** - clear and simple interfaces
- **Presentation of information** - uncluttered, appropriate level of language
- **User/teacher options**- ability to tailor products to suit individual needs (e.g., level of difficulty, number of problems, size of text)
- **Speech output** - allows text to be spoken
- **Multimedia features** - provides visual representations (e.g., pictures, animations, videos) as well as audio content
- **Aids to writing/spelling** -

- Spell checker - suggests alternative spellings to words that are not recognised. Allows pupils to concentrate on content rather than spelling
- Word prediction - suggests words as text is entered which can assist pupils with word retrieval difficulties
- Word Bank - provides list of words/phrases
- Voice recognition - allows pupils to dictate material to the computer

· **Aids to reading**

- Scan/read features - facilitates scanning pages from a book or document and displays an on-screen version it then reads aloud.

Categories of Software

Consider the type of software needed before looking for names of specific software titles. The following describes some of the main categories of software that can be used to support pupils with dyslexia. However, it should be noted that categorisation of software can be done in many different ways. Some software falls into several categories and others into none. The examples provided are merely to give an indication of available software and are by no means intended to be a complete listing of all available titles.

Software evaluations, many of which are relevant to special needs, are available via various educational websites such as the NCTE's website, or that of Teachers Evaluating Educational Multimedia (TEEM). Both sites also contain information for teacher on what to look for when evaluating software. (LINK: See the section 'Addresses and Web Links' in The Library)

Reinforcement Software - used to reinforce basic skills through repetition and practice. Literacy software can give pupils the opportunity to practice the recognition of sight words, to develop phonological skills, and to help increase their reading comprehension (e.g., Lexia, Numbershark, Starspell 2001, Wordshark, Units of Sound).

Interactive Books - animated books on the computer which bring stories to life. This category of software links the written word with the spoken word and consequently strengthens word recognition (e.g., Oxford Reading Tree, Spinout Stories, Start-to-Finish series, Wellington Square).

Content-free Software - allows user to enter own content. This category of software encompasses many different types which can be used to support pupils with dyslexia including those which can be used for writing and planning/organising.

- Word processing programs/ talking word processing programs - provides pupils with the opportunity to express themselves without being concerned with handwriting or the appearance of their work. Talking word processing programs use a multi-sensory approach which allows the pupil to hear as well as see what has been written (e.g., Clicker 4, Texthelp! Type and Talk, Write Outloud).
- Writing Frames - supports pupils through the writing process by providing prompts and sentence starters (e.g., I Can Write 2, Frameworks)
- Word Prediction - normally runs in conjunction with a word processing program and anticipates the word being typed by producing a word list. It allows pupils to choose from suggested words, thereby enabling them to concentrate on the context of their words rather than become embroiled in

spelling issues (Co-writer, Penfriend, Predict It).

- Word Bank - allows the teacher to input lists of words the pupil has particular difficulty with such as topic words, lists of nouns, verbs, adjectives and adverbs, sentence starters, etc. (e.g., Word Bar, Clicker 4, Textease 2000).
- Planning and Organising - allows the user to visually organise ideas and information. It can be used for brainstorming, outlining, prewriting, diagramming and concept webbing (e.g., Draft Builder, Kidspiration, Inspiration).
- Multimedia Authoring - allows the user to easily and effectively communicate ideas. Most multimedia authoring systems incorporate text, graphics, sound, animation and video to create multimedia projects and presentations (e.g., Buildability, Hyperstudio, Clicker 4, Illuminatus).

Assessment Software - used to assess pupil attainment and identify learning difficulties. Normally, this type of software consists of a variety of tests to identify pupil's strengths and weaknesses (e.g., Cops, LASS 11-15, Lexia Comprehensive Reading Test, Superspell Assessment Disc, Studyscan, Quicksan). (LINK: See the section 'Lists of Tests' in The Library)

Study Skills - aims to assist pupils in developing the necessary skills needed for efficient study. Most of this type of software is geared towards older pupils (e.g., Helpdisk! 2.6, Mastering Memory, Timely Reminders, Wordswork).

Other Reading/Writing Tools - There is a variety of other reading /writing tools that can be helpful for those experiencing learning difficulties.

- Screen Readers - reads back the text within any other program. It can also be used to read pages downloaded from the Internet, e-mails, text scanned from a book, etc. (e.g., Hal, Jaws, Texthelp! Screenreader).
- OCR (Optical Character Recognition) Programs - used in conjunction with a scanner. It converts text to a digital format which is then displayed on the computer screen (e.g., OmniPage Pro, Recognita Plus, Textbridge Pro).
- Scan/Read Software - allows you to scan pages from any book or document and displays an on-screen version of the printed material which it can then read aloud. The text can be adapted and altered to suit the individual needs of pupils (Kurzweil, Texthelp! Read and Write Gold, WYNN).
- Voice Recognition - works by the user manipulating the computer using voice commands. It is often used to facilitate the production of written text as it enables the transfer of speech to text format (e.g., Dragon Dictate, Dragon Naturally Speaking, ViaVoice).

Overview of Hardware

There is also hardware available to support pupils with dyslexia. Portable devices should be considered as some pupils may need to have access to technology in a variety of settings (e.g., mainstream classroom, resource room, home). When selecting portable devices, look for products that are lightweight, durable and have a long battery life. Some of these devices include:

- Laptop Computer - A laptop runs the same operating system and software applications as the larger desktop computer but is considerably smaller in size and lighter in weight. Furthermore, a laptop contains a battery, which allows it to be used away from a power supply for a limited time.

- Portable Word Processors - Though technically not a laptop computer, a portable word processor is sometimes used for simple word processing. Its main use is for entering basic text which can then be printed or, if further editing is required, downloaded by cable into most applications on a standard computer. It is considerably cheaper than a laptop, is much lighter than the average laptop and is more durable (e.g., Alphasmart, Dreamwriter).
- Handheld computers - A personal digital assistant (PDA) or handheld computer is a small mobile hand-held device that provides computing, information storage, and retrieval capabilities. The vast majority of PDAs perform four basic functions: contact management (name and addresses), scheduling (calendar), to do list and note taker. PDAs have been used to cater for pupils with learning difficulties in areas such as note taking, following schedules, and keeping track of homework and assignments.
- Tape Recorders, handheld spellcheckers, dictionaries and other electronic devices - Such devices range from small handheld items the size of a large pen or marker which perform one or two simple functions to portable items the size of a large calculator which perform several functions. These devices include tape recorders, portable spellcheckers, reading pens, grammar checkers, thesauruses, dictionaries and organisers (e.g., Franklin electronic spellers, Franklin Speaking Dictionary/Thesaurus, Quicktionary Reading Pen).

Using ICT to support pupils

ICT can be a valuable tool in addressing the educational needs of pupils with learning difficulties. Technology can be used to break down barriers to learning and help pupils with dyslexia compensate for challenges they may experience. ICT can be used to support pupils with dyslexia in the following ways:

- Facilitate individual instruction and learning
- Support literacy and numeracy
- Motivate pupils and raise self-esteem
- Enable pupils to participate more fully in an inclusive environment
- Develop study/independent work strategies and organisational skills

ICT as a Motivational Tool

Learning is not just a cognitive process; it has emotional and social aspects. Research has shown that ICT can play a significant role in increasing self-esteem and motivation levels. Pupils who have learning difficulties can have a poor self-image that may manifest in avoidance behaviour and lack of engagement with their school activities. ICT can be a powerful tool for the remediation of this problem. It can motivate pupils to undertake tasks that they have not attempted in the past. There is often a 'cycle of failure' where a pupil says "I failed before so I'll probably fail again this time". ICT can break this cycle by helping the pupil to succeed.

ICT as a Personal Support Tool

One of the biggest benefits and greatest uses of ICT is as a personal support tool that can empower pupils with learning difficulties to achieve greater independence and enable them to take responsibility for their learning. Computer-based learning strategies that focus on the process of learning rather than the content itself can allow pupils to monitor their own learning. These strategies

can be especially helpful for older pupils who are taking many subjects and preparing for exams. Below you will find some ways of using ICT as a personal support tool.

- **Presentation** - ICT can enable pupils to produce professional looking work which can help struggling pupils gain confidence. Content free software can encourage pupil creativity by allowing them to present information through the use of text, graphics, sound, animation and video.

- **Speed of Work** - Pupils with dyslexia often find that it takes them a great deal of time to complete a piece of work which can result in poor motivation. ICT can assist pupils in completing assignments more quickly which can give them a huge sense of satisfaction in their achievements.

- **Planning** - Pupils can use computers to help organise and manage their workload. Computers can be used to produce timelines, a scheduling matrix, calendars and 'to do' lists.

- **Completing assignments**

- Brainstorming- pupils can use planning and organising software to assist in planning and beginning a project. The results of brainstorming can be printed out and used as the beginnings of a concept map to record and organise further information that is collected.

- Templates- are documents containing a form or structure, not actual content. Templates can simplify the tasks of completing lists, writing reports, reading chapters or other assignments that share similar structures or features. They can be used for book reports, note taking, vocabulary assignments, etc. Wizards in content free programmes like Microsoft Publisher can also be helpful as they provide step-by-step instructions for creating a document.

- Writing papers and reports

- Prewriting – use planning and organising software to brainstorm, gather information, develop a plan and make checklists.

- Writing – use writing aids such as talking word processing programs, word prediction and word banks to write a first draft with emphasis placed on just writing down ideas without worrying at this stage about editing and revising.

- Revising and editing – use writing aids to check spelling, grammar, etc. ICT is particularly useful for revising and editing writing, something that pupils often find very tedious to do when writing by hand. Writing aids allow pupils to edit their work immediately and to see the changes and improvements in front of them.

- **Reading textbooks / Note taking in class** - scan/read software can be used to scan in pages from a textbook into the computer and have it read aloud. A tape recorder is a low-technology option that can be used to record notes as it can be difficult for pupils to listen and write at the same time. An electronic outline/template can be created using a talking word processor or planning and organising software. Information can then be added as text is read or as notes are given. Pupils can also use a word processing program or spreadsheet to make lists of important vocabulary words that will be encountered and use the list as a study tool.

- **Remembering information** – use planning and organising software to synthesise information for pupils who have difficulty seeing the 'big picture'. This type of software is ideal for pupils who think in pictures rather than words and can be used to develop visual aids to define relationships among concepts and to organise information for optimal comprehension.

ICT and Dyslexia: Using ICT to assist teachers

ICT can also be used directly by teachers to enhance teaching and support learning. ICT can provide teachers with a powerful tool to reinforce and supplement learning in a meaningful and non-threatening environment, provided that adequate planning is done to integrate ICT use in the classroom. In addition, ICT can also be used as a timesaving, professional productivity tool to assist in the many administrative tasks required of teachers. Below you will find some of the key ways in which ICT can be used to support teachers.

- Individualise teaching and learning materials
- Create own material to meet needs of pupils
- Motivate and engage pupils to learn
- Source of professional development and support
- Provide additional support to pupils in mainstream classroom
- Facilitate programme planning and complete administrative tasks (e.g., developing individual learning programmes, assessing pupils, weekly planning, recording and storing of data).

Planning for ICT Integration in the Classroom

ICT is most powerful when it is used to supplement teacher instruction and is integrated into the curriculum in a purposeful and meaningful way. When using ICT, it is important that learning does not become fragmented and that pupils can see the relevance of what they are doing in relation to the rest of the curriculum. In order for pupils to gain maximum benefit from computers:

- The teacher/classroom assistant should actively supervise and offer support and encouragement to pupils while they are using the computer and provide related follow-up work in class. It is important to ensure that pupils relate work done on the computers to other contexts and are able to transfer skills learned to other situations.
- If using the Internet, be aware of Internet safety issues and school policy in this regard.
- Consider using content-free software to create tailor-made teaching and learning resources which are directly related to the curriculum, teaching style and pupils' needs
- Teachers also need to carefully plan how ICT will be integrated into day-to-day classroom activities and teaching. Consider how ICT can be used to compliment teaching/learning strategies commonly used with pupils with dyslexia (e.g., comprehension monitoring, activity-based learning, cooperative learning, memory techniques, practical hands-on approaches, think aloud, story mapping, etc.).
- Graphic organisers can be a useful tool to assist in integrating ICT into the curriculum (an example follows). By carefully examining what is actually being taught and the tasks that pupils are expected to perform, the teacher can more easily identify where ICT can best be used to support learning. If a pupil already has an individual learning programme in place, the teacher should examine it to see if ICT can be used to help the pupil achieve the stated goals and objectives.

Example: Integrating ICT in the Curriculum

Task: Write a story called The Spooky Castle

Option 1: Use a talking word processing program /multimedia authoring program with whole class to introduce task and do sample story with whole class. Print off picture prompts and/or word prompts to assist pupils with dyslexia in writing own story. Pupils use talking word processing /word prediction/ word bank programs to complete story.

Option 2: Conduct a class brainstorming session on possible story lines. Use planning and organisation software to construct a story map. Divide class into 3 groups. Each group works on a section of the story using a talking word processing /multimedia authoring program to type and illustrate own section and makes it available to other groups.

Option 3: Pupils with learning difficulties use a talking word processing program that features teacher created writing frames as well as word banks to write their own story.

ICT and Dyslexia: Assisting Parents with ICT Use

More and more parents are interested in how ICT can be used to support their child both at school and at home. In some instances, their child has been provided with laptops for school use and, in some cases, home use. Below you will find some general advice for you to share with parents in regard to using ICT to support pupils with dyslexia.

1. Share with them how you are using ICT to support their child in the classroom.
2. Identify specific tasks that ICT is being used for in the classroom. Try to identify the tasks that parents could possibly work with their children at home using ICT (e.g., letter recognition, word recognition, reading comprehension).
3. Identify the particular pieces of hardware and digital resources (software and web resources) that you are using in your classroom and determine if it would also be appropriate for parents to use the same ICT at home to reinforce learning. Pupils that are using ICT as a personal support tool to complete assignments at school (e.g., laptop equipped with a talking word processor or word prediction), may find it beneficial to use the same tools at home to complete homework.
4. However, parents may want to consider using different software programs at home than used at school to provide sufficient stimulation as pupils may become bored using the same software programs time and time again. You may want to suggest some additional easy-to-use software programs that are geared towards home use which reinforce skills/concepts on which the pupil needs assistance. See for example the Parents Information Network (PIN) website, an independent service that provides evaluations of digital learning resources (software and websites) that are suitable for home use. (LINK: See the section 'Addresses and Web Links in The Library.)
5. It is also important for parents to bear in mind that the right technology in one setting may be entirely wrong in another. Different types of learning take place at school than at home and parents should not therefore necessarily try to replicate the classroom at home. As pupils with dyslexia can sometimes feel stressed and overwhelmed during the school day, home learning should be more relaxed and ICT use at home should be both enjoyable and motivating. Some software programs that may not seem to have any educational value (e.g., some computer games) can offer children an opportunity to work on problem-solving skills, memorisation and collaboration as well as increasing self esteem and building confidence.
6. If ICT is sent home with the pupil, encourage parents to ensure that it is used appropriately and kept in good condition. Have them report any technical problems or difficulties that they are

experiencing as soon as possible so that the use of ICT at home does not become a barrier to the pupil's achievement rather than a help.

7. Encourage parents to take an interest in what their child is doing with ICT. Have parents ask their child to demonstrate to them how ICT works and what it is being used for.

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