Unit 3
Language and communication

Inclusive Consultancy & Training Syndicate

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Terminology

This Unit has been written for teachers and others working in all countries within the UK. There are differences in the legislation, terminology and structure of the educational systems in Scotland, Northern Ireland, and England and Wales and we have tried to reflect these in the document. In some specific Scenarios illustrating the use of ICT by individual pupils, we have given references to a scheme which is only applicable to one country – for example, the Literacy Hour in England and Wales – because it is necessary to make sense of the story.

For fuller information on terminology relating to each country, please see the section **Curriculum and Terminology in the UK**. This can be found at the back of your ICTS ring binder. You may well be corresponding with colleagues working in another part of the UK, and it will always be useful to have a common understanding of the language of education.

Throughout this Unit we have endeavoured to use the preferred spellings used by Oxford University Press and Cambridge University Press, as found in the current edition of the Oxford English Dictionary.

Contents

Introduction

Language plays an essential role in learning, thinking, remembering and reasoning, while communication is essential to participation in classroom groups and other educational and social life situations. Any language and communication difficulties are therefore likely to have far-reaching effects on listening, talking, reading and writing, and in the educational process as a whole.

Language and communication are much more than just speech. Development encompasses:

- behaviour
- participation / interaction
- receptive language
- functional communication
- expressive language through –
  - – augmentative communication (low / high-tech)
  - – speech
  - – reading / writing

Obviously, it is hoped that natural speech will develop to an adequate level, and therapy and teaching will both support this aim. Meanwhile, work has to be put in to the development of all the underlying aspects of language and communication, using any and all tools available – speech, signing, symbols, and technology.

'Wait and see' is not an option!

How can ICT help?

Information and communications technology (ICT) is a broad term used here to cover all kinds of computer hardware and software used in schools, and also highly specialized voice output communication aids (VOCAs) used by individuals as well as adapted access devices. ICT can contribute to the teaching of pupils with language and communication difficulties in three major ways:

- providing augmentative and alternative communication (AAC) aids for individual pupils
- providing computer software for use by the pupil that:
  - provides access to the curriculum
  - supports teaching and learning of a differentiated or adapted curriculum
  - helps to develop language and communication skills
- providing the teacher with the means to make high quality graphic materials to support language and communication work

Expected outcomes

By the end of this Unit, participants will have…

- identified appropriate approaches and ICT tools for pupils at different developmental levels of language and communication development
- realized that the teacher's provision of an effective role model (use of clear simple language, and signing and / or pointing to symbols herself to support receptive language), and pupils working together in pairs and groups are equally important factors in developing pupils' communication, as ICT
- gained ideas about how to improve access to the curriculum for pupils requiring the use of communication technology
- become aware of the value of using symbol-based materials to create a communicative classroom
- acquired awareness of the three main roles of ICT in the possible support of pupils with language and communication difficulties
- gained familiarity with hardware and software resources for the creation of communication materials
- gained knowledge of where to go for further help

Key skills covered in this Unit

Recognize and value all forms of communication and rethink the child's communication needs as circumstances change

See Scenarios: 1, 8, 14, 16, 17, and 18

Create symbol and picture resources

See Scenarios: 1, 10, 11, 12, 14, 17, 20, 21, and 22, 23

Audit and organize resources and create clear instruction sheets for other adults to follow

See Scenarios: 6, 10, 11 20, and 21

Program a communication aid (from single message device to full, complex vocabulary)

See Scenarios: 1, 2, 3, 4, 5, 7, 9, 10, 11, 14, 15, 19, and 21

Create activities using software which accepts symbols and pictures

See Scenarios: 1, 2, 4, 12, 17, 18, 19, 22, 23, and 24

Provide access, via specialist devices, to a wide range of equipment, including mains-powered

See Scenarios: 2, 4, 8, 19, and 21

Set up and maintain systems to enable both communication and writing

See Scenarios: 14, 15, 18, and 19

Use digital cameras and the Internet to create and collect resources and then integrate these resources into framework software

See Scenarios: 10, 22, and 23

Plot a path through available software to develop appropriate skills

See Scenario: 13

Identify a role in activities for each student

See Scenarios: 2, 7, 8, 9, 10, and 21

Augmentative and alternative communication (AAC)

For someone with limited or no speech, including people with autistic spectrum disorders, AAC is a means of getting their message across to others. AAC is also useful for people with difficulty understanding language, with specific language disorders, and as a bridge to literacy.

AAC systems include facial expression, body posture, gesture, eye pointing, and vocalizations as well as more formalized systems of signing and graphic symbols (low-tech), or voice output communication aids – VOCAs – and computer based speech and text producing systems (high-tech). Both low and high-tech systems can be used by people who are unable to spell or read, as well as by people who are highly literate.

Specific educational approaches like the Picture Exchange Communication System (PECS) actually embody a specialized form of AAC, rather than being separate or different from AAC. PECS is primarily low tech. High-tech devices range from simple aids (e.g. single message VOCAs, pointer boards, toys or books which speak when touched, etc.) to very sophisticated systems such as that used by Professor Stephen Hawking.

In general, AAC users typically use not just one but a combination of different forms of communication, such as a symbol communication book and a VOCA, signing with close family and friends and using a VOCA with strangers. Whether ICT is used in a simple or elaborate way it is usually only one component of the person's communication system.

Pupils will commonly use both VOCAs and classroom computers. VOCAs go with pupils ***all the time***, enabling them to participate and interact, ask and answer questions, comment, direct, explain and report, and practise their use of language in a natural and immediate way. Computers are used more for teaching and curriculum support.

Scenario 1

Rosie has quadriplegic cerebral palsy. She seems to understand others but has slow processing and needs structured prompting. Rosie currently communicates using facial expression and eye pointing – PCS symbols in a communication book arranged by topic accessed through manual scanning by a partner with Rosie indicating 'yes' at the desired item – and PCS symbols on an eight-location AlphaTalker (Digitized VOCA, see below) set in topic themes, using auditory prompts and single switch access. Rosie also uses the classroom computer, with a single switch, and is practising scanning and choice making with basic concepts / vocabulary, using *ChooseIt! Maker*.

Rosie's AlphaTalker with single switch access and communication book

Key skills and equipment

The key skills for the above example are the ability to:

- use and accept any 'prop' which will facilitate Rosie's communication – facial expression, eye pointing, PCS symbol book, listener scanning, digitized VOCA
- make a communication book
- program a VOCA
- set up *ChooseIt! Maker* with appropriate options and switch access

The key equipment is:

- Computer running PCS symbol software (*Boardmaker*, *Writing with Symbols 2000*, *Clicker 4*) to create a communication book
- *ChooseIt! Maker* software
- AlphaTalker

High-tech communication equipment

Within this Unit the term 'equipment' includes VOCAs as well as computers, software and specialist access devices. VOCAs have been divided into three categories. Specific VOCAs within each category are briefly described in Appendix 2.

Digitized VOCAs

All VOCAs in this category use ***digitized*** (recorded) speech. The user of a digitized device can only say what someone has already recorded into it on their behalf. On the whole, digitized VOCAs are easier to program than synthesized ones.

This category covers a wide range of VOCAs from those offering single messages to those with multiple messages that can be organized in 'themes' or 'levels'. VOCAs in this category can also be used as a classroom aid or dedicated to a single user.

Synthesized VOCAs

VOCAs in the Synthesized and Computer-Based Communication Applications categories use ***synthesized*** speech, which the computer generates by combining phonemes according to rules laid down within the speech synthesizer used by the device. The use of synthetic speech results in a far more flexible device since the synthesizer can generate any combination of words and / or syllables that the user chooses. These are the most expensive of the dedicated communication aids. Such VOCAs are usually provided for a single user and should not normally be purchased without specialist assessment advice.

Computer-based communication applications

Some communication programs have been written to run on ordinary computers, providing access to curriculum applications as well as providing vocabulary structures to support communication. These can be used as dedicated communication aids for a single user. They can also be used, however, on a classroom computer to explore the child's and staff's ability to manage the system, before funding is requested for a dedicated system.

Key factors for success with AAC and ICT

Whose responsibility?

Ideally an interdisciplinary team will be involved in supporting pupils who need communication aids. While the initial introduction of a communication aid may be led by the speech and language therapist (SALT), integrating the ***use*** of communication aids into classroom learning is the responsibility of the teacher.

Choosing effective teaching and learning approaches

Medical or speech and language therapy diagnostic 'labelling' of pupils may not help much. Teachers still have to identify the most effective teaching and learning approaches for each child. Principal approaches (not mutually exclusive) are:

- ***Remedial approach***
  Levels of developmental speech, language and communication disorders vary. In some cases delays can eventually be overcome, while in others difficulties may be long lasting. The overall educational approach will generally be remedial / rehabilitative and supportive – filling in gaps through the provision of structured language learning opportunities, building on the skills the pupil does have, providing a language-aware environment with plenty of repetition, and modelling.
- ***Compensatory approach***
  Where aspects of the language and communication disorder are very severe, the most effective educational approach will be to bypass defective channels and try to use the pupil's areas of relative strength. Concentrate first on establishing basic functional communication through AAC use, and then use this as the medium for social interaction and the teaching and learning of new skills.

- ***Specialized approaches***
  Structured approaches for pupils with autistic spectrum disorders such as the Treatment and Education of Autistic and related Communication Handicapped Children (TEACCH) and PECS, which is based in behaviourism, are really examples of highly specific implementations of a compensatory model of AAC, but as they tend to be 'packaged' and taught as stand-alone approaches, they might usefully be given their own heading.

  In TEACCH, the use of visual and nonverbal skills are used to build up understanding, confidence and success. As one example, it is recommended that locations in the classroom are specially organized and colour coded, to help the child learn to be independent in following a highly consistent and structured routine, eg. in following the list of activities on his colour-coded visual schedule, he moves activities from left to right across a set of trays or desks depending on whether they are waiting, being carried out, or completed.

  In PECS, children are taught to give a picture to an adult, in exchange for the food, toy or activity that they especially like. If each of the six highly detailed Phases is taught and carried out correctly, some children will move gradually from exchanging any square of card (ie picture recognition not required) to spontaneously initiated requesting and commenting, in short sentences, using a wide range of meaningful pictures/symbols.

  ICT can certainly be used within these approaches but only by trained staff who see how it fits into the overall programme.

AAC Targets

For AAC users, there are communication targets as well as curriculum targets, ultimately leading to ***communicative competence***. Light (in MacDonald and Rendle, 1988) defines the components of this:

- ***Operational –*** how to operate the AAC system – motor and cognitive skills required to access and send / signal a message (knowing the sign or locating the desired message, pointing, scanning, operating switches, controlling cursors, editing, etc).
- ***Linguistic –*** adequate receptive and expressive mastery of the native language (vocabulary and grammar) plus mastery of the AAC code (signs and symbols).
- ***Social –*** competence in the social rules of communication; for example making appropriate eye contact, sharing the balance of talking and listening, responding to non-verbal clues like turning gaze away, giving feedback.
- ***Strategic –*** ability to adapt communicative style to suit the listener (knowing who can understand signs and who will need other clues, changing vocabulary to suit pals, older persons or authority figures), or learning how to repair and extend the conversation (being able to signal “I don’t understand” or “What do you think”).

It is standard practice for teachers and therapists to concentrate on operational and linguistic competencies, but once these are established it is the social and strategic competencies which are crucial to the person becoming an efficient and effective communicator who can cope in all situations and environments. Social and strategic competencies need to be addressed from an early age with cognitively able pupils: they need to be able to make mistakes, be rude and then be corrected in just the same way as a normally speaking child. Above all, they need communication opportunities to practise their skills.

Using support from external specialists

There is a national network of specialist services in ICT for communication in education, and for AAC. There are also specialist communication aids centres within the Health service. Discuss referral of particular pupils to one of these services with your Head Teacher and speech and language therapist.

Choosing and setting up hardware

- Remember that simple AAC devices can be used as ordinary classroom resources for use by groups – they do not always have to be used exclusively by an individual pupil.
- For pupils for whom literacy is a realistic goal, choose AAC systems that offer printout (or connection to computer) facilities, if possible.
- For early learners, choose AAC devices that are simple and quick to manage in the classroom – or else they will not be used (some AAC users will use more than one system – simple for class group work and more complex for personal use).

Choosing software

- So much is available and some of it is very costly (up to £1000). Therefore try to see a demonstration, borrow for a trial, or negotiate 'sale or return' before you buy.
- Always try software out yourself (using the special input method the pupil will use) before trying it out with a pupil.
- Choose software which matches the developmental level of the child, as well as being topic relevant.

But also

- Think about where the pupil is now and the many steps they need to negotiate to become an efficient communicator. Choose software or VOCAs with 'room for growth', but easily usable by the pupil as they are now.
- Keep to a small set of software. Don't 'drown' the pupil (or yourself) in too many different packages at the same time.
- Try to stick to software from the same 'stable', so that presentation and the mode of operation are consistent (especially for scan and switch users). The pupil should not be distracted from the content by having to master lots of different user interfaces.
- Look out for the teaching and learning style embodied within different software (cf. Blamires, 1999, p11-14). Structured 'drills and skills' type software with fixed content may be good for reinforcing language sub-skills, such as matching and sorting, but ineffective for developing connected language and higher level skills. Creative and exploratory software, such as open-ended frameworks and word / symbol processors that allow you to use your own content, are good for developing understanding of word meanings, discovering new concepts and for sequencing words into sentences and stories. These programs may take longer for the teacher to get to grips with initially, but repay the investment of time and effort later on, in their flexibility of use.
- Be aware of software suites such as *Bio-Bytes*, *Earobics* and *Making Tracks to Literacy*, which provide complete 'packages' of graded activities within a consistent presentation style – with pupil progress management, and record keeping, along the lines of Integrated Learning Systems (ILS).

Introducing ICT and AAC use

- Start from where the pupil is, or even slightly below, so that they achieve success that can be built on, rather than imposing notions of what they ought to be doing.
- Phase in technology use gradually, in well-supported steps, with lots of time for reinforcement and consolidation of each stage for both the pupil and all the staff.
- Introduce VOCA use in the natural environments in which specific language and communication needs arise. Teach and practise specific new vocabulary items, language structures or types of interaction in familiar social contexts linked in a meaningful way to the curriculum.

AAC and technology use takes time and work

Pupils who require AAC have a large set of special extra skills to master, and will always use language and communication in slightly different ways to natural speakers. This requires some specialist input (including ICT elements) and the allocation of plenty of ***time and human resources***, which has implications for school policies.

The developing stages of language and communication

This section identifies developmental levels of language and communication, matches these with suggested skill building activities, and suggests ICT tools for carrying out such activities.

The developmental framework used here is loosely based on the work of Coupe and Joliffe (cf Coupe and Goldbart, 1988) and Latham & Miles (1997). The framework used in this section highlights three main areas

- intentional communication
- early language
- language for learning

(For pre-intentional communication, see **Unit 5 – ICT resources for pupils with multiple disabilities**)

Matching ICT based tasks and materials to the developmental level of pupils with severe language and communication difficulties is not a precise science. The profile of each child's needs, abilities and disabilities will be very different, depending on the degree of additional sensory, physical and / or learning disabilities.

In addition to general 'communication' needs, such pupils will also require support in accessing the curriculum. Indeed the curriculum will have to be adapted and differentiated to match the learning / communication level of the pupil(s).

A pupil with severe speech, language and communication difficulties who needs pictorial / symbolic language representation, and perhaps auditory feedback, needs communication software as a means of ***accessing the curriculum***. Access to these resources is fundamental to the child's development. This needs to take precedence over the teaching of specific language sub-skills, such as letter recognition.

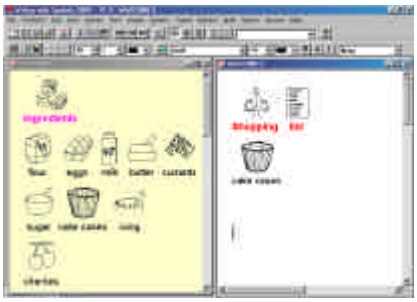
Things to think about

Language and communication are at the very core of the education process and cannot be relegated to the literacy part of the curriculum. Software with both a broad and a narrow focus will be needed to support and develop language and communication skills ***across the whole curriculum***.

Learning and using language and communication must be sociable and fun. Activities should have a purpose and be carried out interactively in a natural setting, to engage the child's interest and motivation and to encourage generalization to everyday activities (not 'work' alone with an adult).

Scenario 2

As part of his work on 'Personal and Social Development' strands, Charlie was working on 'writing' a shopping list in symbols. Later he followed recipe cards in symbols, and took an active part in a team cookery sessions by using a Step-by-Step (digitized VOCA) to 'read out' each step in the recipe to his classmates. He also operated the mixer / blender independently with his PowerLink and switch.



Charlie's shopping list

Key skills and equipment

The key skills for the above example are the ability to:

- think laterally about each child, the curriculum topic and planned activities. What role can each pupil play at each stage?
- produce a *Clicker* grid or *Writing With Symbols 2000* environment containing symbol items to be selected from
- record stages of the recipe into the Step-by-Step VOCA
- connect switch, PowerLink and mixer / blender

The key equipment is:

- child's switch
- PowerLink (for a switch operator to control mains devices safely)
- computer with *Clicker 4* or *Writing With Symbols 2000*

Scenario 3

Susie is learning to put symbols / words / part phrases together in the right order, to form a sentence. She does not respond well to 'table top' activities but she loves her role as class 'Message Monitor'. The teacher sends her to the school secretary's office regularly with the classroom MessageMate (digitized VOCA) with messages e.g.

"hello"; "please can I have – " ; "paper clips"; "post-its"; "thank you".

Susie's MessageMate

Key skills and equipment

The key skill for the above example is the ability to:

- record messages into a digitized VOCA

The key equipment is:

- a digitized VOCA capable of holding five messages

Is ICT always appropriate?

Whether the computer is an appropriate vehicle for the delivery of the pupil goals such as ***enhanced social awareness*** or ***increased interaction with his / her peers*** will depend as much on the task and style of activity chosen, as on the software.

Working in pairs or small groups around the computer offers good opportunities for developing core communication skills – turn taking, negotiation, and basic interaction – especially for pupils with additional severe physical disabilities, for whom manipulating other kinds of materials in cooperative play is difficult.

Scenario 4

Donald and Cheryl are working together, each with a separate switch, on *SwitchIt! Scenes*, set up to require coordinated alternate switch presses to build up the action scenes step by step.

Cheryl keeps reminding Donald that it is his turn by vocalizing loudly at him, and occasionally reaching over and trying to press his switch. By the end of the activity, Donald responds consistently to Cheryl's prompts and has increased the number of turns he manages to take independently.

turn taking in SwitchIt! Scenes

Key skills and equipment

The key skills for the above example are the ability to:

- use *SwitchIt! Scenes* set up to require alternate switch presses
- select and position appropriate switches for each child

The key equipment is:

- appropriate switches for each child
- computer running *SwitchIt! Scenes* software

Tip: Software advertised by commercial suppliers as being for 'language' often addresses only reading and writing learning objectives.

Before trying to implement any software, it is important to identify appropriate language and communication targets for a pupil's individual educational plan (IEP), preferably with the help of a speech and language therapist.

Then begins the process of trying to match software – along with other teaching materials and approaches – to those aims, linking in a meaningful way to the curriculum content being taught.

Level 1 – Intentional communication

At this level, the child's intention to communicate can be inferred from their behaviour. They are able to divide their attention between two stimuli – say a person and an object or activity that they are interested in – and will look purposefully back and forth between the object and the person to signal their wish. They may 'still', squeal, hit, pull an adult's hand towards objects etc. – it is up to the adult communication partner to work out, from careful observation and the context, what behaviours are being used as communication.

Communication level	Classroom approach and activities	Key materials and ICT equipment
Understanding of language is increasing but related mainly to concrete objects and familiar routines	Use objects as symbols for common activities on the daily ***timetable***, to reinforce understanding and build receptive vocabulary. Start development of child's picture/ symbol recognition through repeated pairing and matching of familiar objects with pictures (sorting into boxes, lotto, etc.)	Use photos and large, coloured pictures, (mounted on easel if necessary, to make them easy to see). Create banks of toys / objects / pictures / symbols to be used as symbols for objects and activities-based materials.
Reaches for preferred items	Phase I - Phase II of PECS (physical exchange, prompted at first, then gradually generalised across people, places, reinforcers and distance).	create and mount picture set representing preferred reinforcers.
Expressive communication gradually becomes more deliberate and consistent, e.g. using vocalizations, pointing, eye pointing, reaching etc	Adult provides a model, using gesture and sign; and pointing to pictures / symbols during activities (i.e. aided language stimulation, cf. Goossens, 1999); keep spoken language clear and simple.	Mount objects, toys, pictures, or symbols with Velcro to fuzzy mounting boards (Maxess or QED) or to perspex E-Tran frame (for eye pointers).
Shows she / he wants an object or action (or recurrence of activity)	Provide wide range of activities they can control independently. Adults do not ***direct*** ("go on, turn the cassette recorder on!") but respond to child's switch operation as to communication attempts ("oh you want more music, great").	Battery-operated toys, activated by single switch. Switch latch / timer box to give maximum reward for minimum physical effort (if necessary) Mains Switcher (PowerLink) and single switch, to operate everyday appliances, e.g. lamp, radio, blender.
Recognizes repetitions of familiar language – rhymes, stories	Group story reading	Single message VOCA to speak / sing repeated line or part of song or story
Draws attention to self, objects and events	Encourage initiation, using favourite toy play, adult attention, social contact etc, as reward.	Single message VOCA – can also be attached to toy or appliance, for further reward
Functions of communication include: greeting, requesting, protesting / rejecting, responding, giving information	Adult gives plenty time for child to respond through all possible modalities of communication – with VOCA messages use matching symbols or pictures on the VOCA to help develop symbol recognition.	Change messages frequently in single message VOCAs, used throughout the day. Place appropriate picture / symbol under Snap Switch Caps – or Blu-tack them in place
Uses everyday objects in play, combines objects, explores the function of objects.	Extend range of stimuli and vocabulary giving some independent control; develop access to technology skills. Print computer screens on paper, and use these in a ring binder to keep a visual record and picture vocabulary book.	Computer with a range of simple ***cause-and-effect*** software accessed via a touch screen or single switch. (see comment below) Collect lots of coloured printouts into book / files (use ***Print Screen*** facility)

Tip: Many cause-and-effect programs contain several ***sub-programs***, each suited to very different developmental levels. Great care needs to be taken to select programs and settings appropriate to the child's developmental level. At this level the child should be able to touch the screen anywhere - not just directly on the item - or touch a switch once for something bright, bold and obvious to happen. Examples are *Ghost train*, *Catherine wheel* and *Wakeup*, on *Touch Funfair*, *Touch Games 1* and *2*, respectively, and *SwitchIt! Patterns*, set to whole pattern for one switch press.

Scenario 5

In Mrs B.'s Primary One class a single message VOCA is passed round to each pupil in turn (including the speaking pupils) for the "Good Morning" routine (it says "good morning, good morning, I'm here, I'm here") as a response to the "good morning" greeting song sung to each child.

Key skills and equipment

The key skill for the above example is the ability to:

- record a message into a single message VOCA

The key equipment is:

- a single message VOCA

Scenario 6

In Mrs P.'s class, the key is preparation. She and her staff have made a large ***bank*** of play mats, song boards and story / symbol reading charts. All toys, games and symbol materials have a sheet attached, with ideas about messages to go into VOCAs to be used with them. In many cases, VOCAs are stored in hanging plastic bags along with the story books or set of materials. Classroom staff just record the message(s) written on the back of the materials.

enjoying taking part in the story

Key skills and equipment

The key skills for the above example are the ability to:

- audit and organize equipment and resources
- create good instruction sheets on how to program and use VOCAs
- gather together (bagging) resources that go together (use a photo of a VOCA if the are not enough real devices available to go in each bag so that everyone at least knows what they are looking for)

The key equipment is:

- digitized VOCAs
- resources (overlays, topic grids, books, toys, pictures, symbols, etc)

Things to think about:

- ensure simple technology use is sociable and communicative
- ensure simple technology use is always attached to meaningful activities
- integrate early language / light-tech activity into classroom routines and the curriculum to be delivered

Scenario 7

John is uninterested in most toys, but seems to like stories. A few story books have been assembled, each with one line of text per page and a repeated line in the story, e.g. 'My Old Teddy'. For each book, an eight-location PCS symbol chart, and matching set of single symbols, have been created and laminated.

poor old teddy

When it is time for the repeated line the adult pauses in the story and looks expectantly at John. If John does not respond at first the adult looks at him and looks at the Talking Buddy (single message VOCA), then looks back at John. John hits the Talking Buddy that says "Poor Old Teddy!" and has a matching symbol on top of it. He does not yet recognize the symbol on its own, but can pick it out with the support of the familiar position and colour of the Talking Buddy.

To make the activity more interactive, a ***story group*** has been established (which meets each day during Literacy Hour). John activates the repetitive line "Poor Old Teddy!", in alternation with Louise, who hits one saying "Oh no!" (later they swap around). Toby points out the appropriate symbols on the symbol chart. The teacher does not progress with the story until Melanie hits a Chipper (single message VOCA) with a "turn the page" message.

Key skills and equipment

The key skill for the above example is the ability to:

- record messages into single message VOCAs

The key equipment is:

- three or four single message VOCAs

Scenario 8

Joshua is relatively passive, but has learnt, through repeated physical prompting, to press a switch to turn on a tape recorder with a music or story tape.

The next step is to build in more control and more choices for Joshua. He now chooses the tape he wants by eye pointing to the right box, attached by Blu-tack to an E-Tran eye gaze frame. At first he chose from two; now he can choose from three or four. He never chooses the ***distractor*** (a tape he hates but another pupil is obsessed with).

Joshua's E-Tran frame

To make this activity functional and sociable, Joshua directs class group activities and games. He recognizes and correctly selects the 'Morning circle' time tune first-thing each day. He directs 'Pass the parcel' by controlling when the music stops and starts. This gives him a lot of ***power*** and status in the class and is helping his self-esteem.

Key skills and equipment

The key skill for the above example is the ability to:

- attach a switch to a battery-operated tape recorder or connect a mains tape recorder to a switch via a PowerLink

The key equipment is:

- E-Tran eye gaze frame with relevant easily distinguishable tape boxes
- tape player with switch attached via a battery adaptor or a PowerLink

Level 2 – Early language

At this stage the pupil is intentionally using from twenty to fifty ***key meanings*** and may occasionally link these together into short sentences. PECS pupils are confidently using picture exchange to obtain their preferred toys, food or activities and are ready to pay more attention to the meanings of specific symbols and to expand the number of their choices, instead of relying mainly on context. Expressive communication will still include looking, facial expression, body language, pointing, and gesture etc, but will include more and more use of a formalized language system such as recognizable spoken or signed words, or symbol indications – often with several methods combined together in the same utterance.

Computer use will be more relevant at this stage, to support the development of basic concepts, receptive vocabulary and language, rather than as a means of expression. It is important that the focus of intervention should be on helping pupils to communicate effectively, not on teaching them to use technology per se.

Communication level	Classroom approach and activities	Key materials and ICT equipment
Understanding is still partly situational and based on decoding ***key words***	Work on generalizing concepts and word meanings into different situational and grammatical contexts.	Computer use – create lots of simple picture and symbol activities with auditory feedback to help generalize the meanings of words e.g. houses come in many shapes and forms.
Has achieved Phase I & II of PECS - can signal a request by handing over a picture	Phase III of PECS (discrimination training and error correction).	Expand range of preferred reinforcers and distractors, to add to PECS pictures set ; introduce PECS book.
Learns through own activities	Encourage independence.	Computer use – to consolidate independent computer control skills
Imaginative/symbolic play; real objects hold symbolic meaning	Encourage pair / group play .	
Expressive language at one-word (or two-word) level	Augment speech attempts and communication modalities available, by introduction of symbolic objects, photos, pictures and symbols, (and signs, if appropriate) to widen the range of vocabulary to which the child has access.	Continued creation of a ***bank*** of symbol based materials (see section on Making Materials)
Child is being introduced to lots of new vocabulary and starts combining meanings (two or three symbols)	Lots of games and activities involving symbols; model symbol use by pointing to key symbols as you speak.	Computer with speech feedback to develop agent/action/object constructions – colour-coded grids in *Clicker* or *Writing With Symbols 2000*.
Increasing vocabulary	Phase out photos and pictures; phase in symbols: include people, activities and feelings relevant to the child, not just nouns.	Computer with speech feedback to provide additional support to symbol recognition and use in writing activities (*Clicker* or *Writing With Symbols 2000*)
Can choose / indicate single pictures from a range of about four to twenty	Use a variety of symbol topic charts; start building a symbol communication book.	Digitized VOCA with multiple messages (four to twenty keys)

Things to think about

How do we progress from 'cause and effect'

Many pupils get 'stuck' with the same battery-operated toy or the same very basic software on the computer, allegedly 'doing cause-and-effect' – if they seem to have 'got it' at first then seem to lose it again, consider the possibility that they are horribly bored! To gain access to a wider range of curriculum material and language skill, they need to move on to activities that stretch them further, such as making specific selections from a range of possible choices. To do this they may need to develop and improve their computer control skills, so that they can move about the screen and make selections easily.

Improving control skills

A range of programs that require progressively more accuracy in the use of touch screens and pointing devices (mice, rollerballs, joysticks) can be used. Touch screen programs can be set to ***'touch the object'*** rather than ***'touch anywhere'***. Many programs offer language opportunities alongside the development of operational skills – *Reveal*, *My World*, *SwitchIt! Scenes*, *Kaleidoscope*.

For pupils with physical impairments who are switch users, this means learning to understand scanning (a cursor or highlight box that moves from item to item in an array of possible choices), and learning to time their switch press accurately (to stop the scanning cursor at the right moment). It may involve making a transition from a single switch to using two switches, if possible, or – harder – mastering an automatic scan (see **Unit 8 – The development of switching skills**).

Example programs – *Blob for Windows*, *Foundation Mouse Skills*, *My World*, *BioBytes*, *SwitchIt! Pictures*, *Switch On Travel*, *SwitchIt! Scenes*, *Splatter*, *DoodlePlus* as well as open content programs e.g. *Clicker 4*, *Inclusive Writer*, *ChooseIt! Maker* and *Writing with Symbols 2000* for personalized activities such as finding the child's name, pictures of their mum, dad, pets, house, friends, etc.

Help the pupil to use signs, symbols or VOCAs in active and interactive participation

Component parts of this are: attention, shared looking, listening, responding to non-verbal cues, anticipation, initiation, turn taking to maintain interaction, and timing. Circle time, story reading, and drama can provide a useful focus for developing these communication skills.

Using single VOCAs or digitized VOCAs with the facility to attach multiple switches, so that a group can all use the same VOCA, pupils (speaking and non-speaking) take turns to provide the repeated catch phrase in a story or song broken down into separate parts e.g. "I'll huff and I'll puff – and I'll blow your house down"; "Incey wincey spider / climbed up the water spout / , down came the rain / ", etc.

Scenario 9

Mairi and her group love stories and are already well used to operating a single-message VOCA to take turns to say the repetitive line. Mairi needs to move on a little, read more age-appropriate texts, do more sophisticated listening, and take more control over the turn-taking process. The alternate lines of a number of whole story texts have been programmed into a Chatbox (digitized VOCA), one per location in a progressive sequence (one story per level / theme). An overlay for each story has been prepared, with a key symbol of the message to indicate the content of each location. Mairi and an adult partner can read the whole books together, taking turns. There is a big red sticky label 'dot' positioned on the story book page at the beginning of each line that Mairi is to 'say'; she has to pay more attention to the text on the page, and follow the reader's finger (even if she

is not actually reading every word). When she is more used to this process, the plan is to ask an older pupil from the mainstream school to come in to the Unit to be a ***story buddy*** to do this special kind of ***paired reading*** with Mairi, and hopefully to go to the library with her, to choose stories for the activity.

Key skills and equipment

The key skills for the above example are the ability to:

- record messages into a Chatbox (multiple location / multiple level digitized VOCA)
- change the theme and overlay on the VOCA (to have several stories available)

The key equipment is:

- Chatbox (multiple location / multiple level digitized VOCA)
- story books with spots / stars at the beginning of each section that has been recorded into the VOCA

Tip: Pupils using AAC also need to see a good role model of someone using their communication system effectively. The model needs to be more sophisticated than their own current level, but simple enough for them to follow and hopefully to imitate.

When pupils do express themselves, e.g. through signing or pointing to symbols, perhaps with telegrammatic utterances, these can be expanded by the adult ***in the same communication medium*** (rather than 'corrected' through the spoken medium). This is how young pupils learn spoken language.

Also, ensure that vocabulary taught and made available to the pupil is not just of 'things' but also includes a balance of verbs, adjectives, feelings, adverbs prepositions, etc.

Once the pupil has learned lots more symbols, organize these so that he / she can find and access them for language and communication functions, not just participation.

Scenario 10

Language unit teacher Mrs C., together with the speech and language therapist, created a stack of eight and sixteen-location symbol and word overlays for a Macaw (digitized VOCA), lists of suggested messages and a simple to follow wall-chart guide to reprogramming (so that classroom SNAs can quickly set up a new game). Kevin, who is non-speaking, is empowered in a game of 'Simon Says' by pressing the Macaw, telling his classmates (and adult staff) what to do, deciding whether they have done it satisfactorily, and listening when it is the turn of other pupils to press. Vocabulary is progressively more complex and cognitively demanding as the levels increase. The level is set by the teacher.

Level 1. overlays have messages such as: "jump", "hop", "sleep", "eat"

Level 2. overlays include: "touch your head", "wave your hand"

Level 3. overlays include: "hide under the table", "hide behind the door"

Level 4. overlays include: "look happy", "look frightened"

Pupils and adults carrying out these actions have been photographed with the digital camera. These pictures have been used in wall charts with full sentences (with symbols) as labels.

Key skills and equipment

The key skills for the above example are the ability to:

- record messages into a multiple location / multiple level VOCA
- make overlays with symbols for the actions and one location for 'Simon says'

- organize equipment into packs with clear instructions on how to use the contents

The key equipment is:

- multiple location / multiple level digitized VOCA with appropriate overlays

Scenario 11

James is now nine years old and attends a mainstream primary school. James does not speak, although no-one has detected a physical cause for his lack of communication. James is a self-contained pupil, who has always found ways to get what he wants by climbing to reach items or pulling someone to do what ever is necessary to meet his needs. When he came to the school, although he did not scream and shout he was disruptive in class because he did not want to sit down and engage in tasks as requested – instead he wandered until he found something he wanted to do and then just did it. Teachers and SNAs signed to him, but he never spontaneously signed himself.

One activity that he did enjoy was the singing of action songs. Pictures were used to identify the songs regularly sung in class. All the pupils took turns to choose the song by picking up the appropriate picture and handing it to the teacher (speaking pupils also said the name of the song). James readily accepted this approach and it was progressively extended, using PCS symbols, to other objects and activities in the classroom. James's desk was next to a wall and transparent photograph pockets were used to hold the symbols. James was initially given two or three symbols to choose between but he quickly started getting his own and handing them to his SNA to indicate what he wanted to happen. The symbols were then grouped according to topic and placed in wall hangers with pockets designed originally to store shoes. While this communication method worked in the classroom and at home James was fast outgrowing the number of symbols he could carry around, so a DynaMyte (synthesized VOCA) with PCS symbols was provided for him.

The symbols are still grouped by topic and a few sentence starters are available on each page. James is encouraged to use these to create full sentences. His SNA always tries to talk to him with the DynaMyte while also speaking the sentence. James sometimes still reaches for his symbols but is proud of his DynaMyte and actually spends time sitting listening to the various symbols 'speaking'. At break and lunch time he takes it out and gives it to the member of staff on playground duty and (occasionally) grabs it back to sort something out with his friends.

Tip: The approach used with James was based on Picture Exchange Communication System (PECS) – a highly structured system which has proved particularly useful with pupils on the continuum of autistic behaviour (see references for further information).

Key skills and equipment

The key skills for the above example are the ability to:

- produce and organize large numbers of PCS symbols in photograph pockets
- program and use a DynaMyte VOCA (at the moment this is all being done by the SNA with occasional guidance from a SALT and class teacher)

The key equipment is:

- DynaMyte (synthesized VOCA) with PCS Symbols
- photograph pockets / shoe storage wall hangings
- PCS symbols for everything likely to arise

Basic concept / vocabulary reinforcement

There is no hard and fast rule as to the order in which concepts should be learned, but a suggested sequence is offered below. Paper based games to reinforce these are always valuable. *SwitchIt! Maker*, *ChooseIt! Maker*, *My World*, *Clicker 4*, *Inclusive Writer*, and *Writing with Symbols 2000*, can be used to create equivalent games on the computer, with relevant vocabulary (as opposed to programs with fixed vocabulary content) which brings more independence.

- ***recognition / identification –*** matching object to spoken name, object to picture / symbol, symbol to name – finding a symbol for a requested object amongst a selection of two to ten encourages both listening and visual search skills: doing it in pairs or teams, against the clock (kitchen timer) adds spice
- ***matching (same to same) –*** picture dominos, lotto
- ***same or different? –*** snap, Pelmanism
- ***association by group –*** 'odd man out'
- ***association by function –*** what things go together – e.g. toothbrush and toothpaste tube)
- ***part to whole –*** e.g. leg to body, wheel to car, flower to plant
- ***sorting / classification –*** what goes in the air, what goes in the sea, etc.

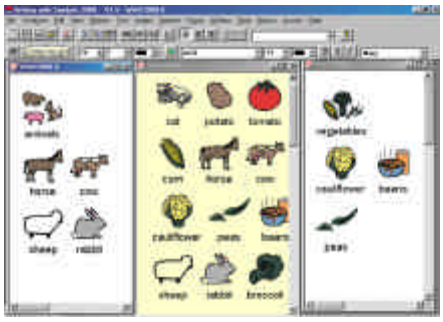
There is always a series of levels within each task, e.g. simple task, task with distractor, task with more items, task with more difficult distractors etc.

Tip: The curriculum traditionally emphasizes classification by shape, size and colour – and so do many computer programs. But for language development, it is much more important to work on classification by meaning groups: e.g. sorting into animals or people, vehicles or buildings, actions or things, places inside or places outside.

Scenario 12

A favourite task among the younger pupils in Mrs H.'s class is sorting the symbols into sets of drawers (normally used for nuts and bolts etc). A category symbol is placed against the front face of each draw (and in the early stages in the bottom of each draw, so that the pupil sees the category item again when they pull the draw open). The pupil has a number of small laminated symbols (and toys / miniatures in the early stages) to put away in the drawers. Where the pupil is likely to progress to a particular communication system, pages from that system are printed and cut up for use in this task to familiarize the pupil with the symbols and colour codings used.

Mrs H. has also created a number of sorting tasks in *Writing with Symbols 2000,* using three part environments. To sort the items, the pupil clicks on the appropriate category window and then on the item. They are all done to the same format so that the pupils can concentrate on their categorization skills rather than the mechanics of the task. She also keeps a number of worksheet templates set up in *Boardmaker*. Dropping in the relevant symbols is quick and easy. In the sorting task, the pupils ring the odd-one-out.



sorting task in Writing with Symbols 2000

Key skills and equipment

The key skills for the above example are the ability to:

- create worksheets in *Boardmaker* – templates make it quicker!
- create environments in *Writing with Symbols 2000*

The key equipment is:

- *Boardmaker* software (can be done in *Clicker* or *Writing with Symbols 2000*)
- *Writing with Symbols 2000*

Scenario 13

Janet speaks, but has restricted hand function. She will be using the computer for recording, rather than pencil and paper. Her ability seems patchy at different levels; she is strong on all visual tasks and can complete all discrimination, matching, sorting, visual memory, counting and mental maths tasks quickly and accurately – ahead of most of her classmates. However, although her speech is clear and her word recognition is good, her auditory discrimination and memory skills are much poorer; her understanding, expressive vocabulary and use of grammar are all extremely limited. Her new class teacher has temporarily banned all the visual skills and maths-based computer tasks. Janet is to follow a specially devised path through different packages, focusing at first on adjectives, prepositions, sequencing and sentence building.

Key skills and equipment

The key skill for the above example is the ability to:

- be familiar enough with the software available to sort out a progression of tasks specific to the needs of each individual

The key equipment is:

- *Making Tracks to Literacy* software (or in this case, language)
- *Spider in the Kitchen* software (prepositions)
- *Making Sense with Words*, *Making Sense with Letters* software
- *Picture Sentence Key* software (sentence building – agent-action-object)
- *Clicker 4* software (continuation of sentence building, and for making a personalized talking book, using agent-action-object sentences generated by the pupil)

Moving on:

Once the pupil has acquired a basic symbol vocabulary it is time to move on to extending the pupil's use of single word / symbol / or sign ***key meanings*** into more complex linguistic structures. For example, correctly ordering two, three word or longer sentences.

Scenario 14

Anne is mobile and has good hand function, so she can interact with her environment independently. She has no intelligible speech, has very severe difficulties in understanding the spoken language of others, and can get very frustrated. Manual signing is used in class, and Anne is acquiring quite a large expressive sign vocabulary. She can generate two-sign utterances on occasion. However, the more advanced her signing becomes, the more difficulty others in her family and in the community have in understanding it; so she is getting frustrated all over again.

She started by using a PCS symbol communication book (thirty symbols per page) to answer questions and spontaneously point out meanings she wishes to communicate. She has excellent visual skills and memory; she seems to acquire new symbol vocabulary quickly with a minimum of teaching. In class she also uses the Eclipse digitized VOCA set to eight-location, set up for small group use with various games and stories overlays.

She needed to move on to a more powerful VOCA, to give her access to a much bigger vocabulary, with a screen and printout providing visual feedback of her sentences. She now has a Norand portable touch screen PC, with *Winspeak* software and the Ingfield Dynamic Vocabulary.

It is not a question of Anne having to choose between signs, symbols or a VOCA – she will continue to use all of these, as well as her speech attempts.

Key skills and equipment

The key skills for the above example are the ability to:

- sign
- produce communication books
- program *Eclipse* (digitized VOCA) with appropriate vocabulary
- identify appropriate next VOCA or arrange an assessment with a team experienced in these issues
- set up and personalize the Norand PC as a communication system (with help from the supplier and an assessment team)

The key equipment is:

- *Eclipse* (digitized VOCA)
- Norand portable touch screen PC, with *Winspeak* software and the Ingfield Dynamic Vocabulary

Level 3 – Language for learning

By this stage the pupil is using a large, expressive vocabulary of spoken words, signs or symbols for social communication. Pupils with speech will be putting words together into sentences, though these may be limited and contain errors of word order and grammar. PECS pupils will able to build short symbol sentences, following a structured format.

A non-speaking pupil can follow and understand a multiple sign or symbol stimulus, and can sign, or indicate in symbols, short sequences of meanings from the range of hundreds of signs and symbols available to them, from communication charts, books or symbol bank etc. Utterances may still be grammatically disordered or telegrammatic.

In terms of computer control and access to the curriculum via technology, the pupil is becoming accurate, and hopefully faster, through the use of an appropriate access method, e.g. touch screen, mouse, rollerball, joystick, or switches.

Communication level	Classroom approach and activities	Key materials and ICT equipment
At least some instances of a full range of language and communication functions: socializes, gives information, describes, directs, questions, repairs misunderstandings	With AAC users, teaching the user all the vocabulary available to them – best done in short (15-minute) sessions twice a day – and then practising using it in functional situations	VOCA with large stored vocabulary (multiple levels or screens with 16 to 40 locations per level or screen)
Has achieved Phase III of PECS- can signal a request by handing over a picture	PECS Phase IV (building 2 and more symbol sentences) PECS Phase V (answering 'what do you want?" questions and spontaneously requesting, in a short sentence) PECS Phase VI (commenting)	Greatly expand range of symbols to add to PECS pictures set; introduce use of sentence strip along with PECS book.
Understands abstract ideas and language e.g. past and future	Develop language comprehension with longer and more complex texts.	Use VOCA and/or computer with wide range of software to answer questions, do worksheets, etc.
Literacy	Try to make meaningful links between language work already mastered, and literacy tasks.	Carry picture and symbol prompts and speech feedback across into literacy work – gradually phasing them out later, if possible.
Emergent literacy – interest in text	Whole language may be more suitable than dis-embedded words, since it provides contexts for understanding the words.	Print symbol communication messages, make personalized talking books (*Clicker*, *SwitchIt! Maker*, *Writing With Symbols 2000*).
Word recognition is developing	Increase the size of the text and reduce the size of the symbol in all paper based activities.	Software with whole word word-banks, picture / symbol support and speech feedback, preferably under the independent control of the student (point and click – hear the word speak; e.g. *Writing with Symbols 2000*, *Clicker*, *TextEase*)
Phonics skills are developing	Use visual clues to back up phonics work for students with poor articulation, if required. Ask SALT if there are synthesized VOCAs no longer in use by individual children (e.g. TouchTalkers).	Move from digitized to synthetic speech aids and / or computer programs (pre-programmed digitized VOCAs cannot do ***sound blending***). Use out-of-date VOCAs as ***talking phonics*** work sheets

Things to think about

Personal computer or dedicated VOCA, for non-speaking pupils?

If speech is still difficult to understand by the time they have reached this stage of development, then classroom resources are too limiting and the pupil needs a computer or VOCA of their own. Many different, complex VOCAs are available. Help with selection should be sought from your SALT, Head Teacher, Educational Psychologist or SENCO. They may in turn refer to a specialist centre such as one of the Education (ACE or CALL) centres or Health Service Communication Aid Centres.

Introducing a powerful personal VOCA to the pupil and integrating its use into the classroom raises many issues. These need to be addressed if success is to be achieved.

Management issues

- Who will take responsibility for programming the VOCA?
- Who will take responsibility for coordinating use of the VOCA?
- What arrangements need to be made for staff training and ongoing support?
- What arrangements need to be made for technical support, maintenance and repair?
- What arrangements need to be made for regular review and reassessment if / when a new VOCA is necessary? – the pupil will change and new technology will become available
- What arrangements need to made for parental training and guidance?

Vocabulary selection / programming issues

- Use vocabulary and language structures that the user cannot readily access in any other way.
- Use vocabulary that is highly useful and / or motivating for the user.
- Add vocabulary in context and immediately use it functionally.
- Include partial phrases as well as single words to ensure that the user can create longer utterances quickly.

Should a pupil have two separate systems – a personal VOCA plus a computer for school work and writing?

Managing two complex technological systems (computer and VOCA) can be difficult; one of them may not get used, so an integrated speech output and writing aid might appear the best answer. Such systems can, however, end up meeting neither learning or communication needs so well as a specialized piece of equipment. Each case will need to be judged on the specific requirements of the pupil and the support available to them (technical as well as someone to carry it around for them).

Single integrated system

Scenario 15

Liam uses a portable computer with a touch screen, running a dynamic screen communication aid program (*CALLTalk* on Freestyle). When he needs to switch from chat to 'work' he goes from the 'Top Page' to the 'School Stuff' page, and presses either 'Diary' or 'Maths'. The application (*Speaking Dynamically Pro*) launches either the word processor (*Write:Outloud*) or the maths work sheet program (*MathsPad*). When he is finished, he closes his writing or maths work and is automatically returned to the communication system.

Liam's communication setup

Key skills and equipment

The key skill for the above example is the ability to:

- Set up a program to contain communication pages and to launch other programs

The key equipment is:

- *Speaking Dynamically Pro* on a Freestyle (synthesized VOCA / Apple MAC portable)
- Word processor and / or maths program

Two separate systems

Scenario 16

Throughout her time at a small rural primary school, Sophie has done well using her own speech (dysarthric but intelligible to those who know her well) and written using her own computer system, with *Clicker 4* plus *Penfriend*, in the classroom. However, now that she is about to go to secondary school, with larger numbers of people who do not know her, she will probably encounter many situations in which she is unable to make herself understood by her speech alone. Recently she received a Lightwriter (synthesized VOCA) which is small enough for her to carry around. Now she is never without some back-up to speech.

A young Lightwriter user talking with friends

Key skills and equipment

The key skill for the above example is the ability to:

- rethink equipment in the light of changing circumstances and need (child, environment, new technology)

The key equipment is:

- Lightwriter SL35 (synthesized VOCA)

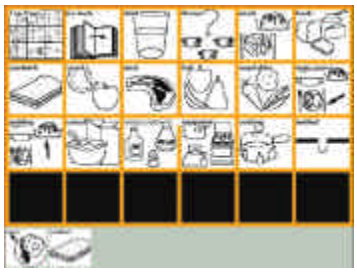
What happens if the computer / VOCA that was recommended is not being used effectively?

Four key components to successful use of a powerful VOCA are:

- ***Vocabulary –*** The vocabulary available to the pupil needs to be extensive, motivating, relevant and useful. But, most of all, the pupil needs to know where to find the words he wants. Since most powerful communication systems will contain vocabularies of 1000 - 3000 words (normally speaking pupils have a vocabulary of upwards of 20,000 words) this represents a challenging organizational task for the vocabulary designer, and a huge memory and navigational task for the learner.
- ***Teaching –*** the pupil will not just 'pick up' a vocabulary of this size. The vocabulary and its complex organization will need to be ***taught*** and practised in interactive settings. Support to gain experience of using it outside school is also important.
- ***Time –*** mastering a vocabulary of this size, at the same time as coping with all the other educational demands upon young learners, will take much time. Learning and practising the system will have to be timetabled, possibly under the heading of Learning Support, English Language. Ideally a ten to thirty-minute slot each day would be devoted to this work, linked with additional activities throughout the day, possibly in groups, to consolidate it.
- ***Collaboration –*** keeping parents and other staff informed of vocabulary learned, as well as vocabulary required, demands considerable organization and commitment.

It is clear that there is limited time for this in schools! Creating a personalized vocabulary for a user takes many hundreds of hours and specialist skills. It is advisable therefore to buy a commercially available pre-programmed vocabulary and then spend time personalizing it to the needs of the user, rather than creating one from scratch. For example:

Chailey Communication System is designed for users with severe physical and learning difficulties and perhaps additional visual impairment. The search for a symbol always starts from a concept index page and branches through a highly structured ***tree*** of related concepts. Communicating with this vocabulary is very slow but the method is completely consistent.



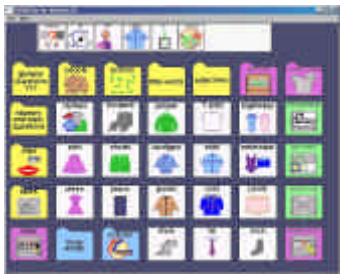
Ingfield Dynamic Vocabularies (IDV) are available for use with the following programs:

- *Clicker 4* (known as *Quickfire* vocabularies in the context of this program) with PCS
- *Talking Screen* (or *Symbols for Windows*) using PCS – Rebus or Blissymbols may be substituted (although this would be time consuming)
- *Winspeak* using PCS or Rebus Symbols (illustrated)

This vocabulary comes in four levels (lowest suited to four-year-olds) and uses colour coding to help develop a sense of language structure, and to aid the process of symbol selection (e.g. looking at the yellow words to find a person). It is faster, mainly because of the ***part sentences*** on each page that allow for construction of longer sentences without excessive navigation through the system.

Gateway runs on the DynaVox / DynaMyte (synthesized VOCA), using DynaSyms. It uses a different structure but follows the same principles of IDV by using colour coding and topic pages. The level of language required is higher than that required for the simple levels of IDV.

CALLTalk runs on the Apple Mac (PCS) and another version runs on the DynaVox (DynaSyms or PCS). It gives access to a large vocabulary and its structure of pop-ups (e.g. for ***little words***) emphasizes grammatical sentence building. It is intended for the Primary level pupil who is expected to acquire literacy. Text alone is used in parts, as well as symbol displays. It has full-scale word prediction built-in into the symbol vocabulary, offering a dual route to users who are developing literacy.



Unity and Language, Learning and Living (LLL) are Minspeak applications for the DeltaTalker (synthesized VOCA). Good users are fast, because there is no time spent on screen changes. Users must memorize symbol sequences for each word or phrase used. This is a major challenge.

Supporting language development

There is evidence to show that using VOCAs can support the development of children's language structure. The key may be in the use of progressive levels of difficulty and additional types of support: e.g. visual feedback through symbols, speech feedback, colour coding, spatial / locational structuring or organizing by topic. The user learns with all of these supports, and then each can be removed or reduced very gradually. Joint planning and working closely with a speech and language therapist helps teachers to get ideas about working with specific areas of language structure.

We have already discussed symbols and speech feedback. Programs like *Clicker 4*, *Inclusive Writer* and *Writing with Symbols 2000* offer a colour coding facility. A user vocabulary and / or language exercises can easily be set up in line with formally established colour coding schemes, such as the Fitzgerald Key or the John Horniman colour-coding scheme. Spatial / locational structuring can also be very powerful.

Scenario 17

Freda has a tray with six compartments, each with a coloured background. She knows that her sentence work starts at the left and that she must fill the compartments with a word from the box labelled with the same colour, to build sentences like:

The boy sat on a big box.

A dog went down the long road.

My friend saw the sad film.

A similar structure has been set up in *Writing with Symbols 2000*, with the same left to right layout and each familiar colour on the key grid leading to a ***bank*** of words from that same class. For her, this is easier than a system where pages of symbols are arranged in topics.

Key skills and equipment

The key skill for the above example is the ability to:

- set up a 3 × 2 grid in *Writing with Symbols 2000* so that each cell is a different colour and each cell leads to a bank of words (in line with the colour coding used)

The key equipment is:

- computer running *Writing with Symbols 2000*
- colour coded tray for doing the task manually

VOCA users' needs change

Scenario 18

Bobby has cerebral palsy and speech that is very difficult to understand out of context. When he was in the nursery, he benefited from the use of signing, symbol topic and story charts, and single-message VOCAs. Later he used a 32-location AlphaTalker (digitized VOCA), intending to progress from there (via the vocabulary Stepping Stones) to a DeltaTalker with Unity, a 'top of the range' synthesized system, particularly suited to people with relatively good hand function and excellent memory skills.

He is now being educated in a mainstream Primary class (working within Level A, Scottish 5–14, Keystage 1). His speech has improved significantly, but he still needs a back-up to speech. Educationally, reading and spelling are Bobby's strongest areas. He has made good progress using *Clicker 4* as a simple word bank and is just starting to using the alphabetic index grid to access a wider number of words organized alphabetically. He has a low-tech back-up to speech to carry around, i.e. the 26 *Clicker* alphabetic word grids printed out, laminated and stored in a ring-bound 'dictionary'.

When his spelling has progressed somewhat, he will go on to using predictive typing. He has started to learn basic French. With all this going on, it seems increasingly irrelevant to think of making him learn Unity, which is an extra whole new language. Instead, it is planned that he will now leapfrog that stage and use the highly portable text-based Lightwriter (synthesized VOCA).

Key skills and equipment

The key skills for the above example are the ability to:

- produce printouts of *Clicker* word lists
- add words quickly and promptly to *Clicker* word grids
- identify the child's changing needs and prepare accordingly or consult a specialist team for advice

The key equipment is:

- *Clicker 4*
- *Penfriend* (predictive typing program)
- Lightwriter VOCA (in the future)

Computers and conversation

On the face of it, computer use and conversation do not go together naturally. However, computer programs can provide a stimulating context for discussions engineered by the teacher, that might bring in to use a wide range of unusual vocabulary. Computer use with a peer can also motivate reluctant speakers.

Users of VOCAs (who may use very telegrammatical utterances) – may need to be ***taught*** how to have a conversation that includes replying to questions giving listeners feedback, asking for information, expressing feelings and desires, describing past events, talking about the future, asking for clarification and correcting listeners' misunderstandings.

Linking language and literacy

There is a great deal of overlap between language, communication, literacy and recording. Similarly, there are many programs designed for early reading and writing practice, which can also be used to develop vocabulary, comprehension and sentence building; for example, using tried and tested approaches such as cloze procedure, jumbled sentences, sequencing sentences to make a story, and so on.

From the language perspective, key links to literacy include talking books, phonology programs and picture and symbol supported word processing.

Talking books

Talking books on CD-ROM (e.g. Brøderbund *Living Books*, Sherston *Naughty Stories*, *Oxford Reading Tree Talking Stories*, *Cambridge Reading*) are good because, unlike most of the software mentioned so far, they present longer chunks of connected language, within a context. They also offer the user a degree of independent exploration through the language, with minimal physical effort. Working at the computer with another pupil encourages spontaneous communication. The teacher is provided with a ready-made non-threatening language context in which to assess comprehension and stimulate discussion.

Phonology, reading and spelling

Another link area between language and literacy is that of phonological awareness (a language skill) and the important role of phonics in reading (increasingly emphasized in early intervention and literacy programmes).

Computer programs focusing on this area include:

- *Earobics*
- *Oxford Reading Tree Rhyme and Analogy*
- *InSound*

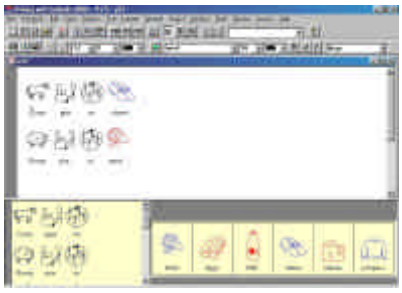
These are comprehensive program suites designed to be worked through systematically with class groups, rather than 'dipped into' for individual pupils. Their use requires a commitment of time which needs to be built into medium term target planning.

Picture and symbol-supported word-processing

There are powerful and flexible programs, which can be used in a huge variety of ways to support language and communication, all working on the basis of making it easy to put pictures and symbols together with words, and to provide speech feedback. There are no real limits except those of the teacher's time and imagination.

Teachers will probably wish to choose to concentrate on one, rather than all of these programs, since each requires an investment of time to 'get to grips with' the full range of its features, and to build up a ***bank*** of useful grids and exercises.

Writing with Symbols 2000 – This would be the program of choice for educational settings where there is a serious commitment to using symbols to support language and communication.

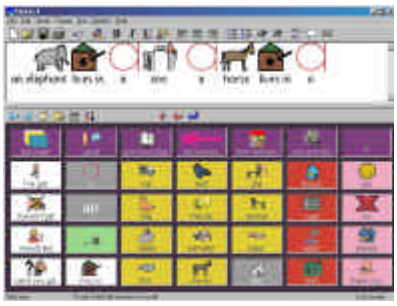


Inclusive Writer – Similar in structure to the above, and for use where symbols are useful occasionally rather than by necessity. The support materials and examples in this program are more curriculum-oriented and include rhyming words, sequencing activities, story starters and word banks.

In both programs, multiple windows can be opened which "talk" to each other allowing word and phrase banks to be created in one window (free-standing or in a grid format) for use in a task or in the other window. The content of the windows is easy to create and save as a collection of windows or ***environments***.

Clicker 4 – *Clicker* is a well known and popular program which many schools are using; so extending its use more into language work does not require too much new learning.

With *Clicker* you can link grids to each other but you can only ever see one grid at a time. This makes it marginally less suited to sentence building work, when you might want to pick words from different pages to correspond with different word classes.



Access to alphabetic word lists at the same time as topic based grids is, however, a great advantage in linking language and literacy.

Further information on these approaches is available in **Unit 1 – Literacy and recording – Using symbols, pictures and sounds**.

At a later stage the pupil may benefit from access to word prediction programs such as *Co:Writer* and *Penfriend*. Further information on these approaches is available in **Unit 2 – Literacy and recording – Using ICT to support literacy across the curriculum**.

Making materials

For pupils with little or no speech and little or no literacy, we need to find other ways of representing language, in order to make it possible to assess the child's level of inner language, and to work on language development at an appropriate level.

As well as causing expressive problems, language impairment can be associated with difficulties in ***understanding*** the meaning of the words and sentences that other people say. Pupils who have receptive language problems may respond better to materials presented visually.

Children on the autistic spectrum with speech, language and communication difficulties very commonly respond well to visual stimuli where they may not process or respond to auditory stimuli, and are able to make use of pictures both for receptive language and for expressive communication. This will often be within the context of a highly structured communication teaching approach such as the Picture Exchange Communication System (PECS).

Computer hardware and software provide the means to generate materials in which language content is represented by photographs, pictures and symbols, that make word meanings clear and illustrate grammatical relationships in a simple way.

ICT is, therefore, a key tool in enabling teachers to make language visible, tangible and manipulable – even for pupils at very early levels of development (i.e. pre-reading). ICT can help to make materials that are:

- relatively quick to produce
- personalized
- attractive and motivating to pupils
- easily edited and reused

Where pupils have severe language and communication difficulties, there will be a heavy demand for materials making extensive use of graphics: photographs, pictures and augmentative communication symbol sets. Although some materials are available off the shelf, it is often best to create new materials that are highly personalized and adapted to the curriculum and classroom projects. ICT will support the teacher to design and make such materials.

Choosing hardware

Where graphics are concerned, for best results, go for fast and powerful computer equipment and ***lots*** of memory.

The following basic hardware will make the task much easier and quicker:

- digital camera
- scanner
- fast colour printer (with facilities to produce A3 and A2-size printouts, if possible)
- photocopier with enlarge / reduce (colour photocopier if possible)
- laminator (preferably able to take matt laminate and do 'poster' size)

(Do not overlook the fax machine as a means of exchanging materials between schools.)

There will also be a need for all sorts of basics such as replacement colour printer cartridges, symbol display folders (or photo albums), Velcro, laminator pouches – remember to budget for these!

Making resources to create a communicative classroom

Picture and symbol use has to become part of the daily routine if it is to have an impact. The whole school / classroom environment will be translated into a graphic environment. Adults in the classroom will act as 'role models' and will point to key symbols as they talk, rather than expecting the pupil to use symbols on their own with no example to follow (Aided Language Stimulation; Goossens 1999).

Paper-based graphic materials will include:

- visual schedules and timetables
- labels for objects around the room, banners, posters and captions for wall decorations
- a graphic Menu for snack and lunch choices
- graphic ***Story Boards*** and ***Song Boards*** (Goossens, 1999)
- graphic topic vocabulary boards to go in '***corners***', (e.g. library corner, colour table, painting corner) and for specialist subjects, such as music, project work and use in aided language stimulation
- graphic weather charts
- '***loose***' graphics, duplicates of charts in use, cut up for matching games, lotto, etc.
- overlays for overlay keyboards, symbol '***tops***' for simple VOCAs
- worksheets
- adding graphics to wall charts or Passports so that the pupil themselves can participate in making them, and can 'read'them.

Tip: If you have a pupil in your class who could benefit from use of symbols it may be salutary to look around your classroom to see how many symbol materials are evident. If there are very few – or none – what message does this give to your symbol user about the respect his / her communication system is awarded in your classroom environment?

Scenario 19

Mrs C.'s classroom is just such a ***symbol environment***. She has individual symbols (all laminated) alphabetically stored in card index drawers; bundles of symbols for specific tasks are hung in bags with category labels on a curtain wire stretched between two cupboards; sheets of symbols grouped for specific tasks are kept in plastic packets with work sheets where appropriate. She has found it faster to quickly cut up these sheets than trying to find lots of separate paper symbols. She does an induction session for anyone who is working with her, so that they know how she stores the symbols (and therefore where they are to put them back when they are finished with them). She is regularly asked how she manages to be so organized and replies that she was always rushing and hassled so decided to spend one half term making, laminating and organizing the symbols and other associated resources. Having done it she finds it easy to keep to the structure and feels 'on top of it'. Having spoken to me it was song time, so she grabbed the 'body parts bag'; each pupil was given some symbols and "Little Peter rabbit had a fly upon his…" was under way.

Key skills and equipment

The key skills for the above example are the ability to:

- commit the time and energy to setting up a system
- use a computer program to generate symbols

The key equipment is:

- a computer running a symbol program
- a laminator and printer
- lots of plastic file pockets, strong polythene bags with handles

Graphic resources for an individual pupil

Pupils using graphics as part of their personal communication system will need both paper-based and computer-based materials. Pupils on specialized educational intervention programmes such as PECS and TEACCH, will need an extensive set of pictures and visual teaching/behaviour control materials to structure their day and establish routines. Design and creation of these may be a task shared with the speech and language therapist, but it is advisable to have the means of production of these within the school or classroom, for everyday use. Ideally an assistant could be trained to produce materials as specified by teacher and therapist. These might include:

- PECS pictures - ie. individual pictures to represent every familiar toy, food item and activity (for pupils on PECS programme, Frost & Bondy, 1994)
- visual schedules / timetables
- visual reinforcement systems, eg. 'wait' cards
- symbol teaching games such as picture dominoes
- new vocabulary flashcards
- personal communication boards and / or communication books
- overlays for static display VOCAs
- printouts of dynamic display VOCA pages

On the computer:

- development of a symbol vocabulary for use on a dynamic screen VOCA (or the addition of individual new vocabulary items to an existing system)
- on-screen symbol exercises and worksheets
- establishment of a folder of downloads and screen shots of pictures and symbols taken from web sites and favourite software, for printing out and incorporating into low tech materials and/or importing into on-screen exercises.

Scenario 20

Tom has cerebral palsy and is using a Cameleon VOCA with level C of the Ingfield Dynamic Vocabulary. The pages have been personalized and additional pages have been added to cover the term's topic, science, and the reading scheme. The screens have been printed out via the ***Print Screen*** command using a colour printer. These printouts have been laminated and are kept in a file. A piece of foam has been stuck on the top right-hand corner of each sheet to separate the pages, so that Tom can turn them over himself. The pages approximately one and two thirds of the way through the file have a lolly stick (well washed) attached to them, so that Tom can flip several pages at a time if he is aiming for one of the bottom pages.

For a while Tom had become very dependent on his SNA and would not work without her at his side. A Talking Buddy Button (single message device) was placed on his tray with the message "Can I have some help please?" that he could use to attract attention. This has helped to wean him from his dependency on adults and he will now get on with his work for a while without her beside him.

Since Tom is a switch user he is slow to answer in class and started to give up trying. Paper charts are sometimes created before or during a class so that Tom's SNA can row / column scan for him (he nods when it is the correct row or column) to give his answer quickly. Where appropriate he also uses his file in this way. Charts appropriate to Tom's toilet needs are kept on the window sills of both of the toilets that he can access.

Tom also needs overlays for the IntelliKeys Keyboard that he uses to answer a series of questions independently, from a limited number of possible answers, in a relatively quick time using his switches.

Key skills and equipment

The key skills for the above example are the ability to:

- use common sense and ingenuity – to plan ahead and identify how Tom is going to complete each task during the day as independently as possible
- create pages in *Talking Screen* software and sometimes in *Clicker 4*; print out and laminate them as necessary
- create overlays for IntelliKeys keyboard

The key equipment is:

- *Talking Screen*, *Clicker 4*, IntelliKeys, *IntelliTalk*, *Overlay Maker*
- laminator

Picture / symbol-support for literacy

(See also **Unit 1 – Literacy and Recording – Using symbols, pictures and sound**)

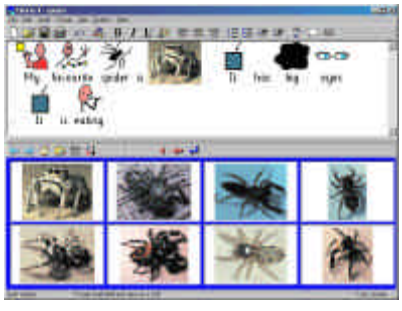
Pupils with language and communication difficulties will commonly also have difficulties with literacy, and will benefit from picture and symbol support which makes text meaningful, gives access to information and brings success with reading attempts. Useful materials will include:

- graphic story reading charts
- detachable ***stick-on*** graphics for favourite story books and reading schemes
- personalized books with photos of friends and family, and with graphics (both on paper, and ***talking books*** on computer)
- graphic story writing frameworks

Scenario 21

Simon has some learning and attention difficulties as well as language difficulties. The current focus for him is prepositions. Simon is particularly fascinated by spiders. Any activity which involves the use of a large plastic spider, purchased cheaply at a local market, increases the length of his ability to remain on task. The laminated symbols for the prepositions 'in', 'on', 'under', 'in front', 'behind', 'beside' are Velcroed onto a large die. The die is rolled and Simon must place the spider in the appropriate relationship to other items – a large truck is a favoured item. Sometimes his SNA places the spider and Simon must point to the appropriate symbol Velcroed to the board in front of him.

Spider pictures collected from the World Wide Web have been used in *Clicker* Grids to encourage Simon to write. The computer program *Spider in the kitchen!* has been introduced but Simon thinks this spider is a bit boring! He prefers the real thing.



Simon writes about spiders using Clicker

Key skills and equipment

The key skills for the above example are the ability to:

- create laminated symbols of relevant prepositions
- collect images that will motivate the pupil from the Web
- make *Clicker* grids

The key equipment is:

- large hairy plastic spider
- laminated preposition symbols
- large die
- computer with Web access
- *Clicker 4* and *Spider in the kitchen!* software

Scenario 22

Ashley is 5 and newly started in P1 in a special unit for children with autistic spectrum disorders. She has no speech and very little understanding or response to others spoken language. She is just being started on a PECS programme (Phase 1, the physical exchange). Although she shows little in the way of preferences for food or activities, she loves bubbles, one Teletubbie video and one particular spinning toy, so these have been chosen as her preferred reinforcer items to introduce the first stage of PECS. Her teacher Miss L. has taken digital photos of her preferred items and reduced these in size to fit on to 2" square hard backed and laminated cards. The unit is also a TEACCH environment, so Miss L. has also used the PCS graphics CD and Clicker to make Ashley her own set of green activity lists and red 'finished' activities lists (to match the colour coded areas on desks and areas in the classroom), with velcro spots on which various day to day activity pictures and symbols are attached, each day.

Choosing software

Finding useful pictures

Personalized

Use a digital camera, or scan familiar photos or drawings, to create personalized and thus highly meaningful pictures. Involving pupils in producing the materials can be highly motivating.

General

CD-ROMs are available with photos or clip art with simple, visually clear pictures of basic vocabulary items. Avoid the huge commercially available collections of clip art – it is difficult to find any specific picture quickly, and most of the pictures are useless for learners with special needs. Images and video clips can also be downloaded from picture libraries available on the Web.

- *Picture This… Pro*
- *Early Years Clip Art*
- *Sherston Primary Curriculum Clip Art*
- *Just Pictures*
- *Disability Clip Art* (images of people with disabilities) especially Vols. 01, 02 and 04

Specific

Clip art packs on CD-ROM for popular reading schemes:

- *Oxford Reading Tree*
- *Wellington Square*
- *Fuzz Buzz*

Finding useful symbols

There are several electronic symbol libraries available; currently the most commonly used in the UK are PCS, Rebus and Makaton. (Others available include – Bliss and Compic)

Boardmaker is simple and very widely used. It is designed for use with only one symbol set (PCS) although occasional extra graphics can be added into its libraries. Additional symbol sets are published from time to time, e.g. the 1998 and 2000 addenda.

Clicker or *Writing with Symbols 2000* are extremely flexible programs which can be used with any of the symbol libraries that come with the program or have been purchased separately. They can combine symbols from more than one symbol system, or can combine symbols, pictures and photographs within a library created for a specific child, class or school.

Overlay BUILLDer and *Flashcard BUILLDer* (Macintosh only) generate the Minspeak symbols used in the Unity application, in overlay or flashcard format.

Picture and symbol communication materials on the Web

An increasing number of Web sites offer freely downloadable picture and symbol-based materials, as well as many ideas and resources developed by practising teachers. These are listed in Appendix 1. If your school has a Web site, or email contact with other centres, you could also offer to share or exchange materials.

Some of these are listed in Appendix 1. Excellent starting points are http://trainland.tripod.com/pecs and http://www.do2learn.com

Materials production software

'Ordinary' word processors with the capacity to accept graphics alongside text such as *ClarisWorks* or Microsoft *Word* may be useful for ***occasional*** illustrative use of pictures or symbols. *PowerPoint* can be used to make ***talking books***, or 'Personal Passports' (Millar & McEwen, 1993). The advantage of these programs, together with ***ordinary*** painting / drawing programs, such as *Paintshop Pro* or *Corel Draw*, is that they are often already on the computer and can be used with no extra costs or learning. A disadvantage is that they are often over-complicated for educational use.

Usually, it is advantageous, in terms of time, ease of use and range of features, to look at the more specialized packages available. For example:

Specialized word processors and desktop publishing packages – such as *Pages* or *Talking TextEase*. Designed for use by pupils (and also good for adults!), these are simple to use because of ***drag and drop*** graphics handling, and offer extra features such as speech feedback. These make good worksheets.

Book Spinner – designed specifically to create and print out personalized books, using a built-in library of pictures and linking to other symbol libraries.

Highly specialized word processors – designed to work with pictures and libraries of communication symbols, such as *Clicker* (*Writer*); *Inclusive Writer*, *Writing with Symbols 2000*. *Inclusive Writer* is more geared to picture support for literacy work, while *Writing with Symbols* is even more specialized and offers symbol support for language and communication work. These can be used in many different ways, not only to create materials but also in direct use by pupils.

Resource Packs of ready-prepared symbol materials – that you simply have to print out. For example, *Print 'n Play* and *Print 'n Communicate* (PCS based game boards and communication charts and chart templates, for use in conjunction with *Boardmaker*).

Dynamic display voice output symbol communication aid programs – that allow printing out of on-screen symbol displays, to make up low-tech symbol communication books that exactly match the pages of the high tech aid. For example, *Talking Screen*, *Winspeak* and *Speaking Dynamically Pro*.

Scenario 23

Mr L. decided to check what grids were available for *Clicker* from the 'Clicker grids for learning' Web site www.clickergrids.com. The site was easy to navigate and he acquired several useful new grids, which he could use directly. He liked the structure of two other grids but not the content. So he downloaded them with the intention of just changing the content.

materials from the 'Clicker grids for learning' Web site

Key skills and equipment

The key skill for the above example is the ability to:

- access the Web and locate useful sites either by typing in the address from a catalogue or newspaper cutting, or by using a search engine

The key equipment is:

- a computer with access to the Web

Resources to support text use

(See also **Unit 2 – Literacy and Recording – Using ICT to support literacy across the curriculum**)

Pupils using text, but unable to use a pencil and paper for writing, may be able to complete worksheets on a computer. Worksheet creation provides an opportunity to differentiate the curriculum for pupils with speech and language difficulties. Remember, though, that some activities may be more sensibly handled with oral answers and scribing.

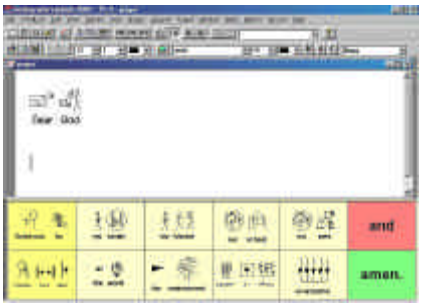
Using templates

For writing activities at any level – and especially for pupils with speech, language and communication difficulties – it is almost always a bad idea for pupils to be faced with a completely blank screen. It is better by far to build their confidence and stimulate their ideas by asking them to write into a prepared template. This should provide a title and useful ***starter*** phrases, accompanied by some interesting pictures or symbols.

Once a worksheet or writing framework page has been created, it should be saved as a template (or ***stationery pad***), so that it is ***locked***. With the original safely stored, the template comes up as a blank, untitled document, ready for use each time it is loaded (e.g. for repeated use, perhaps by many different pupils). Each pupil completes the worksheet and saving their work under their own document name.

Scenario 24

Mrs S.'s class was scheduled to organize assembly the following week, so they talked about what they would want to pray for. The topics raised were put into a grid with *Writing With Symbols 2000;* each pupil wrote their own prayer.



Key skills and equipment

The key skill for the above example is the ability to:

- create a grid and writing environment within *Writing With Symbols 2000*

The key equipment is:

- *Writing With Symbols 2000*

Practical teaching activities

Please choose and complete one or more of the following activities:

1. Audit and catalogue hardware and software resources

   Make an 'audit' of your classroom (or whole school). Identify hardware and software resources already available that could be used to produce picture and / or symbol based resources. Devise a system for listing and categorizing these that makes it easy for staff to find and use suitable ICT resources.

2. Audit and catalogue prepared graphic resources

   Devise a system for storing and cataloguing symbol materials (both in electronic and paper formats) once you have made them, so that staff know what each other have made, know where they are, and can find what they need to use quickly and easily.

3. Preparing graphic resources

   Choose one program from the 'Making materials' section and spend time learning how to make and print out:

   · single symbols (e.g. for a 'Snap' or 'happy families' game)
   · a symbol topic chart (e.g. the weather) or lotto base board
   · a worksheet template

4. Management issues

   Draw up a 'shopping list' for new resources that would be helpful. Identify staff training needs. Identify time-management issues, e.g. allocating time for staff to learn to use the software and – on an ongoing basis – to make materials and support users.

5. Functional use of communication

   Choose a pupil in your class who has a speech and language difficulty. Describe the child's difficulties, using reporting and observational techniques. Describe your plan for developing the child's receptive / expressive communication through one specific activity involving ICT.

6. Software to develop language skills

   Choose two pieces of software you are familiar with – one content-free, the other fixed-content. Describe your use of both with one of the following and critically evaluate the effectiveness of each:

   · a pupil with a speech and language delay
   · a pupil with a specific language disorder
   · an AAC user

7. Inclusion – Signing / symbols

   Describe how you would include a pupil who uses signing or symbols as his primary means of communication into your class. Include information on the teaching techniques and materials used, including photocopies where possible. Give examples of the ICT and AAC materials which you would use to support your work with the child.

8. Integrated software suites

   Review, compare and contrast two or three of the integrated software suites relevant to language and communication. Discuss which type(s) of learner each would be most / least useful for.

OR

   Review one of the integrated software suites relevant to language and communication, and comment on:

   - its suitability for pupils with language and communication difficulties
   - its feasibility as a programme, in a busy classroom
   - how it fits together with other materials, other software, and with curriculum demands.

     e.g. Bio-Bytes, Making Tracks to Literacy, Earobics, InSound, Oxford Reading Tree, Rhyme and Analogy

9. Learning objectives

   Write a profile of a pupil you have worked with, who has language and communication difficulties. Write down your short, medium and long-term targets for this pupil, showing how ICT could be used to support the achievement of these objectives.

10. Sentence building

    Study the examples that come with the software, and then create for a specific pupil that you know, a structured symbol-supported sentence building environment using one or other of Inclusive Writer, Writing with Symbols 2000 or Clicker 4.

    For example, use:

    - a 'sentence starters' grid with a grid of words that might finish sentences off
    - a 'fill in the missing word' grid or jumbled words
    - colour coded grid, etc

    Discuss why you have chosen the layout and vocabulary and sentence structures that you used.
    Try using this with one pupil or a group of pupils. Write a report of how it worked and what you might need to do next.

Appendix 1 – References and Web sites

SEN and ICT

UK centres

ACE Centre: www.ace-centre.org.uk

ACE Centre North: www.ace-north.org.uk

CALL Centre: callcentre.education.ed.ac.uk

Worldwide centres

Adaptive Technology Resource Centre: www.utoronto.ca/atrc/
University of Toronto, creative solutions for users of adaptive technology in education

Closing the Gap: www.closingthegap.com
Information on the annual Closing the Gap conference, articles from the journal and more

Low Incidence Unit: education.qld.gov.au/tal/liu/
Australian site with lots of useful ideas for technology use to help pupils with special needs in education

Special Needs Research & Development Centre, Canterbury Christ Church College of Higher Education; www.canterbury.ac.uk/xplanatory/xplan.htm

Trace Center: trace.wisc.edu
University of Wisconsin, information about AAC software, hardware and assistive technology guidelines

Language and communication

Assessing Communication; Latham C. & Miles A., 1997, David Fulton Publishers

Communication Before Speech: normal development and impaired communication, Coupe J. & Goldbart J.(Eds.), 1988, Croom Helm, London

Developing the foundations of Communicative Competence in Pupils with Severe Physical Disability, MacDonald A. & Rendle C., 1994, in J. Watson (Ed) 'Working with Communication Difficulties', Moray House Publications

Functional Communication in the Classroom, Johnson M., 1991, 1992, Clinical Communication Materials, Manchester Metropolitan University

Individual Education Plans: Speech and Language, Tod J. & Blamires M., 1999, David Fulton Publishers London

Making Communication Special: Chris Abbott, 1999, Ideas and school case studies all involving ICT www.sed.kcl.ac.uk/special/index.html

Teaching Communication Skills to Pupils with Severe Disabilities: Downing J.E., 1999, Paul Brookes Publishing Co., Baltimore

Language and literacy

Special Access to Interactive Literacy (SAIL); Millar S. & Kerr J., 1998, in Augmented Communication in Practise: An Introduction
SAIL video
both available from the CALL Centre. callcentre.education.ed.ac.uk

The Literacy Center: www.the-literacy-center.com
An educational centre that specializes in assisting individuals with their efforts to meet their literacy potential

Useful information for parents and staff

Attitudes and Strategies Towards AAC, Murphy J. & Scott J., 1995, Winslow

AAC Skills Development Package, Lester-Cribb M., 1999, Winslow

Enhancing Communication: Godfrey D., 1999, available from CALL Centre, callcentre.education.ed.ac.uk. A clear and easy to read book introducing AAC to parents and newcomers to the field

Leaflets on a variety of relevant topics; available from Communication Matters – www.communicationmatters.org.uk

YAACK (AAC connecting Young Kids): www.maui.com/~duffy/yaack/b0.html
Introduction to augmentative communication with a number of useful links

Michelle Finds a Voice: Hollins S., & Barnett S., 1997, St Georges Hospital Medical School. Obtainable from Communication Matters. ISBN 1-901242-06-4

33 coloured pictures tell the story of a young women who gets a communication aid. There is a written narrative at the end which tells one possible story to accompany the pictures.

Speaking Up, Speaking Out: Pathways to Self Advocacy, Communication Matters, 1998 – www.communicationmatters.org.uk

Classroom resources

CALL story / symbol pack: available from CALL Centre, story books with repetitive lines, with accompanying symbol charts – also available, Apple Mac version only, on disk and freely downloadable from CALL Centre Web site. callcentre.education.ed.ac.uk

Caroline Musselwhite: aacintervention.com

AAC Intervention with many useful resources

Crick Software Ltd: www.cricksoft.com and www.clickergrids.com

Ideas, downloadable grids and resources created by teachers for Clicker

IntelliTools: www.intellitools.com

Many *IntelliPics* overlays and activities to be downloaded

Linda Burkhart: www.lburkhart.com

Information, on using technology as a tool for education and communication

MAPE: Micros and Primary Education: www.mape.org.uk

Information and software deals

Mayer-Johnson publications: www.mayer-johnson.com

A wide range of highly practical books from North America, some full of ready-made photocopiable symbol topic charts to help with the integration and education of AAC users. Available from Cambridge Adaptive Communication (Possum Controls Ltd).

NCIP: www2.edc.org/NCIP/
Association with lots of useful information, advice on classroom applications, and reviews of software

Special Education Technology, British Columbia: www.setbc.org
Lots of useful downloadable resources for *IntelliKeys*, *Boardmaker* etc.

AAC

Augmentative Communication in Practice: An Introduction, 1998, published by CALL Centre, ISBN 1 898042 03 9; callcentre.education.ed.ac.uk
A straightforward overview of AAC. The sections cover both low-tech and high-tech, assessment and encouraging literacy development and includes sections written by people who use AAC as well as by professionals working in the field.

Communication without Speech: AAC Around the World, Anne Warwick, 1998, published by ISAAC, ISBN 0-9684186-0-0 – available from Communication Matters communicationmatters.org.uk
Highly accessible but very comprehensive introduction to AAC, with lots of practical tips, photographs and illustrations

Management of Severe Communication Disorders in Pupils and Adults: David Beukelman and Pat Miranda (second edition), 1998, published by Paul Brooks, ISBN 1-55766-333-5; www.pbrookes.com

A comprehensive textbook

See also **ACE** and **CALL** Web sites

Autistic Spectrum related Communication Approaches

Information and resources for parents and staff of autistic children - a wonderful cornucopia of pictures, games, cards, blank chart layouts, worksheets, software etc.

www.do2learn.com or www.dotolearn.com

trainland.tripod.com

www.autismuk.com

Voluntary organizations - information about specific approaches to teaching, learning and communication.
National Autistic Society www.nas.org.uk
Scottish Autistic Society www.nas.org.uk/scotland.org.uk
www.autism-in-scotland.org.uk

PECS: The Picture Exchange System Training Manual: Frost L. & Bondy A., 1994, available from Pyramid Educational Consultants: www.pecs-uk.com and www.pecs.com
Lots of information about this specialized use of pictures and symbols with children with communication difficulties associated with autistic spectrum disorders. Also information about products and training courses.

Treatment and Education of Autistic and related Communication Handicapped Children (TEACCH)

This website from University of North Carolina outlines the principles of the TEACCH approach (building up nonverbal thinking, using a visual approach, eg. pictures, colour, location, routines etc.), and provides useful suggestions about resources: www.teacch.com
www.teacch.com/teacchco.htm

General information about autism (and other conditions)
www.familyvillage.wisc.edu/specific.htm
www.oneworld.org/autism_uk

Teaching using symbols and signs

Creating a Communicative Classroom: Carol Goossens, 1999, available from Communication Matters; communicationmatters.org.uk
Many solid, practical, down-to-earth ideas for managing classrooms and making resources

Meldreth Manor School: atschool.eduweb.co.uk/meldreth/
A school site with information about symbols, switch software and techniques for introducing switches and scanning

Symbol Software: Millar S. & Larcher J., 1998, published by CALL Centre, Edinburgh, ISBN 1 898042 12 8; callcentre.education.ed.ac.uk
Review of symbol systems and software that can handle symbols

Using Signing Systems for Communication: Leaflet available from Communication Matters, communicationmatters.org.uk

Widgit Software: www.widgit.com
A hugely informative site with lots of ideas and information for symbol users, with possibility of joining a symbol users' discussion forum

Communication aids (VOCAs)

AAC Device Review: Rumble G. & Larcher J., published by Vocation, 1998, ISBN 0-953375-80-3. Email voca@dial.pipex.com
Comparative review of all communication aids available in the UK

CASC section of Communication Matters, communicationmatters.org.uk
Access to the Web sites of the major suppliers of communication aids (VOCAs) in the UK

AAC Support

Communication Matters: communicationmatters.org.uk
A national charity concerned with the needs of people with severe communication difficulties. It provides information and support through a Web site, a journal three times a year and a friendly yearly conference in September, attended by AAC users and people from all the professions working in this field.

ISAAC: www.isaac-online.org
An international organization linking people interested in AAC throughout the world with a useful Web site giving information about the organization, publications, events, resources and an online forum.

Communication Aids Centres

Other communication aids centres exist but those listed below are some of the larger centres which are operated on a full time basis.

ACS, Charing Cross Hospital, London. Tel. 020 8846 1057 (adults only)

The Wolfson Centre CAC, London. Tel. 020 7837 7618 (pupils only)

Bristol CAC. Tel. 0117 970 1212

ACT Birmingham. Tel. 0121 627 8235

Communicate, Newcastle. Tel. 0191 219 5640

Belfast CAC. Tel. 028 9066 9501 ex 2917

SCTCI, Glasgow. Tel. 0141 201 2619

Appendix 2 – Equipment and suppliers

Software and equipment referred to in the text

AbleNet switches	Inclusive Technology Ltd, Liberator Ltd, Techcess, Semerc
AlphaTalker	Liberator Ltd
Animated Alphabet	Sherston Software Ltd
BIGmack	Inclusive Technology Ltd, Liberator Ltd
Bio Bytes	Widgit Software Ltd, Inclusive Technology Ltd
Blob 1 and 2	Widgit Software Ltd
Boardmaker	Cambridge Adaptive Communication, Inclusive Technology Ltd, Don Johnston Special Needs
Brøderbund Living Books	Inclusive Technology Ltd
Build1	Sensory Software
CALLTalk	The Call Centre
Cameleon	Cambridge Adaptive Communication
Chailey Communication System	Cambridge Adaptive Communication
Chatbox	Liberator Ltd
Chipper	QED
Choices	Widgit Software Ltd, Inclusive Technology Ltd
ChooseIt! Maker	Inclusive Technology
Clicker and associated resources	Crick Software, Inclusive Technology Ltd, Semerc
Co-Writer	Don Johnston Special Needs
Delta Talker	Liberator Ltd
Doodleplus	Semerc
DynaMyte, DynaVox, Dynamo	Sunrise Medical Ltd
Earobics	Don Johnston Special Needs
Eclipse	Morphonics
Eye Pointing Frame	Winslow
Face Paint	Semerc
First Keys to Literacy	Widgit Software Ltd, Inclusive Technology Ltd
Freestyle	Don Johnston Special Needs
Fuzzy mounting Boards	QED
Gateway	Sunrise Medical Ltd
Inclusive Writer	Inclusive Technology Ltd.
Ingfield Dynamic Vocabularies (IDV)	Cambridge Adaptive Communication
InSound	Inclusive Technology Ltd
Kaleidoscope	Inclusive Technology Ltd
Language, Learning and Living (LLL)	Liberator Ltd
Learn More about Words	Inclusive Technology Ltd
Lightwriter	Toby Churchill Ltd

Macaw	Toby Churchill Ltd
Make It Happen	Widgit Software Ltd
Making Sense with Letters	Inclusive Technology Ltd
Making Sense with Words	Inclusive Technology Ltd
Making Tracks to Literacy	Widgit Software Ltd
MathsPad	Inclusive Technology Ltd
Maxess Mountings	Inclusive Technology Ltd, Semerc
MessageMates	Cambridge Adaptive Communication
My World	Inclusive Technology Ltd, Semerc
Naughty Stories	Sherston
Norand	Sensory Software International
One Step Communicator	Inclusive Technology Ltd, Liberator Ltd
Oxford Reading Tree Rhyme and Analogy Activities	Sherston Software
Portacom	Easiaids
Penfriend	Design Concept, Inclusive Technology Ltd
Play mats	(Indoor / outdoor door mats from Poundstretchers etc. at 99p, hooky Velcro sticks to it to provide a toy or symbol environment)
Powerlink	Inclusive Technology Ltd, Liberator Ltd
Quickfire	Crick Software
Reveal	Inclusive Technology Ltd
Sequencer	QED
Simon Sounds it out	Don Johnston Special Needs
Single Message VOCA	e.g. BIGmack, One Step Communicator, Chipper or Talking Buddy – see individual items
Speaking Dynamically Pro	Don Johnston Special Needs
Spider in the Kitchen	Inclusive Technology Ltd
Step-by-Step	Inclusive Technology Ltd, Liberator Ltd
Switch On Travel	Semerc
SwitchIt! Series	Inclusive Technology Ltd
SwitchIt! Maker	Inclusive Technology Ltd
Talking Buddy	Cambridge Adaptive Communication, Techcess
Talking Screen	Cambridge Adaptive Communication
TechTalk communicators	Inclusive Technology Ltd
TechSpeak communicator	Inclusive Technology Ltd
Touch Funfair	Semerc
Touch Games 1 & 2	Semerc
Touch Here!	Inclusive Technology Ltd, Semerc
Unity	Liberator Ltd
Winspeak	Sensory Software, AbilityNet
Write:Outloud	Don Johnston Special Needs
Writing with Symbols 2000	Widgit Software Ltd, Inclusive Technology Ltd

VOCAs

Digitized

Single message VOCAs

BIGmack Inclusive Technology	1 message from large round switch
Chipper QED	1 message from large square switch
One Step Inclusive Technology	1 message from a small, round, angled switch
Talking Buddy CAC	1 message from large round switch

Sequential message VOCAs

Sequencer QED	Sequential messages from a large square switch
Step-by-Step Inclusive Technology	Sequential messages from a small, round, angled switch

Multiple message

AlphaTalker Liberator	4, 8 or 32 locations, direct, switch and optical pointer access. Icon prediction
Barry Box G.B. Ritchie	Robust, 48 key (1-second) messages, keyboard only
Blackhawk Techcess	16 message locations on each of four levels, portable
Chatbox Liberator	16 location, icon prediction, 4 levels, small easily portable
Cassiopeia RSL Steeper	Dynamic screen palmtop with communication software, switch-accessible
Dynamo Sunrise	Small, light, portable, black & white dynamic screen, range of inputs
Eclipse Morphonics	Up to 128 locations on a membrane keyboard, up to 12 levels, range of inputs
Hawk Techcess	A large but light communication aid offering 8 message locations on each of 2 levels
Macaw Toby Churchill	4, 8,16 or 32 locations, up to 32 levels, multiple inputs
MessageMate CAC	A range of robust, slim, portable, membrane keyboards with 1–40 locations, switch accessible
Portacom Easiaids	1, 2, 4, 10, 20 or 40 messages size of location depends on number of messages – portable, switch accessible
Speakeasy AbleNet	12 messages from surface – portable
Spokesman Toby Churchill	1, 2, 4, 8, 16 messages (each as a separate version), size of location dependent on number of messages – portable
Superhawk Techcess	Large, maximum of 120 messages across 72 levels, up to 72 locations on each level
Voicemate Easiaids	4 or 8 messages from surface of small brick or Scanmate for scanning version
Voicepal QED	10 messages from surface – portable

Synthesized VOCAs

Computers

Cameleon 3 CAC	Robust portable computer with a touch screen, wide range of inputs. Designed to be used as a communication aid running one of the applications and vocabulary packages listed below
Norand Sensory International	Very slim, light, touch screen PC
Freestyle Don Johnston	Portable Apple Mac with touch screen

Dedicated communication aids (VOCAs)

Pathfinder Liberator	New Minspeak VOCA combining static and dynamic screen
DeltaTalker Liberator	8, 32 or 128 locations, direct, switch or optical pointer access. Icon Prediction. Vocabulary sets: Unity, Word Strategy, LLL
DynaMyte Sunrise Dynasyms or PCS symbols	Small, light, easily portable, dynamic screen using
DynaVox Sunrise	Dynamic screen device using DynaSyms. Has built in environmental controls
Lightwriter Toby Churchill	Range of twin-screen portable keyboard devices. Word prediction. Also supply switch-accessible systems

Computer based communication applications

Dynamic screen software able to handle symbols

PC

DynaVox 3100 Sunrise	Software which runs on DynaVox / Myte VOCAs, Vocabularies: CALLtalk, Gateway
Talking Screen CAC	Very flexible software, challenging to program, expensive, can handle digitized pictures and video clips. Vocabularies: IDV (PCS) and Chailey Communication System
Winspeak Sensory International	Flexible, inexpensive, can handle digitized pictures. Vocabularies: IDV (PCS and Rebus), Chailey Communication System
Clicker 4 Crick	Flexible, teacher friendly, cheap, other curriculum uses, can handle digitized pictures. Vocabularies: Quickfire (IDV in PCS)

MAC

Speaking Dynamically Pro Don Johnston	Very flexible program, Vocabularies: CALLtalk

Text based

EZ keys CAC	Flexible keyboard and mouse emulation program offering up to ten word predictions. Wide range of inputs accepted
Hands Off! Sensory International	Flexible keyboard and mouse emulation program, can launch other programs. Wide range of inputs accepted
WIVIK Liberator	Keyboard emulation program offering up to five word predictions

Vocabularies

CALLtalk The Call Centre

Chailey Communication System Cambridge Adaptive Communication

Gateway Sunrise Medical

Ingfield Dynamic Vocabulary (IDV) Cambridge Adaptive Communication

Unity Liberator

Stepping Stones Liberator

Language Learning and Living (LLL) Liberator

Appendix 3 – Suppliers' addresses

ACE Centre Advisory Trust
92 Windmill Road
Headington
Oxford OX3 7DR
Tel. 01865 759800
Web: www.ace-centre.org.uk

CALL Centre
University of Edinburgh
Paterson's Land
Holyrood Rd
Edinburgh EH8 8AQ
Tel. 0131 651 6236
Web: callcentre.education.ed.ac.uk

Cambridge Adaptive Communication (Possum Controls Ltd)
8 Farmborough Close
Aylesbury Industrial Park
Stocklake, Aylesbury HP20 1DQ
Tel. 01296 719736
Web: www.cameleon-web.com

Crick Software
35 Chartergate
Quarry Park Close
Moulton Park
Northampton NN3 6QB
Tel. 01604 671691
Web: www.cricksoft.com
www.clickergrids.com

Don Johnston Special Needs
18 Clarendon Court
Calver Road, Winwick Quay
Warrington WA2 8QP
Tel. 01925 241642
Web: www.donjohnston.com

Dudley Controls
10 Peverel Drive
Granby
Milton Keynes
Bucks MK1 1NL
Tel. 01908 640777

Easiaids Ltd
5 Woodcote Park Avenue
Purley
Surrey CR8 3NH
Tel. 020 8763 0203

Inclusive Technology Ltd
Gatehead Business Park
Delph New Road, Delph
Oldham OL3 5BX
Tel. 01457 819790
Web: www.inclusive.co.uk

Liberator Ltd
Whitegates, Swinstead
Lincolnshire NG33 4PA
Tel. 01476 550391
Web: www.liberator.co.uk

Morphonics Ltd
Sharpesmill, White Cross
Lancaster LA1 4XQ
Tel. 01524 848373

Penfriend Ltd
30 Oswald Road
Edinburgh EH9 2HG
Tel. 0131 668 2000
Web: www.penfriend.ltd.uk

Pyramid Educational Consultants, UK, Ltd
Pavilion House, 6/7 Old Steine
Brighton BN1 1EJ
Tel. 01273 609555
Web: www.pecs-uk.com

QED 2000 Ltd
1 Prince Alfred Street, Gosport
Hampshire PO12 1QH
Tel 0870 787 8850
Web: www.qedltd.com

RSL Steeper
Queen Mary University Hospital
Roehampton Lane
London SW15 5PL
Tel. 028 788 8165
Web: www.rslsteeper.com

Semerc
Granada Learning Ltd
Granada Television
Quay St
Manchester M60 9EA
Tel. 0161 827 2966
Web: www.semerc.com

Sensory Software International
26, Abbey Road
Malvern WR14 3HD
Tel. 01684 578868
Web: www.sensorysoftware.com

Sherston Software Ltd
Angel House
Sherston
Malmesbury
Wiltshire SN16 OLH
Tel. 01666 843200
Web: www.sherston.com

Sunrise Medical Ltd
High Street
Wollaston
West Midlands DY8 4PS
Tel. 01384 446688
Web: www.sunrisemedical.co.uk

Techcess Ltd
Unit 12 Willow Park Estate
Upton Lane
Stoke Golding
Nuneaton
Warwickshire CV13 6EU
Tel. 01455 213708
Web: www.techcess.co.uk

Toby Churchill Ltd
20 Panton Street
Cambridge CB2 1HP
Tel. 01223 316117
Web: www.toby-churchill.com

Widgit Software
26 Queen Street
Cubbington
Leamington Spa CV32 7NA
Tel. 01926 885303
Web: www.widgit.com

Winslow Press
Telford Road
Bicester
Oxfordshire OX26 4LQ
Tel. 01869 244644
Web: www.winslowpress.co.uk