Unit 4

Identifying individual needs for pupils with severe & complex difficulties

Acknowledgements

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

All pupils with severe and complex educational needs will have a *Statement* or *Record of Needs*, informing the curriculum appropriate to the pupil.

In practice, they should all have an *Individual Education Plan* (IEP) or individualized curriculum, within which there should be detailed learning objectives, targets, and outcomes. They should all have differentiated or alternative resources and 'special tools' with which to access the curriculum (national or otherwise). The central question is, therefore:

How is ICT relevant to individually focused special needs?

Throughout this Unit the term ICT (Information and Communication Technology) is used to mean specialist computer hardware and software which is relevant to pupils with severe and complex needs. It is also used to include electronic communication aids – devices that are often described as AAC – Augmentative and Alternative Communication aids (see **Unit 3 – Language and communication**). For pupils with severe and complex needs ICT primarily embraces:

- alternative input devices in the form of switches, keyboards, and alternative pointer controls e.g. joysticks and rollerballs

- differentiated or adaptive software

- augmentative and alternative communication aids

Expected outcomes

By the end of this Unit, participants will…

- have an understanding of what ICT means in the context of pupils with severe and complex needs

- have an understanding of the key issues involved in making appropriate ICT choices for pupils with severe and complex needs

- recognize the important role of Individual Education Plans (IEPs) in framing the use of ICT with pupils with severe and complex needs

- have the confidence to include ICT within the learning objectives of an individual pupil

- realize that co-ordinated teamwork lies at the heart of identifying individual needs and securing successful ICT outcomes

- know where to go for help and know what specialist services are available

Key skills covered in this Unit

By the end of this Unit, teachers will…

- be able to participate in discussions regarding the physical, sensory and cognitive abilities of your pupils, which need to be addressed for successful use of ICT – the importance of Teamwork, Planning, and Time are stressed

- be able to suggest a variety of equipment to help a pupil with severe and complex needs to access ICT

- be able to contribute to the planning, writing or updating of your school's ICT Development Plan

- be able to contribute to the sections referring to ICT in Statements or Record of Needs, Annual Reviews or Case Reviews and Individual Education Plans or Individual Curriculum

Accessing the technology

Alternative input devices

Most pupils with severe and complex needs will not be able to use the standard 'QWERTY' keyboard and mouse provided with a typical educational computer. These pupils will almost certainly need significant physical adaptations to be made to their computers if meaningful and effective activity is to take place.

Accessing a laptop computer using a modified joystick

Alternative input devices (see **Units 7** and **8)** range from a membrane keyboard (e.g. IntelliKeys) to a modified joystick or rollerball (e.g. Joystick Plus), or one or more external switches (e.g. Buddy Buttons). Whenever such alternatives are considered, many other 'factors for success' (see below) immediately come into play. Simply providing an alternative input would not bear much fruit for a pupil with severe and complex needs unless these other factors are recognized as central to the process of identifying individual ICT needs.

The IntelliKeys membrane keyboard

A modified joystick (centre right)

Differentiated or adaptive software

The provision of standard, mainstream software, without adaptation, will have little impact on the ICT success of pupils with severe and complex needs. Fortunately, there is a myriad of special needs software which can be adapted or which is already differentiated to suit individual needs. The spectrum ranges from a variety of cause-and-effect software (e.g. *SwitchIt! Maker*) to versatile, alternative frameworks for writing and learning (e.g. *Clicker 3* and *4*). Identifying and, thereafter, tailoring a nucleus of appropriate software (see **Units 1**, **2**, **3**, **8**, **9**,and **10**) is fundamental to successful ICT outcomes in pupils with severe and complex needs.

Remember:

- choose software that will 'grow' with the pupil

- choose software with an appearance, content and degree of difficulty you can adapt

- choose software that is reliable and technically well supported

- do not choose too much software, as a 'little quality' will go a long way!

Example of a SwitchIt! Maker screen (left) and a Clicker 3 screen (right)

Augmentative and Alternative Communication (AAC)

Many pupils with severe and complex needs have significant communication difficulties. As a result they will already have, or they will need, communication aids. Communication aids belong in the classroom! They should not just be the charge of speech and language therapists, used intermittently in therapy or social communication or restricted to specific language sessions. The use of ICT in the form of communication aids (from BIGmacks to DynaMytes) can be a rich resource for learning in general and language development in particular. One should not, of course, underestimate the complexities, skills and resources involved in successfully integrating communication aids into the learning process. But where this is achieved (invariably where teamwork is strong and well co-ordinated), the educational outcomes are also much more successful.

Communication aids belong in the classroom!

Key issues and factors for success

What are the key issues and factors for success, which underpin the identification of individual needs?

In the previous section we identified three important areas of ICT, which are especially relevant to pupils with severe and complex needs. However, making good decisions in these areas is interdependent with other key issues and factors for success. These can be identified as follows:

- physical abilities
- sensory abilities
- cognitive abilities
- chronological age
- ICT Assessment and Review – a Continuum of Need
- teamwork
- funding of equipment
- training and support of pupils, staff, and parents
- time

Physical abilities

This is a good starting point when assessing individual ICT related needs, especially where a physical difficulty impacts on a pupil's performance. Establishing the optimal means and level of physical control provides a concrete baseline from which to progress. It opens doors to other areas of ability. It enables many pupils to experience a quality of independent success they have never before attained. It can reveal levels of cognitive and linguistic ability, which might otherwise be overlooked.

To identify the physical abilities of pupils with severe and complex needs, a checklist of three important principles needs to be completed:

Key issues and factors for success

- seating
- positioning of the user
- positioning of ICT equipment

Seating

In the case of pupils with significant physical disability, optimal seating is critical to the success of introducing and developing ICT skills. The degree of seating support required to maintain a good position is dependent on the pupil's physical abilities. Seating should always be the starting point when identifying individual ICT needs. Even where a pupil uses standard school furniture, a conscious effort should be made to ensure that a good seating position is maintained.

The degree of supportive seating will vary from pupil to pupil and will depend on the pupil's physical abilities (see illustration).

A stylized example of good seating

Above all, the seating system should allow a pupil to concentrate on the ICT activity and the movements required to operate an input device. It should not result in the pupil struggling with the instability of their seating in order to maintain balance and gain some minimal control.

Good seating will:

- ensure that the pupil strikes a keyboard, manoeuvres a joystick, or presses a switch more accurately and consistently

- improve posture

- enable the pupil to achieve *much more* with *much less* effort (reducing fatigue)

Identifying correct functional seating for use with ICT involves collaboration between school staff, therapists (physiotherapists, occupational therapists and speech and language therapists), pupils and parents. Sometimes the seating varies from environment to environment; yet despite this the pupil is expected to use the same ICT! A well co-ordinated, multidisciplinary approach will reduce such anomalies.

Positioning of pupil

The positioning of the pupil is inherently linked with correct functional seating and the appropriate positioning of ICT equipment (see below). With good seating in place fine adjustments can be made to the positioning of the pupil in relation to their ICT activity. This may vary from day to day or from activity to activity. A pupil may require positional adjustments when tired or when moving from a communication aid to a computer. Whatever the case, a simple checklist of questions should be asked from time to time:

- Is the pupil correctly supported and, above all, comfortable?

- Can the pupil easily see the screen or device they are using?

- Is the pupil still able to see and interact with peers?

An example of poor seating

The following adaptations are needed to this seating position in order to achieve maximum control of the computer:

- hip position is poor due to lack of firm back and bottom support

- left tilt of upper body needs to be prevented – this may be achieved by improving back and bottom support

- a slight forward tilt of the upper body from the hips

- a tray to give elbow support

- the foot-rest needs enlarging because his feet slip off

In the powered chair some of the adaptations mentioned above have been addressed. However, further adaptations are needed:

- the temporary cushion, to help with the forward tilt, needs to be replaced with a permanent adaptation

- the tray gives good elbow support but needs enlarging to accommodate his communication chart

- the foot-rest still needs enlarging

Access to ICT equipment

Reliability and consistency of access are important, yet often neglected, areas of ICT intervention. They make all the difference between success and failure, comfort and pain, motivation and fatigue. Once again a number of practical questions can be posed:

Is the ICT equipment (monitors, keyboards, joysticks, switches) in the optimal position agreed by the multidisciplinary team?
This implies correct height of tables, position and angle of monitors, and location within the classroom. It is usually recommended that equipment be placed on height-adjustable tables / trolleys, particularly if a pupil is using more than one seating and positioning system.

Are the pupil's access devices (for example, keyboard, joystick, and switches) reliably, yet flexibly fixed?
With physically complex pupils fine adjustments of position need to be made from time to time. The fixing of input devices needs, therefore, to be solid and robust but not necessarily permanent.

Is the classroom lighting good?
This is a simple but often overlooked question. Reflection of light off computer or communication aid screens, direct sunlight from behind monitors, and poor screen contrast can make life more difficult for pupils with severe and complex needs.

Choice of access

Many pupils will use a variety of input devices during the course of their ICT experience. At times (and with some individuals), these may be used in parallel – perhaps a joystick for 'point-and-click' activities and switches for writing. Alternatively, it may be more appropriate for some pupils to move sequentially from one access device to another – for example, from switches to a modified joystick. This may be due to an improvement in their muscle tone, greater maturity, or higher cognitive abilities. What matters is that there is a consistency of approach and delivery of service to the pupil. This must be based on a clear understanding and mutual agreement about what is most appropriate for the pupil at any instant.

A summary of this philosophy would be this. Look for access, which is…
- preferred (particularly by the pupil)
- easy
- quick
- reliable
- safe – in the sense of not compounding or causing physical difficulties / damage
- successful!

Sensory abilities

Surprisingly, the sensory abilities of a pupil with severe and complex needs are sometimes overlooked. Clearly, what a pupil can hear and see is crucial in deciding whether and how ICT can be a useful augmentative tool. Hearing and seeing require not only the receptors (ears and eyes) to be functional, but also the pathways within the brain to work and make the correct connections. It is these internal pathways that have great bearing on how sight or sound is perceived by the pupil. As with physical ability, the establishment of an agreed baseline is vital. This may involve seeking specialist expertise and making an assessment before decisions relating to ICT can be properly made. Sometimes, however, the use of ICT within the base-line assessment process can in itself reveal important information relating to the sensory abilities of the pupil. An example of this might be the case of a pupil with cerebral palsy and no speech, for whom standardized sensory baseline testing does not reveal any specific visual acuity or perceptual difficulties. In this case the introduction of ICT via a switch or joystick, with some appropriate software, can sometimes reveal a damaged field of vision, a tracking problem or even a visuo-perceptual difficulty.

An example of visuo-perceptual difficulties as demonstrated by a user, who only placed his pizza toppings in the bottom half of his My World screen.
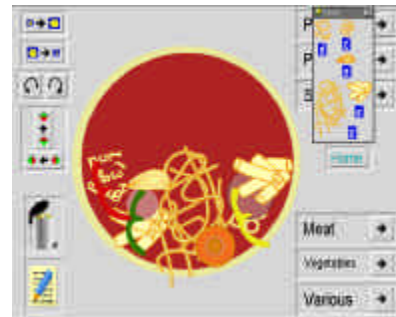
Cognitive abilities

Identifying ICT needs cannot be successful without recognizing and understanding the cognitive abilities of the pupil. Pupils with severe and profound difficulties should have diagnostically detailed assessments of their cognitive abilities in place by the time they start school and, preferably, before ICT is introduced. In some cases, ICT can be successfully used as a supportive diagnostic tool within the cognitive assessment process itself.

Knowing where a pupil sits within the continuum of cognitive ability affects initial and subsequent choices of ICT hardware and software. For example, the decision to introduce one or more switches might depend as much on the cognitive abilities of a pupil as on their physical ability to control these devices. It is sometimes impossible, especially in younger pupils, to separate one from the other.

Choosing hardware

In choosing hardware (in particular, peripheral access devices such as switches and joysticks) two important questions need to be considered:

- ***Does the pupil understand the causal relationship between the access device and the ICT activity?***
  Put simply – when I move my joystick ***forward***, the on-screen pointer will move ***up*** and when I move it ***back***, the pointer will move ***down***. For some pupils such conceptual links will be very confusing, whereas, for more able pupils, the link between 'forward' and 'up' will be intuitively understood. Students with such difficulties may understand pointer control more easily if the joystick is stood on its end, thereby creating a direct link between the movement of the joystick and the movement of the screen pointer.

- *When is it the right time to review and consider a change of hardware input?*
  Pupils with severe and complex needs are always being subjected to change, both planned and unplanned. Change, which is not carefully managed, can be very disruptive, particularly when it is associated with discontinuity. However, change must be considered when things are not working well or when the pupil has been so successful that they have outgrown the original recommendations. A change of device does not necessarily mean using one thing instead of another.

An example of such change introduced 'in parallel' would be a Joystick Plus user, who is cognitively and physically ready to use a keyboard for some simple writing activities. However, in making this transition from joystick to keyboard, they would not wish to abandon their accustomed mode of 'point-and-click' writing. They might continue to use 'point-and-click' for most of their writing but have short periods using a keyboard. Once skillful at using a keyboard they might stop using 'point-and-click'.

On the other hand a switch user may be ready to consider 'row and column' scanning as a much faster but conceptually more involved alternative to 'simple' scanning. In this scenario the change of input method could not effectively be introduced 'in parallel'. Otherwise, huge confusions, both cognitive and physical, would ensue.

Choosing software

The choice of software and the way it is presented (or interfaced) to the pupil will equally depend on that pupil's cognitive abilities. Identifying suitable software for individual pupils is, furthermore, complicated by the many of choices now available to teachers and parents. Here are some helpful tips for avoiding 'software indigestion':

- *Is the chosen software relevant?*
  This may seem an obvious and simple question but one that is worth asking from time to time.

- *What specific learning objective(s) does the software address?*
  Software should rarely be used as a 'time filler', however tempting this might be, even on Friday afternoons! This will only devalue its importance within the overall scheme of things. As with any learning resource, software should be thoughtfully selected and dovetailed into learning objectives where it has the most impact and pertinence.

- *Is ICT an appropriate vehicle for the delivery of a learning objective?*
  Remember that you don't always have to use ICT for the delivery of learning and communication!

- *Is the software flexible in terms of its range of input methods?*
  Some pupils will need to change their input method or even device. Make sure that the chosen software will tolerate this need. Does it enable the pupil to use their preferred method of input (this applies in particular to switch scanning) or will they be asked to accommodate themselves to the software's limitations (see **Unit 8**)?

- *Where appropriate, does the software offer the pupil an opportunity to work independently?*
  Can it build up self-reliance and confidence? There will be times when pupils can work independently of their teacher or LSA but within a secure and successful framework. Such periods of work should be part of a plan for a pupil to work independently, not just as a 'time filler' (see above). Random and unfocused ICT use should be avoided.

- *Will the software allow the pupil to grow and expand at his or her own pace?*
  This is particularly important in the selection of writing or AAC software. While good practitioners will want to adapt content and presentation the more a pupil succeeds and develops, they will also want to do this within a consistent and largely familiar framework. They will not want to buy new software or face frequent upgrades!
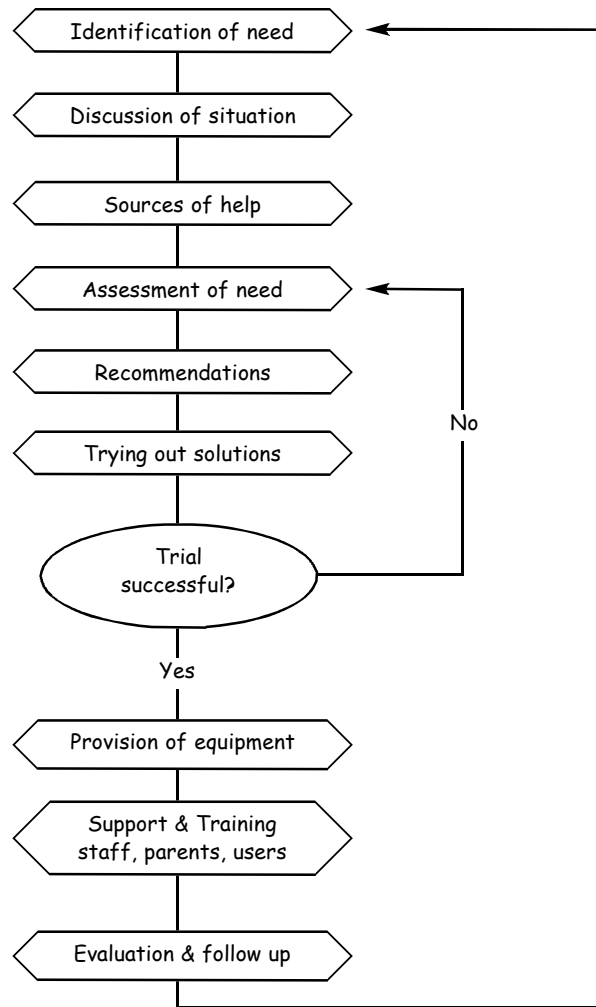
Chronological age

This point requires no real elaboration except to remind us that both the ***chronological*** and the ***developmental*** age are important in defining an appropriate ICT environment for pupils with severe and complex needs. For example, the content of cause-and-effect software will have to be idiomatically very different for an adolescent with severe learning difficulties (see **Unit 5 – ICT resources for pupils with multiple disabilities**) as opposed to a young switch user with no learning difficulties. To avoid this kind of pitfall, ICT decisions relating to age should be regularly reviewed (see below) by teachers, therapists and parents. This applies in equal measure to the review of communication aids.

ICT assessment and review – a continuum of need

A framework for the assessment and review of ICT needs is essential. One example is set out in the diagram below. This could be adapted to suit different situations, environments and resources. An unequivocal process of assessment and review should be in place before a pupil is of school age. Everyone in the pupil's multidisciplinary team should understand and adhere to it. It should be intrinsically linked to the pupil's Record of Needs or Statement, Annual Reviews and Individual Education Plan (see below).

With all reviews a key person should be identified to co-ordinate the often large number of personnel involved in the process. This could, for example, be the pupil's SENCO, Learning Support or Special Educational Needs Teacher, class teacher, therapist or educational psychologist. Where it works effectively, the ICT assessment and review process is invariably rooted in teamwork. This ensures that problems and challenges are widely and openly discussed, and creatively resolved by consensus. In this way a consistency of approach can be promoted to form the backbone for successful outcomes. As the diagram shows, the ICT assessment process should be continuous and cyclical in many of its aspects. There is also an implicit emphasis on the idea of a 'package of needs and support'. This package includes not merely the ICT hardware and software recommendations but the more time-consuming and costly training and support components.

Without the guarantee of these additional components (components that often cause funding agencies anxiety), there is little point in going beyond the point of ***Assessment of Need*** and ***Recommendations*** within the cycle.

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        │  Identification of need │◄──────────────────┐
        └─────────────────────────┘                   │
        ┌─────────────────────────┐                   │
        │  Discussion of situation│                   │
        └─────────────────────────┘                   │
        ┌─────────────────────────┐                   │
        │     Sources of help     │                   │
        └─────────────────────────┘                   │
        ┌─────────────────────────┐                   │
        │    Assessment of need   │◄──────┐           │
        └─────────────────────────┘       │           │
        ┌─────────────────────────┐       │           │
        │     Recommendations     │       │           │
        └─────────────────────────┘       │ No        │
        ┌─────────────────────────┐       │           │
        │   Trying out solutions  │       │           │
        └─────────────────────────┘       │           │
              ╭─────────────╮             │           │
              │    Trial    │─────────────┘           │
              │ successful? │                         │
              ╰─────────────╯                         │
                    │ Yes                             │
        ┌─────────────────────────┐                   │
        │  Provision of equipment │                   │
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        │    Support & Training   │                   │
        │   staff, parents, users │                   │
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        │  Evaluation & follow up │                   │
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The Assessment Cycle

Teamwork

The successful identification and delivery of ICT solutions can only be accomplished within an ethos that recognizes the importance of teamwork. Teamwork is, of course, about 'working together' (ref. Lacey, P. & Lomas, J., Support Services and the Curriculum: A Practical Guide to Collaboration) – a maxim that is easier to adopt than to implement in the hurly-burly of schools and special needs environments! Its implementation is made harder by the fact that a pupil with severe and complex needs is usually surrounded by a multifaceted army of professionals and carers. Typically, this consists of teachers, LSAs, LEA advisers, two or three varieties of therapist, an educational psychologist, parents and close family members – all of whom 'want to help' and all of whom have a stake in the pupil's development.

Effective teamwork requires:

- *Co-ordination*
  A person in the team (usually the Special Needs or Learning Support teacher, SENCO, class teacher, therapist or educational psychologist) needs to be identified and nominated as the pupil's co-ordinator or key worker. Their primary role is to ensure good communication within the immediate team and with local authority agencies (Education, Health, and Social Services). They should encourage active participation in Annual Reviews and case conferences by those responsible for the planning and delivery of ICT in its various forms.

- *Complementary skills*
  Where teams are multifaceted, the skills of individual team members should complement each other in forming a cohesive entity. For example, a multidisciplinary team (consisting of a teacher, a physiotherapist, and a speech and language therapist) will be required to collaborate in identifying optimal seating and positioning, an augmentative communication system and computer-assisted access to learning.

- *Time*
  For teamwork to be successful, time must be allowed for meetings to plan and support a pupil's ICT (see section below).

Funding of equipment

The funding of ICT equipment remains a significant issue despite improvements during the last decade. The funding of ICT equipment and related support is not statutorily guaranteed; so equipment might be funded from a variety of sources, ranging from local authority and school budgets to charities and local, voluntary fund-raising or sponsorship. Many pupils will also be subjected to delay caused by limited budgets. Others will have difficulty finding funds for communication aids from educational budgets (some authorities have set up inter-agency funding budgets to address this anomaly). Therefore, it is important that, where ICT is identified as a crucial component within a pupil's needs, provision is identified within the pupil's Statement or Record of Needs.

Training and support of pupils, staff, and parents

Pupils with severe and complex needs will need ICT environments that are in turn complex and tailored to individual needs. This means that investment in training and support must be considered above and beyond the provision of hardware and software. It is also an ongoing process, as technology relentlessly progresses towards better and greater opportunities. Training and support is much more expensive and time-consuming than purchasing and installing the equipment in the first place. For some pupils, and in some schools, this will imply the provision of additional teacher, learning / classroom assistant, and technician support. Quantifying this is difficult. So much will depend on the individual pupil profile, the type of school or unit, the effectiveness of home / school links, and the quality of the infrastructures within the local authority and health provision. Research and experience has shown that:

Successful outcomes resulting from ICT provision are interdependent with good quality training and well-managed pupil support.

Time

This precious resource is often made the scapegoat within a package of ICT needs and recommendations. The quantity and quality of the time scheduled for ICT can be used as an acid test for ICT service delivery to pupils with severe and complex needs:

- time to plan and meet with colleagues and family members

- time to record and monitor ICT progress

- non-contact time for classroom assistants / auxiliaries and therapists to prepare and adapt ICT resources

School and individual education plans

ICT development plan

All schools should have School Development Plans, which should be annually reviewed. Schools that serve pupils with severe and complex needs should include a convincing and credible ICT Development Plan, based on 'good practice' models. This should describe the purpose and function of ICT within the school's overall educational framework. The ICT Development Plan should include:

- a current position statement on the use of ICT within the school

- the changes and improvements envisaged for the forthcoming year

- a realistic allocation of resources (staffing, time and money) to deliver these intentions

- a commitment to ICT from the head teacher and senior staff

- a shared understanding of aims

- an acceptance that staff development is a priority

Creating this 'culture for success' underpins the whole fabric of ICT service delivery to individuals with severe and complex needs.

An example of an AAC policy statement, embedded within a special school's ICT Development Plan

Augmentative and Alternative Communication (AAC) refers to methods of communication such as signing, symbols, pictures, communication aids and computers. This school recognizes that the ability to communicate, interact and learn within his / her environment is fundamental to the development of the whole child. Much of the child's development – educational, social, emotional, and cultural – takes place through communication.

We, therefore, acknowledge within this policy statement that some of our students will require the use of augmentative or alternative mode of communication. These modes will be specific to the individual. To meet each pupil's needs, full use will be made of a combination of technological equipment (voice output communication aids and computers) and 'low' or 'light' technology systems (symbols, signing, communication books and charts, objects, and pictures).

Principles to follow:

- AAC is the responsibility of the whole school.

- AAC, where appropriate, is integrated throughout the curriculum.

- AAC will be used to acquire the essential life skills of language, literacy and numeracy.

- Staff will themselves use AAC systems (symbols and signing) where appropriate in their interaction with pupils. This will promote the validity of using AAC systems and also establish a 'community of users'.

- Staff will receive initial and on-going training in the use of AAC within their areas of responsibility.

Statement or Record of Need

We have already said that all pupils with severe and complex needs will have a Statement or Record of Needs. If, following a statutory assessment, the school or local authority concludes that a special needs pupil requires a significant piece of equipment (for example, a communication aid, a computer, specialist software or even more ancillary support), then this should be formally identified in the pupil's Statement or Record of Need. Furthermore, if a pupil with severe and complex difficulties needs 'the regular involvement of non-educational agencies' (for example, the Visual Impairment, Hearing or Speech and Language Therapy services), this too should be formally identified.

The pupil's Statement or Record of Need should be a living, 'organic' record, evaluated and, if necessary, emended at each review. It should be a powerful framework for ensuring that a pupil's use of ICT is well defined, implemented and evaluated in terms of learning objectives and outcomes.

Individual Education Plans

The purpose and function of an Individual Education Plan (IEP) or individual curriculum is to inform the teacher, and others working with a pupil, of specific objectives and targets, and how these will be achieved. In the case of pupils with severe and complex difficulties this will usually involve the use of ICT.

ICT within the IEP or individual curriculum

What are the essential characteristics of a good IEP or individual curriculum in which ICT needs are well integrated?

Here are some suggestions:

- *Focus on the specific learning and communication difficulties* of a pupil with severe and complex needs will reveal to what extent ICT is in place already and, more crucially, for what purpose it is being used.

- There should be *an account of what the pupil has already achieved* within their learning objectives and what part, if any, ICT has already played in this process. Do not forget that, for pupils with severe and complex difficulties, initial ICT intervention (this might be in the form of a communication aid or a home computer) should often occur pre-school. This would often be the case where language and communication are receptively or expressively delayed.

- A *set of clear targets* should be achieved over an agreed period of time and within which ICT is integrally placed. An acceptable time period for reviewing IEPs or individual curriculum is termly or half yearly, with the Annual Review determining more long term provision. It is within the target setting of an IEP or individual curriculum that the choice and presentation of software (for example, specific file templates, formats or personalized access settings) can be referred to in considerable detail.

- *Pupils, parents and key, non-teaching personnel* (for example, LSAs, therapists and educational psychologists) should be actively included in identifying how ICT can be integrated into the delivery of learning and communication objectives.

- There should be identification of *local and regional expertise* whence advice can be sought relating to how ICT can enhance the delivery of the learning and communication targets specified within the IEP or individual curriculum.

Finally, here are a few ICT related questions to ask within the context of an IEP or individual curriculum:

- Does the ICT fundamentally address the pupil's priority needs?

- Is the ICT offered really worth the effort of the pupil and their support team?

- Are the targeted learning objectives appropriate to the medium of ICT?

- What outcomes have been achieved with ICT that could not have been achieved just as easily or more easily without it?

- Does the IEP or individual curriculum assist staff to plan and prepare targets of achievement in advance of ICT delivery?

- Has sufficient ICT time (both contact and non-contact) been allocated to staff by the school management?

- Is this ICT time well managed?

- Is the ICT time being used for the benefit of the pupil with severe and complex needs or for the benefit of others?

IEPs or individual curricula that are written with 'purpose and function' will soon reveal where there is a place for ICT. They should contain a summary of a few short-term targets focused on the provision and use of additional resources allocated to pupils with special educational needs. The pupil portraits outlined below may help this process of defining a meaningful role for ICT within an IEP's or individual curriculum's set of learning objectives and targets.

Case study 1 – Sam

Sam is a very able student, who is about to transfer to Key Stage 4 within the context of his local mainstream secondary school. He has a rare combination of athetoid and ataxic cerebral palsy. This severely affects the functionality of all four limbs. Although he has significant speech impairment (dysarthria), there is no need for an augmentative communication system. However, his physical difficulties necessitate the use of assistive technology for all independent recording of work. A combination of a laptop, an external keyboard with keyguard and a specially modified joystick (Joystick Plus) provides Sam with full independence in writing and recording whenever this is appropriate. A range of specialist software (for example, *AccessMaths*) and appropriately selected non-specialist software (for example, *SmartDraw*) complements this suite of hardware requirements. The table below illustrates some key moments in the evolution of Sam's IEP, revised on an annual basis over a two-year period.

Notice how the detail and focus are sharpened as staff become more confident and experienced in defining ICT objectives and targets.

Date	Cross curricular	Targets	Success Criteria	Review comments
1998	ICT	To continue to develop ICT skills	To undertake an additional 1:1 termly training session with an ICT expert	Liaise with SENCo to link training session with normal ICT curriculum slot
		To develop some organizational skills for storing and printing work	To use registration time to organize computer work	Sam will need support to organize
1999	ICT	To develop ICT skills and use the laptop to draw and create scientific diagrams and maps using SmartDraw	To be able to use SmartDraw for work in all subjects, which require drawing and diagrammatic work	We need to investigate whether Sam can use his hardware and software for 'exams'. Can he use SmartDraw and 'autocorrect'? How will he be able to take the spelling component?
		To use the 'autocorrect' facility in Word for abbreviation expansion	Greater usage resulting in an observable increase in the rate of text output	
		To use his laptop in his normal classroom position and only use his more isolated workstation position for organizational and printing work.	Improved quality of inclusion within classroom setting	

Termly, more clearly defined learning objectives would complement and enhance this IEP.

Case study 2 – Peter

Peter is five and half years old and attends a Special School for pupils with severe and profound learning difficulties. He has cerebral palsy. He has no independent mobility and no speech. He shows preferences via facial expressions and uses eye-pointing to choose between two items. The items are presented to him as real objects, photos, pictures or Picture Communication Symbols (PCS). Because of his communication difficulties it has been difficult for his school to fully assess his level of understanding. However, it is felt to be limited.

The first table below shows Peter's 1999 IEP as it relates to ICT. The school had not identified whether the difficulties for Peter in achieving this target were a physical access problem or a cognitive problem and had set a target that would not be meaningful for him. The Annual Review comment (see below) shows the school were beginning to realize that part of the problem was physical. Notice that following a multi-professional assessment at the end of 1999, the IEP for the year 2000 is much more focused. It was decided that at this stage, until Peter had accurate physical control of two switches, it would be more appropriate for him to make choices from photographs and pictures displayed on an E-tran frame.

Date	Cross curricular	Targets	Success Criteria	Review comments
1999	ICT	To use two BIGmacks to make choices	To make a choice within a 5-minute time span	Peter finds using BIGmacks with his hands difficult.
2000	ICT	To use one head switch, to the left side of his head, independently. A picture or photograph of the toy to be activated is to be displayed towards the left side of an E-tran frame. When achieved – to use two head switches with an adult holding the second switch. Pictures or photographs of the toys to be activated are to be displayed on an E-tran frame – appropriately positioned according to the switch being used. Progression of above is to use two head switches to activate two BIGmacks to control someone in a meaningful activity e.g. "go to sleep" and "wake up".	To activate a toy or the tape recorder (with a latching box set on 'timed mode' using one head switch) without a verbal reminder. To activate two toys (or a toy and a tape recorder) by using two head switches, with verbal reminders, and with the adult pointing to the appropriate picture / photograph as to which switch activates which toy. To use two BIGmacks appropriately e.g. if a person is already asleep to say "wake up" and not press "go to sleep" instead.	

Termly review of these learning objectives would enable progression through them for Peter, and ensure all those involved in his learning to monitor progress consistently.

Scenarios

In the following three scenarios the items to be included in an Individual Education Plan (IEP) are shown *emphasized*.

Pupil portrait 1 – Paul

Name:	Paul	IEP Start Date:	
Date of Birth:	(age 6½ years)	Annual Review Date:	
Year Group:	Reception (P1)		
Class Group:	Ms S.	Teacher's Initials: PS	
Target Setting:		Level 1	

Nature of special needs

Paul is just starting the reception year at his local mainstream primary school. He is already a statemented pupil who has a range of complex special needs resulting from his cerebral palsy (in Scotland a pupil like Paul is likely to have a Record of Needs). Paul has excellent, age-appropriate understanding of language. However, he has severe difficulties in speaking (dysarthria). While he sees himself as a speaking person, much of his speech is unintelligible, even to his parents. They only understand a few words he says and then only in context and within a quiet environment. Paul vocalizes 'word and phrase sounds', which for him are linguistically meaningful. This assists him in constructing the form and content of a phrase or sentence.

Paul relies on a sophisticated 'communication book' made up of symbols (PCS), pictures and photographs to enrich his expressive communication. This book, which he has used since he was three, goes everywhere with him.

It was designed and implemented by his speech and language therapist, although responsibility for extending it has been largely taken up by his parents. He now has approximately 500 symbols and words in it. These are divided into sections of topically related vocabulary with 30 symbols and words per page, an alphabet and number page, a Contents Page and an Introduction to his communication system for new conversation partners.

Paul's communication book

Paul tries to initiate conversations, ask simple questions and construct between two and four 'symbol phrases'. He can also spell a few familiar words (for example, 'Paul', 'mum', 'dad', 'drink', 'TV') and choose the initial letter of a few other common words. However, his communication is inevitably abbreviated, and pressured by time constraints and his reliance on his communication book to get complex messages across. Paul has to be patient with his conversation partners, most of whom are inexperienced in talking to pupils with very limited speech production. This has delayed the development of Paul's expressive vocabulary and syntax.

In addition, Paul has severe physical difficulties. As a result he is in a wheelchair and finds grasping and releasing small objects, such as Lego bricks, very difficult. Paul cannot control a pencil or use crayons and felt tips purposefully. This prevents him drawing shapes and figurative pictures or developing any meaningful, pre-handwriting skills such as tracing, patterning or colouring in.

Despite these difficulties, everyone agrees that Paul should be able to follow a normal curriculum within a mainstream school setting. Some allowances and modifications will have to be made to suit his individual needs and slower pace. Paul will be dependent on sophisticated computer-based technology for writing and recording his work. If he is to fulfil his undoubted intellectual and educational potential, Paul will need increasing access to multimedia curricular resources via CD-ROMs and the Web. Although it is hoped that Paul's 'fluent vocalizations' will one day evolve into intelligible speech, there is no guarantee that this will happen.

Contingency plans to augment his existing communication strategies have, therefore, been made. These include the extension of his communication book, particularly for school use, and the purchase of an electronic communication aid.

Prerequisites for ICT success

The following prerequisites are essential if Paul is to make full use of his ICT equipment and communication system. These prerequisites need to be understood and implemented by all those working with Paul, because they are essential for the successful delivery of his learning and communication.

1. Seating and positioning

Paul has recently had his seating reassessed by his wheelchair service. His recent growth spurt has led to some significant adjustments being made to the chair he uses at school. The correctly adjusted seating will enable him to concentrate on the ICT activities he is engaged in. Similarly having a height-adjustable table will ensure that the work surface and computer monitor are at the correct height for Paul. Consequently, his energies and concentration will be focused on the movements required to operate his input devices (see below) accurately, rather than on maintaining balance and position. The correct seating will also ensure good a postural position throughout the ICT activity, thereby reducing long-term damage to his spine and hips. *It is essential that Paul use his wheelchair whenever he accesses his computer or communication system.* Otherwise, his control and accuracy will deteriorate and he will tire quickly. Discussion and review of Paul's seating and positioning will be on-going but will receive particular attention at all his Annual Reviews.

2. Multidisciplinary ICT assessment

Paul attended a regional multidisciplinary ICT assessment at a specialist centre six months before he started school and while he was still at his pre-school nursery. The assessment team included his parents, an ICT adviser, his new class teacher and LSA, the school SENCO, his physiotherapist, and his speech and language therapist. The assessment team recommended that Paul should be equipped with his *own laptop computer, a modified joystick (Penny & Giles Joystick Plus) with an external Buddy Button switch to activate the 'mouse click', and a compact QWERTY keyboard (Cherry) and a keyguard* for occasional access to letters and other keyboard characters. To complement this hardware, an initial core of software *(My World, Clicker 3, Oxford Reading Tree Talking Books)* was also recommended. This will enable Paul to access more independently some important areas of early primary school learning.

(For information on joysticks and switches, see **Units 7** *and* **8**. *For information on the related software, see* **Units 1**, **2** *and* **3***)*

The assessment team also agreed that consideration of a powerful Windows-compatible communication aid to complement Paul's low-tech communication system would be deferred until the second Annual Review. If by then Paul's speech had not improved, this option would be reconsidered. Meanwhile, the purchase and use of a simple, digitized communication aid would provide sufficient augmentative support for extending his communication opportunities.

After trying a number of digitized devices, Paul and his team felt that the robust *MessageMate 40* would suit him and the environment best (the MessageMate 40 is a small, robust, digitized communication aid – see **Unit 3**). This device would be used for specific activities within the school day, for example during literacy and numeracy activities or at lunchtime.

MessageMate communicator

It was stressed that this communication aid would not replace Paul's numerous modes and strategies for 'getting his message across' – his use of some limited *speech, vocalization, gestures*, and above all his well structured and versatile *communication book*.

3. Access

The positioning of all Paul's ICT equipment was thoroughly explored in order to reach the best solutions. This included optimal location of the joystick and switches in relation to his body position as well as the height and distance of the computer monitor in relation to his head and eye movements. A Polaroid photograph of these positions was taken as a visual record and reminder of what worked best on the day of the assessment. This will help to ensure a consistent pattern of intervention and an attention to detail.

4. Teamwork

Paul's multidisciplinary team also discussed in detail '*where*', '*when*' and '*how*' ICT would be used during the school day and at home. A *team co-ordinator* was nominated to ensure that everyone working with Paul would adopt a consistent approach. Where important changes were desirable or necessary, these would be communicated to everyone (including Paul's parents) by the team co-ordinator. It was agreed that significant changes to his ICT use would also be recorded and attached to Paul's IEP for attention at the next Annual Review. The team co-ordinator will also be responsible for encouraging team members to attend subsequent Annual Reviews where key decisions will be made. *A timetable for the team to plan and prepare the details of ICT within Paul's learning goals was outlined*.

Access to the curriculum

This section of Paul's 'portrait' offers one approach to the task of embedding meaningful ICT activities within specific curricular objectives and targets. By way of illustration, the example focuses on incorporating his objectives into the Literacy Strategy used in England and Wales ('The National Literacy Strategy' – DfEE). These targets can be easily translated into literacy activities where the Literacy Hour is not an integral part of the curriculum.

WHAT? Targets in literacy (Reception)

Paul's inability to speak means that the focus of attention should be placed on his expressive language and communication over and above other considerations and priorities. It is crucial that his early and emergent literacy skills should be accelerated. Literacy will become a pivotal tool for face-to-face social, as well as written communication. Within one year Paul should:

- be able to take an active part in the Literacy Hour

- have a basic sight vocabulary of 50+ words (without symbolic embellishments) embedded within familiar print contexts

- have an understanding of simple sentence construction in the form of 'Subject, Verb, Object' together with simple conjunctions ('and', 'because', 'but') and prepositions ('on', 'in', 'under') and to use these in his writing

- have a basic understanding of rhyme, letter sounds and spelling patterns and be able to spell a few personal and familiar words

- be able to write commonly used letters in response to letter sounds and names

- be able to compose simple, meaningful sentences within the context of retelling familiar stories, recounting personal experiences or imaginative stories, or writing simple letters and greeting cards

HOW? – ICT can help to meet these specific targets

(i) Be able to take an active part in a typical Reception Literacy Hour

Shared text work (reading and writing) – whole-class session.

Paul and his LSA will work together to prepare, in advance of the Literacy Hour, messages and overlays for his MessageMate 40. These messages will relate to the books (for example 'Big Books') and various shared texts that will be read and written by the whole class. This structured use of Paul's communication device will enable him to participate on more equal terms alongside his speaking peers.

Shared word work (vocabulary extension, phonics, spelling and grammar) – whole-class session.

Use of Paul's ICT equipment will be of little value within this whole class component of the Literacy Hour. Instead Paul should use his communication book and alphabet board to actively participate in these sessions.

Guided group and independent work (reading and writing) – small group or individual session.

Here Paul has excellent opportunities to develop and consolidate independent skills in reading and writing. Given the complexity of his needs and the time it takes him to complete a task, this session should be planned to link to other literacy opportunities beyond the Literacy Hour. Paul should use his adapted resources and specialist ICT tools, in the form of *Clicker* grids, to assist his independent reading and writing.

Reviewing, reflecting, consolidating – whole class session.

Paul and his LSA will decide what should be programmed into his MessageMate 40 so that he can contribute during this session.

(ii) Have a basic sight vocabulary embedded within familiar print contexts

Use *Clicker* (or similar) and appropriate *My World* (or similar) language resources to provide cloze procedure and other structured activities by which Paul's basic sight vocabulary can be consolidated and extended within a linguistic framework. Symbolic (PCS) or pictorial representations of words should only be used to embellish new and unfamiliar vocabulary. Once learnt, these should be removed to leave only auditory cueing as an optional prompt. Paul also needs extension reading opportunities to consolidate his basic sight vocabulary. Here he will gain from the electronic versions of The Oxford Reading Tree scheme. He can access this reading scheme independently of his LSA when this is appropriate.

(iii) Have an understanding of simple sentence constructions and to use these in his writing

This is a crucial area of learning for Paul, as a pupil with poorly articulated speech whose understanding and experience of language and sentence structure is delayed. Use personalized *Clicker* templates with auditory cueing and, where appropriate, PCS symbols, to construct simple sentences from whole words listed within the *Clicker* grids. Use a colour-coded 'Subject, Verb, Object' framework initially, before extending this to include common prepositions and conjunctions.

(iv) Have a basic understanding of rhyme, letter sounds and spelling patterns and be able to spell a few personal and familiar words

Paul's limited speech deprives him of opportunities to use and practise sound patterns. Compensation for this must be made. *Clicker* templates consisting of sound patterns linked to phonemes (for example, initial 'a–z' letter sounds, 'ch', 'sh', and 'th'), rhymes and simple alliteration can be used to achieve this. Auditory cueing should be digitized (recorded via the computer microphone) as synthesized sounds are ambiguous in this context. The occasional use of rote-based spelling software in the form of *Starspell 2000* could also be considered. Use could be made of Paul's modified keyboard or a *Clicker* alphabet grid to build up further understanding of spelling, based on the high frequency words being taught at Reception.

(v) Be able to hand write

Paul's physical difficulties preclude his ability to hand write. Exercises and activities specifically related to the acquisition of this fine motor skill should be replaced by keyboard familiarity and spelling activities that are either contextually meaningful or, if rote-based, fun to do! This will pay dividends later when the use of a 'QWERTY' keyboard (as opposed to the joystick with on-screen grids of letters and words) will become more important as a computer input device.

(vi) Be able to compose simple and meaningful sentences within the context of retelling familiar stories, recounting personal experiences, or writing simple letters and greeting cards.

Use whole word based *Clicker* grid and *Clicker* document templates to compose short letters and greeting cards to friends and relatives, or produce labels and captions for *My World* 'collage pictures'. Such ICT-based activities will increase Paul's overall independence and enrich his creative writing and linguistic skills. Published *Clicker* resources (some of which can be freely downloaded from the *Clicker* Web site) can be also used or modified to extend his independent reading and writing opportunities.

WHO? – responsibility for ICT

Paul's ICT support will be mainly the responsibility of his LSA and parents, who will need specialist training in its use and potential. Initial familiarization training should, therefore, be consolidated by **biannual, on-site training sessions from the LEA's ICT adviser**. As Paul's team co-ordinator, the school SENCO will be responsible for planning, supervising and monitoring the framework, content and delivery of his ICT activities. In doing this, he will be **supported by Paul's multidisciplinary team** (see above).

WHEN? – to use ICT

To begin with, Paul's use of his computer will be '**little but often**'. His computer should be used primarily to deliver or enrich activities for which it is best designed – activities such as those described above. Likewise, his **digitized communication aid should be used sparingly but with real impact and in situations and contexts for which it is most appropriate** (see above). **ICT equipment should be used only when Paul is mentally fresh and physically relaxed**. In his mind's eye it should always be associated with quality time and successful outcomes. A positive perception of ICT at this formative stage is crucial and will pay dividends at Key Stage Two and beyond.

Learning objectives (learning objectives for Paul are set for a half-term).

(Only those specifically involving ICT, and communication and literacy are itemized below.)

- Paul to spontaneously use his MessageMate to get his message across in pre-planned situations

- Paul to answer and ask questions in the Literacy Hour

- Using *Clicker* grids with whole words, auditory feedback and colour coding, Paul to write simple sentences independently, from a 'Subject, Verb, Object' framework

Pupil portrait 2 – Shoab

Name:	Shoab	AR & IEP Start Date:	
Date of Birth:	(age 7½ years)	Next AR & IEP Date:	
Year Group:	Two		
Class Group:	Mr S.	Teacher's Initials:	JS
Target Setting:		Towards Level 1	

Nature of special needs

Shoab is in Year 2. He has difficulties controlling his movements and has associated moderate learning difficulties. These are due to his having cerebral palsy. Shoab has no recognizable speech but his limited vocalization can be understood by those familiar with him. Shoab has good vision and reasonable head control. He can recognize 50 to 70 Rebus symbols including a number within the context of his early reading books.

For face-to-face communication the Rebus symbols are presented to him four to six at a time on an E-Tran Frame. This enables him to eye-point to the E-Tran frame and make simple choices or communicate needs and feelings. He does not have access to any form of electronic communication aid.

Shoab shows good awareness of his environment and is developing good social and personal skills. He prefers group activity to one-to-one learning. Shoab can listen attentively for ten to fifteen minutes, for example to an interesting story.

Using his Rebus symbols he can recall single key events or characters in the story. He can consistently recognize his own name and the names of his class friends without the help of symbols.

An E-Tran frame with Rebus symbols

In addition, there are some five to ten other words he can read including 'mum', 'dad', and 'Hanif' (his brother). Shoab cannot number-bond to five or match simple objects in a one-to-one correlation. However, he is developing some basic comparative concepts such as 'big' and 'little', 'fat' and 'thin'. He can also receptively recognize some basic geometric shapes such as 'square', 'circle', and 'triangle'. Shoab is unable to control a pencil, crayon or felt tip without hand-over-hand facilitation. He is in a wheelchair.

Prerequisites for ICT success

Seating and positioning

Shoab's seating has recently been replaced because he outgrew his wheelchair insert last year. His new seating now enables him to make effective use of ICT equipment including a simple communication aid. *It is essential that Shoab use this modified seating whenever he accesses a computer or communication aid*. Discussion and review of Shoab's seating and positioning will be on-going, but will receive particular attention at his Annual Reviews.

Multidisciplinary ICT assessment

An interdisciplinary ICT assessment took place soon after Shoab received his new wheelchair insert. The team recommended that Shoab should have *two-switch access to the class computer* together with *a pair of simple One Step digitized communication aids* (the One Step communication aid is a simple, robust, digitized communication aid, see **Unit 3**). It was also flagged up that in the medium-term Shoab would need a more flexible switch-based communication aid such as the Message Mate (see **Unit 3 – Language and communication**).

To complement this hardware a nucleus of *special needs educational software* (*Choices*, *ChooseIt! Maker*, *ClickIt*, and *Writing with Symbols 2000*) was recommended. This software will provide a switch-accessible framework for Shoab to develop and consolidate many aspects of his Towards Level One learning objectives.

(For information on the special needs software, see **Units 1**, **2** and **8**)

find the bus
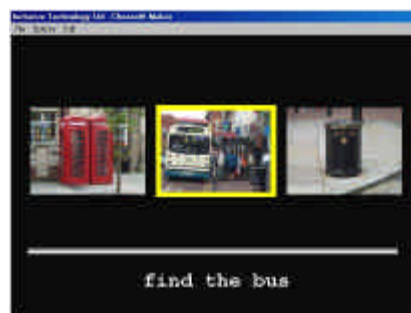
ChooseIt! Maker switch scanning

Access

Shoab has only gross motor control of his hands. This will only enable him to press and release his One Step communicators with any degree of hand control.

To access the computer-based switch software recommended above, when greater accuracy is required, Shoab will need to use *two Tash Cap switches fixed on a mounting system at either side of his head. Universal Mountings* should be used to ensure that fine positional adjustments can be made to these switches at any time during ICT activity. Initially, he will be introduced to *switch scanning* and selecting incrementally (see **Unit 8**).

Tash Cap switches on Universal Mountings, connected to two One Step Communicators

Shoab will need help to learn how to use the head switches. This might be by an adult holding the switches attached to two rulers and moving one close to Shoab's head when he is trying to press it and moving it away to ensure he does not press it accidentally.

A mirror placed in front of Shoab would also help him learn how to use the switches. If he has difficulty in learning the necessary movement, a gentle touch on the side of the head can indicate the movement he needs to make.

Teamwork

Shoab's multidisciplinary team also discussed in detail '*where*', '*when*' and '*how*' ICT would be used during the school day and at home. A *team co-ordinator (his class teacher)* was nominated to ensure that everyone working with Shoab would adopt a consistent approach. Where important changes are desirable or necessary these will be communicated to everyone (including Shoab's parents) by the team co-ordinator. Significant changes to his ICT use will also be recorded and attached to Shoab's IEP for attention at the next Annual Review. The team co-ordinator will also be responsible for encouraging team members to attend subsequent Annual Reviews, at which key decisions will be made.

Access to the curriculum

WHAT? – Pre-level 1 performance criteria (taken from 'Supporting the Target Setting Process' – DfEE)

The performance criteria itemized below are those that Shoab is working towards achieving in the following year.

Language & Literacy (Pages 24 – 29)

Listening / comprehension	Speaking / expression	Reading	Writing
P7	P6	P6 – P7	P5 – P6

Maths (pages 30 – 35)

Number	Using & Applying	Shape, Space & Measures
P5 – P6	P5 – P6	P5 – P6

Personal & Social Development (pages 36 – 41)

Interacting with Others	Independent / Organizational Skills	Attention
P6 – P7	P5 – P6	P5

HOW? – ICT can help to meet the following targets

(i) Language & Literacy

Listening / comprehension and Speaking / expression (P6 – P7)

- Learn to follow instructions.

ICT intervention: Shoab can be asked to go to the school office and deliver a message / collect the register etc. Messages can be put on the One Step communicators, which he must use appropriately in the office.

- learn and use Rebus symbols for 'What?', 'When?', and 'Why?' within meaningful contexts.

 For example, in the context of 'Weather':
 "What is snow?"   "When is it dark?"   "Why is it sunny?"

ICT intervention: Reinforce Shoab's use of simple questioning by sticking symbols on his One Step communicators and recording various questions according to the context of the activity.

Reading (P6 – P7)

- show an interest in stories by answering questions about it.
 "What is your favourite part of the story?"
 "What do you think will happen next?"
 "What animal might be on the next page?"

One Step Communicators programmed with two responses to the questions above – these can be connected to Shoab's head switches

ICT intervention: Using his E-Tran frame Shoab can answer the above questions. These answers can be put on his One Step communicators so Shoab can join in with the rest of the class during group work of the Literacy Hour when, these questions are asked of all the pupils.

- Encourage Shoab to recognize and select words / symbols associated with familiar objects, actions or activities.
- Familiarize Shoab with the shapes and sounds of initial letters associated with words he already recognizes.

ICT intervention: Use a very large three or four-cell *Writing with Symbols* template to contain Rebus symbols (with words) or single letters and digitized speech. Facilitate Shoab's use of the 'scan' (move) switch to auditorily scan each cell. These can be automatically linked to other two to three-cell files when added complexity is needed. A simple template like this will also develop Shoab's understanding of early switch scanning. Use and create appropriate *ClickIt!* templates to scan and read talking books (for example, 'Wellington Square').

A screen from Wellington Square with ClickIt! enabling Shoab to scan the 'speak' and 'turn page' buttons.

Writing (P5 – P6)

- Raise an awareness of how words / symbols are sequenced.
- Produce letters, words and symbols from a small repertoire of familiar vocabulary.
- 'Play and pretend' to write with a random choice of letters, numbers and other characters.
- Use copying, under or over a model, to produce some meaningful print.

ICT intervention: Design document templates into which Shoab can write by adding initial or final words / symbols to simple phrases or sentences. Shoab can auditorily scan (move) and select (facilitated by his LSA) keywords or letters from his three cell grids. Writing with Symbols grids (perhaps, with up to six cells at a time) can also be set up for random 'play and pretend' letter-by-letter writing. The use of digitized auditory scanning will be essential for this activity to have more meaning.

(ii) Maths

Number (P5 – P6)

- Join in familiar number rhymes and songs ("One man went to mow…", "Ten green bottles…").
- Develop an understanding of one-to-one correspondence.
- Rote count to five and use numbers up to five in games and fun activities.

ICT intervention: Use the One Step communicators to join in the rhymes and songs. This will also reinforce the important social skill of turn-taking within a group activity. Use *Writing with Symbols 2000* templates set up for 2-D, one-one-correspondence activities. Use a simple five-cell grid with the scan or 'move' switch to join in with rote counting. Make sure auditory cueing is switched on!

Using and applying (P5 – P6)

- Group or sort objects according to characteristics such as size, colour or shape.
- Copy and begin to create simple patterns and sequences.

ICT intervention: Use *Choices* and *SwitchIt!* resource files to provide a variety of activities to explore the concepts of grouping, sorting and sequencing.

Shape, space and measures (P5 – P6)
- understanding of words / symbols which have positional value (in, on, under, next to)
- comparative awareness (short, tall, shorter, taller, shortest, tallest)

ICT intervention: A number of the *SwitchIt!* suite of programs offer the switch user activities which address these concepts in a stimulating fashion. However, such early learning programs should be used in moderation and always in context.

(iii) Personal & social development

Interacting & working with others (P6 – P7)
- working and playing with another pupil or within a small group
- taking turns
- interacting by responding to the initiation of others
- beginning to initiate, for example by asking a 'What', 'When' or 'Why' question

ICT intervention: Abundant use can be made of Shoab's E-Tran frame and keyword Rebus symbols to discuss what messages to put into the One Step communicators. These messages can then be used to interact, initiate or turn-take in a variety of situations.

Independent & organizational skills (P5 – P6)
- anticipating the next step in a familiar routine or activity
- initiating a desire to be challenged and experience new or untried activities

ICT intervention: Using the E-Tran frame and appropriate symbols, Shoab could anticipate the next activity in the school timetable or the next ingredient in a cake recipe and have appropriate messages programmed into his One Step communicators. Likewise, new symbols and associated One Step messages could be offered to Shoab to encourage him to initiate a wish to try something different or new.

Attention (P5)
- paying attention to others' activities

ICT intervention: While playing near other children his One Step communicator could be programmed with a message such as "Can I see what you are doing?" or "Will you show me your drawing?"

WHO? – responsibility for ICT

Shoab's ICT system (both for communication and education) demands *specialist training* of his LSA, teacher and parents. Initial familiarization training will, therefore, be consolidated by on-site training sessions from the teacher, and speech and language therapist with responsibility for ICT and Communication. The *LEA's ICT advisor* will provide further support when this is requested. Shoab's class teacher will hold overall responsibility for planning, supervising and monitoring the framework, content and delivery of his ICT needs. In doing this, he will be *supported by Shoab's multidisciplinary team* (see above).

WHEN? – to use ICT

Shoab should make *frequent use of his One Step communicators* (see **Unit 3 – Language and Communication**) *in a wide variety of situations*, both at school and at home. Their use should be integrated, wherever possible, with his increasingly successful use of the E-Tran frame and Rebus symbols. For the next year Shoab will not need to have his own computer, as shared and modified access to one of the three classroom computers will be sufficient. However, at the next Annual Review this decision should be reviewed, especially if his understanding and control of early switch scanning progresses well, as is expected. The computer should be used primarily to deliver or enrich activities for which it is best designed – activities such as those described above. As a switch user it is particularly important that the use of ICT be associated with success and adult praise.

Learning objectives

Learning objectives for Shoab are set for a half-term:

(Only those specifically involving ICT are itemized below.)

- Shoab should use his One Step Communicators without prompting and appropriately in familiar situations.

- Shoab should be able to independently, with his head switches, scan and select items in a Living Book.

- In *Writing with Symbols 2000*, with three large cells with whole words, symbols and auditory scanning, Shoab should be able to use his head switches to scan to the correct word and choose it – to be achieved with adult vocal support and encouragement.

Pupil portrait 3 – Stacey

Name:	Stacey	IEP Start Date:	
Date of Birth:	(age 11 years)	Annual Review Date:	
Year Group:	Five		
Class Group:	Mr R.	Teacher's Initials: AR	
Target Setting:		Towards Level 1	

Nature of special needs

Stacey is in Year 5. She has profound and multiple learning difficulties and very little control of her movements. These are due to her having cerebral palsy. She has periodical epileptic seizures. Stacey has no independent movement and no easily recognized form of communication. Her profound cognitive and communicative impairments tend to isolate her from other members of her class. Stacey is difficult to motivate and responds best to one-to-one adult attention. There is empirical evidence that she has significant visual difficulties, although this has as yet not been ophthamologically confirmed. Stacey cannot hold objects and has no formal communication system.

However, she does demonstrate some sensory awareness and facial expression. She responds to stimuli by smiling, crying and vocalizing and has some basic appreciation of cause and effect. Stacey's hearing seems to be normal indicated by her tendency to reach out for objects that make a sound and to turn towards familiar voices. Staff feel that facilitated ICT should be introduced in the form of early environmental and mobility control, auditory stimulation, and cause-and-effect communication.

Prerequisites for ICT success

Access to ICT equipment

Stacey is suitably seated in her *Caps II wheelchair*. There is, therefore, no immediate need to review her seating and positioning. The assessment by her multidisciplinary team has found a *position for a Big Buddy Button switch* that Stacey can press with her right hand with help from an adult. The *physical facilitation* that has been identified as appropriate is support under Stacey's arm. In this position an adult can help Stacey move forwards towards, press and then release the switch. The adults working with Stacey have been instructed that they need to be very sensitive with helping with this movement – feeling for any active involvement from Stacey. When Stacey begins consistently to join in with the movement the adult should then wait till Stacy initiates the movement and with time should reduce the amount of help.

Multidisciplinary ICT assessment

Stacey's multidisciplinary team (teacher, physiotherapist, occupational therapist, and speech and language therapist) has flagged up a number of distinct areas of activity where ICT could be integrated into Stacey's daily programme. Over the next few months ICT will be used to:

- *give Stacey the sensation of independent movement through space*

- *enhance her sense of participation in sensory activities*

- *stimulate her auditory channel*

- *develop early appreciation of cause-and-effect communication*

To achieve this Stacey will have facilitated access to the school's *switch operated Mobility Platform, switch-operated electrical devices (a hairdryer, foot spa, fan, disco lights), music (radio, tape-recorder, rhythm synthesizer, sound beam), and a simple communication device (BIGmack).*

(For information on switch operated devices, see **Unit 8 – The development of switching skills**. For information on communication aids, see **Unit 3 – Language and communication**)

Access

To stimulate Stacey's early appreciation of cause and effect, her access will be *facilitated at all times* as specified above. *Random exploration of ICT-related activities should be discouraged* at this early stage.

Teamwork

Teaching and therapy staff have combined to plan a *programme of activity* involving the use of ICT. *Whenever possible and appropriate this will also be delivered jointly*.

Access to the curriculum

WHAT? – Pre-level 1 performance criteria (taken from 'Supporting the Target Setting Process' – DfEE)

Language & Literacy (Pages 24 – 29)

Speaking and Listening, Reading, Writing

Maths (Pages 30-35)

Number – using & applying, Shape, Space & Measures

Personal & Social Development (Pages 36 – 41)

Interacting and working with others, Independent & Organizational Skills, Attention

In all areas Stacey has achieved P2 of the Performance Criteria and is now working towards P3.

HOW? – to meet these specific targets with ICT

Stacey's educational and communication objectives fall within a cross-curricular, pre-level one set of Early Development Targets. In terms of ICT, this has the effect of blurring the distinctions between 'Language & Literacy', 'Mathematics', and 'Personal & Social Development'.

Give Stacey the sensation of independent movement through space.

ICT intervention: Use the Mobility Platform, with a latching box, on pre-programmed 'routes' to move her through sensorily stimulating and contrasting environments. With facilitation enable her to press a 'tactile' switch (with an auditory click) to move the Mobility Platform towards familiar and comforting voices; through a half closed curtain or beaded screen'; through a Sound Beam; into a Sensation Room with contrasting smells and other sensations such as 'Hot' and 'Cold'.

The Big Buddy Button switch angled to enable the user to 'drive' the pre-programmed Mobility Platform

Enhance Stacey's sense of participation in sensory activities.

ICT intervention: Use a number of different switch-operated battery toys and electrical appliances (see above and **Unit 8**) to heighten her sensory awareness and early understanding of cause and effect.

The Big Buddy Button, angled on a wedge, attached to an electric fan via a CALL Mains Switcher

Stimulate Stacey's auditory channel

ICT intervention: Use radios, tape-recorders, simple rhythm synthesizers, and the Sound Beam to stimulate this channel. Facilitated switch access will ensure a clearer link between cause and effect.

The Big Buddy Button connected to the Soundbeam equipment

Develop in Stacey a formative appreciation of cause-and-effect communication.

ICT intervention: Use BIGmack messages together with Objects of Reference (see **Units 8** and **10**) to begin the process of associating an object and digitized message with a reward or other specific and recognizable outcome. Eating, drinking, singing, tactile playing, music-making are all obvious areas for BIGmack inclusion.

WHO? – responsibility for ICT

Stacey's **class teacher will take responsibility for ICT** and its inclusion in her IEP and Annual Review. A commitment to **training** and technical support will be included in the School Development Plan.

WHEN? – to use ICT

Stacey's limited appreciation of cause and effect requires avoidance of random and unfocused ICT. **ICT should be used meaningfully and sparingly**. There is probably little value at this early stage in using computer-based cause-and-effect software. This is something to be considered at the next Annual Review.

Learning objective

Learning objectives for Stacey are set for a term

- using a switch with adult facilitation under Stacey's arm, during a ten-minute activity (one that Stacey shows she likes) Stacey actively joins in with the forward movement to her switch. (This movement may only be felt by the adult and may not result in actual independent movement but shows that Stacey is beginning to appreciate that she can become involved in controlling the activity.)

Only **one** learning objective specifically targeting ICT has been set for Stacey. Achievement of this will be the starting point for all her future development in this field.

Help! – You are not alone!

Where do I go for specialist services?

Your pupil's difficulties, although rare, are not unique! There are people and organizations that want to help you! Some offer you independent advice; these are listed below. They may be local, regional, national or even international. They can be accessed directly (local ICT advisers, therapists, voluntary support groups) or indirectly (by phone, letter, email, or the Web). Some are briefly described below. Their addresses and other details can be found in Appendix 2 (Contact Addresses).

The ICTS discussion forum

As part of this training programme, ICTS has a Web-conferencing facility on the programme Web site, www.inclusive.net You can make use of this to ask others for information about a specific problem. For more information see **Unit A – Communicating with Colleagues**.

The ACE Centre Advisory Trust

An independent, non-profit-making, assessment, advisory, training and Research & Development service centre for children and young people with severe and complex physical and communicative difficulties, its constituency is the South of England, The Midlands and South Wales.

ACE Centre North

An independent, non-profit-making assessment and advisory service centre for children and young people with severe and complex physical and communicative difficulties, its constituency is the North of England, North Wales and Northern Ireland.

Becta

Becta is a Government-funded agency with a staff of approximately 100 who work to ensure that ICT supports the Government's efforts to drive up standards in curriculum subjects, in the teaching of key skills, in institutional effectiveness, and in the development of lifelong learning. Becta's work is often advisory, developmental and based on partnership with others such as LEAs and the commercial sector. This includes specific work with the Education Departments for England, Wales, Northern Ireland and Scotland. Becta also monitors international developments in ICT.

CENMAC

An independent, non-profit-making assessment and advisory service for pupils with severe and complex physical difficulties, its constituency is the inner London area.

Communication Aid Centres

These are funded by various health trusts. They all offer AAC assessment and information services to adults, children or both. For further details about each contact The ACE Centre in Oxford.

Communication Matters

The UK 'Chapter' of ISAAC, this is an association of all those with an interest in Augmentative and Alternative Communication. The membership consists of AAC users, their parents / partners / carers, speech and language therapists, teachers, psychologists, and many others. The benefits include an annual conference, a quarterly newsletter, membership of ISAAC, access to ISAAC publications, networking opportunities, and many other things besides!

ISAAC

A global association of all those interested in Augmentative and Alternative Communication, the membership is made up of all the national 'Chapters' and individual members. The benefits include a biennial conference, a bulletin, access to many publications, networking opportunities, and many other things besides!

SENCO Forum

This email forum consisting largely of SENCOs and other special-needs professionals. A very active forum providing mutual help and support for all who sign on, it covers the full gamut of special needs issues.

SENIT Forum

This email forum consisting largely of special needs teachers, advisers, and other special-needs professionals. The focus within this forum, as its name suggests, is I(C)T, providing mutual help and support for all who those interested in ICT matters.

Conclusion

"All our pupils deserve to leave school equipped to enter a fulfilling adult life"

(D. Blunkett, 1998)

For many pupils with severe and complex needs ICT, in the form of computers, software and communication aids, will be an essential ingredient in fulfilling this promise. However, ICT cannot be regarded as an end in itself. Wherever pupils find themselves on the physical, cognitive and communication continuum, the principle of weaving ICT into the fabric of learning – at points where it can be most effective – applies.

Finally, and in no particular order of priority, we conclude this part of the Unit with a checklist of ICT 'Good Practice'.

- **I**dentification and frequent review of specific learning objectives

- **C**ontinuity in target setting

- **C**onsistency in intervention practice

- **T**eamwork (that includes the pupil and their family)

- **T**raining and **T**echnical support

- **T**ime to think, plan and prepare

Practical teaching activities

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

1. School development plan

    Imagine this situation. An otherwise excellent OFSTED / HMI Report on your school has highlighted one significant area of weakness – the rather limited and inappropriate application of ICT (including communication aids) right across the school curriculum and within IEPs. OFSTED / HMI notes the absence of an integral ICT Development Plan. Your head teacher asks you to modify the School Development Plan to include an ICT Development Plan as a first strategic step in improving this situation. Mock up parts of a typical SDP with 'before' and 'after' sections that demonstrate the changes you think should be made to the existing SDP.

2. Individual Education Plan / Individual Plan

    Find two or three pupils in your school with IEPs or Individual Plans, in which there is ample opportunity to include ICT within their prescribed targets. Highlight the weaknesses in their existing Plans and what you feel, in terms of ICT, can be done to improve them. Once again, you might like to complete this activity as a 'before' and 'after' exercise.

3. Pupil profile

    Write a pupil profile of a student you have worked with. Identify a specific set of the educational targets and learning objectives for which you think ICT intervention might be appropriate. Describe in detail 'how' this will achieved, 'by whom' and 'when'. Make specific reference to computer equipment, software and communication aids to illustrate your points.

4. Learning objectives (1)

    Write a pupil profile of a student you have worked with. Write the learning objectives for a half-term / whole term (as appropriate), showing how ICT is used to achieve these objectives. Write these in such a way that they may be used by all those (for example, LSAs, parents and volunteers) working with the pupil. Demonstrate how you would keep a record of what the pupil has achieved. As a conclusion, show what the future goals in ICT would be for this pupil.

5. Learning objectives (2)

    Choose and describe six important learning objectives from various parts of the curriculum. These learning objectives could be cross-curricular and appropriate to more than one of your pupils. Research ways in which ICT as defined in this Unit could be creatively and meaningfully applied to these pre-selected learning objectives. Provide details of the hardware and software you have chosen and explain why you have made these specific choices.

6. Access to the curriculum

   Write a pupil profile of a student you have worked with. Choose a curriculum area not already referred to in this Unit (i.e. not Literacy or Numeracy). Write, in some detail, how you would use ICT to help the student access this area of the curriculum.

7. Multidisciplinary team building

   Write a pupil profile of a student you have worked with. Interview the other members of the team who work with this student and find out what contribution they feel they can make to the pupil's ICT needs. Summarize these interviews and then amend the pupil's IEP appropriately.

8. Choosing software

   Imagine this scenario. You are new to a school. The school has limited experience of ICT. You are given a modest budget with which to purchase and establish a core of flexible ICT equipment (computers, communication aids and peripheral access devices) for your classroom. As the budget is limited, the ICT equipment must enable your pupils to grow and expand at their own pace. Write brief profiles of the pupils for whom ICT will be beneficial. Then identify and select the hardware and software you need to make a start. Explain how and why you have prioritized your 'shopping list' in the way that you have, making reference to the pupil profiles and their individual needs.

Appendix 1 – Key resources

Name	Supplier	Unit Cross reference
Battery Toys	Toys for the Handicapped	8
BIGmack	Inclusive Technology, Semerc, Liberator	3
Buddy Button switches	Cambridge Adaptive Communication (CAC)	7 & 8
CALL Box	QED 2000	7 & 8
Cherry keyboard & keyguard	Special Access Systems, Inclusive Technology	7
Choices	Widgit, Inclusive Technology	8
ChooseIt! Maker	Inclusive Technology	8
Clicker	Crick Software, Inclusive Technology	1, 2 & 3
ClickIt	Inclusive Technology	2
E-Tran Frame	Clinical Engineering Consultants Ltd	1 & 3
Jelly Bean Switch	Inclusive Technology, Semerc	7 & 8
Living Books	Inclusive Technology	1 & 2
MessageMate 8 & 40	CAC	3
Mobility Platform	SCOPE	8
Oxford Reading Tree Talking Books	Sherston Software, Oxford University Press	1 & 2
PCS Symbols	Inclusive Technology, CAC, Widgit	1 & 3
Rebus Symbols	Widgit	1 & 3
Joystick Plus	Inclusive Technology, Semerc	7
One Step Communicator	Inclusive Technology, CAC	3
Sound Beam	Soundbeam Project	7 & 8
SwitchIt!	Inclusive Technology	8
Switch Latching Box	Inclusive Technology, QED 2000	7 & 8
Starspell 2001	Fisher-Marriott, Inclusive Technology	2
Tash Cap Switches	CAC	7 & 8
Universal Mountings	Inclusive Technology	7 & 8
Wellington Square	Semerc	2
Writing with Symbols 2000	Widgit, Inclusive Technology	1, 2 & 3

Appendix 2 – Contact addresses

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

ACE Centre North
1 Broadbent Road
Watersheddings
Oldham OL1 4HU
Tel. 0161 627 1358
Web: www.ace-north.org.uk

Becta
Milburn Hill Road
Science Park
Coventry CV4 7JJ
Tel. 024 7641 6669
Web: www.becta.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 Vale Industrial Park
Stocklake, Aylesbury HP20 1DQ
Tel. 01296 719736
Web: www.cameleon-web.com

CENMAC
Charlton Park School
Charlton Park Road
London SE7 8JB
Tel. 020 8 854 1019
Web: www.cenmac.demon.co.uk

Communication Aid Centres
Contact the ACE Centre, Oxford for
details.

Communication Matters
c/o ACE Centre Advisory Trust
92 Windmill Road
Headington
Oxford OX3 7DR
Tel. 0870 606 5463
Web:
www.communicationmatters.org.uk

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

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

ISAAC
See Communication Matters

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

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

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

SENCO Forum
E-mail: senco-forum@ngfl.gov.uk

SENIT Forum
E-mail: senit@ngfl.gov.uk

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

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

Appendix 3 – References

AAC Policy in Schools, Becta, 2000

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Barnes, D. & Coles, C.,, **IT for All: Developing Curriculum and IT Curriculum for Pupils with Severe or Profound and Multiple Learning Difficulties**, David Fulton Publishers, London 1995

Becta, **Connecting Schools, Networking People 2000**, Becta Publications, 1999

Code of Practice on the Identification and assessment of Special Educational Needs, HMSO, 1994

Cook, A.M., Hussey, S.M., **Assistive Technologies: principles and practice**, Mosby, 1995

Early Learning Goals, QCA/DfEE, 1999

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Gains, C., **Collaborating to Meet Special Educational Needs**, NASEN, 1994

Glennen, S.L., DeCoste, D.C., **Handbook of Augmentative and Alternative Communication**, Singular Publishing Group. 1997

Goossens, C. & Crain, S., **Utilizing switch interfaces with children who are severely physically challenged**, Pro-Ed, Austin, Texas, USA, 1992

Goossens, C. & Crain, S., **Communication displays for engineered pre-school environments** Books 1 & 2, Mayer Johnson Company, USA, 1994

Goossens, C. & Elder, P., **Communication overlays for engineering training environments** Books 1 - 4, Mayer Johnson Company, USA, 1996

Goossens, C., **Creating a communicative classroom**, AAC Study Day for Communication Matters & Augmentative Communication in Practice, UK, 1999

HMI, **Interdisciplinary support for young children with Special Educational Needs**, HMSO, 1991

National Literacy Hour, Crown Copyright, DfEE Publications, 1998

National Literacy Strategy, Framework for teaching, Crown Copyright, DfEE Publications, 1998

Supporting the Target Setting Process (1998), Crown Copyright, DfEE Publications, Ref: STSSS

Tod, J., Castle, F. and Blamires, M., **Individual Education Plans: Implementing Effective Practice**, Fulton, 1998

Appendix 4 – Some useful Web sites

ACE Centre – www.ace-centre.org.uk

Independent, non-profit-making assessment and advisory service for children and young people with severe and complex physical and communicative difficulties.

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

Independent, non-profit-making assessment and advisory service for children and young people with severe and complex physical and communicative difficulties.

The Advisory Unit – www.advisory-unit.org.uk

Has considerable experience of special needs. Provides software, training and advice at a regional level.

Becta – www.becta.org.uk

Government-funded ICT advisory agency, which works to ensure that ICT supports the Government's efforts to drive up standards in education.

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

The CALL Centre (Communication Aids for Language & Learning) provides specialist expertise in technology for children who have speech, communication and / or writing difficulties, in schools across Scotland.

CENMAC – www.cenmac.demon.co.uk

Cenmac provides assessment, training and information in the context of children and young people with physical disabilities.

Crick Computing – www.cricksoft.com and www.clickergrids.com

A special needs software company. Best known for its *Clicker* software.

Department for Education and Employment (DfEE) – www.dfee.gov.uk

Government department with the overall aim "to give everyone the chance, through education, training and work, to realize their full potential…"

Inclusive Technology Ltd – www.inclusive.co.uk

Special-needs hardware and software company. Offers a wide range of products plus training.

MAPE – www.mape.org.uk

Micros and Primary Education Web site. Information and software deals.

Meldreth Manor School – atschool.eduweb.co.uk/meldreth/

Ideas and information for symbol users.

NCIP – www2.edc.org/NCIP/

Provides useful information, advice on classroom applications, and reviews of software.

National Grid for Learning – www.ngfl.gov.uk

The national focal point for learning on the Internet with access to "over 5,000 pages of hosted content and 250,000 pages of indexed content."

Semerc – www.semerc.com

Special-needs hardware and software company. Offers a wide range of products plus training.

Widgit Software – www.widgit.com

Special needs software company. Best known for its symbol software, *Writing with Symbols 2000*.