

COMMUNICATION TECHNOLOGY – A VOICE IN THE WILDERNESS?

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"If one has to be disabled, this is the age to be so"

Stephen Hawking 1994

The current availability of sophisticated communication technology has not only revolutionised working practice for speech and language therapists, it has opened up immense possibilities for non-speaking people. The familiar phrase, "We have ways of making you talk" is no longer a cliché. However, many people remain unaware of what is available, appropriate and helpful to those who are unable to produce intelligible speech.

WHAT IS AIDED AND AUGMENTATIVE COMMUNICATION? (AAC)

The concept of aided and augmentative communication is not new. In the 1950s supplements to human speech were available through sign and symbol languages. Today these continue, but combined with technology it is possible to create increasingly dynamic communication systems for even the most physically restricted individual. More, it is possible to give people a voice. The portability of computers and the improvements in voice synthesis have each contributed to communication aids becoming a serious alternative to a more passive "low tech" communication system. For many people the acquisition of a VOCA (Voice Output Communication Aid) has allowed them to convey their innermost thoughts and feelings, even their personalities.

There can be no better example of a successful communication aid user than Professor Stephen Hawking. Recently he stated that, "If one must be disabled, this is the age to be so." To stretch this point a little further the age in which one should ideally be disabled is tomorrow. Communication technology is becoming faster and more powerful, and close to home extensive work in this field is currently being successfully undertaken by MARDIS at Lancaster University.

The implications of such developments have already been recognised and identified by the College of Speech and Language Therapists. The professional and ethical code for working practice, states:

"Given the state of the art regarding development and use of communication techniques there is no non-speaking person too physically handicapped to be able to utilise some augmentative communication system"
Communicating Quality 1990

This document also discusses service delivery, stating that there should be at least one specialist therapist within each district who has a responsibility for provision of an AAC

service. Failing this, there should be, at a minimum, one specialised therapist with an interest in AAC, who could seek further information and advice where necessary.

WHO CAN BENEFIT FROM AAC?

There are many client groups who may benefit significantly from using a communication aid. The most obvious group is those who have severe orofacial dysarthria, typically resulting from cerebral palsy or some form of head injury. Similarly, those who lose orofacial motor control from progressive de-myelinating disorders such as motor neuron disease, multiple sclerosis, Parkinson's disease and so on have found such systems beneficial. For these people, the ability to recall words from a memory store allows them to compile and create sentences and messages which can be spoken out. As words can be encoded symbolically, pre-literate or non-literate people are not prevented from using such a system.

APHASIA

The initial VOCAs which appeared in the eighties were heralded as the solution to aphasia. In practice, however, this client group experienced least success from the use of electronic communication aids. This was probably because the concept of AAC was being applied too widely. Aphasia is not a single condition but a collection of complex language disorders affecting motor programming of articulation and respiration, specific linguistic competence (word recall, sentence formulation, and verbal comprehension) as well as para-linguistic features (motivation and intent). As aphasia can be such a global disorder it is hardly surprising that intervention in the form of a voice substitute was not ideal. More recently there has been growing success in using communication aids with specific types of aphasic patients. Those who have retained literacy skills and who also benefit from a form of therapy called phonemic cuing have found VOCAS useful but not primarily for speaking out a message. Typing the target word with voice reinforcement has enabled clients to recall and physically speak out the word more readily. At present, there appears to be a revival of interest in using AAC devices after cerebrovascular accidents.

LANGUAGE DEVELOPMENT

Perhaps the biggest changes in aided communication are in supporting and stimulating language development in children who are physically unable to speak. It is almost impossible to give an early prognosis as to whether or not a child may develop an acceptable level of intelligible speech. Many parents reject the idea of introducing a communication aid



A young man with something to say



Have you heard the one about ...

fearing that it will prevent the child from speaking, or that therapy to facilitate speech production will not be maintained. It may well be that a delay in motor development will allow the child to develop speech at a later age, but what of language development?

Current research suggests that the inability to produce speech does not imply that the child cannot learn language.

Therefore the early introduction of a communication aid is highly advisable. This will actively prevent a language delay or a language disorder complicating the child's development at a later stage. If the child is deprived of any method of communicating with others, it seems logical that language cannot be consolidated during the natural milestones when the brain is most receptive to this information. Also, social skills and relationships with others rely heavily on communication skills at this time. Many adolescents with congenital disorders show patterns of learned helplessness from the absence of an acceptable method of communication in early childhood.

For some children it may be that the use of a communication device is transient. Research studies in young children having tracheostomies during the first year of life highlight the importance of a physical substitute for speech during crucial ages for language acquisition.

INTRODUCING A COMMUNICATION SYSTEM

The introduction of a communication aid warrants certain considerations, regardless of the type of client involved. This is not an immediate solution, but only the starting point in addressing a potentially severe communication problem. The success of the communication device is likely to be dependent on a number of factors listed as follows:

1. The individual's motivation to use the device
2. Appropriate teaching in use of the device – both for the user and involved carers
3. Appropriate selection of vocabulary for the user
4. Ease of use of the device
5. Speech and language therapy support
6. Maintenance of the system

VOICE OPTIONS

In considering using a communication aid with a client most people focus on the voice. There are two types of voice options on offer, Digital or Synthetic speech. Normally a communication aid will offer one of these, so decisions on voice output may influence the selection of a specific machine. Digital speech is natural human speech which is stored in a microprocessor within the machine. The advantages of having this type of speech are that the voice sounds natural and can be matched appropriately for age, sex or regional accent. One problem is that digital speech needs significant memory space for storage. It is also more suitable for a phrase- or message-based system than for single words. These would sound too fragmented and would lose the natural rhythm of speech if sentences were created using this speech option. Listeners usually express a preference for good quality digitised speech, but users often reject this because it is someone else's voice and not individual enough to suit their own personality.

Synthetic speech, on the other hand, is wholly impersonal computer-generated speech. Initially, voice synthesizers sounded rather robotic and monotonous, but recent developments have enabled synthesizers to sound impressive and comprehensive. The most advanced synthesizer, DECtalk currently offers nine voice types (four male, four female, plus a child). Each of these voices, although they have a mid-West American accent, can be modified or personalised to suit the users.

The strength of voice synthesis lies mainly in its capacity to conserve memory storage. It is possible to store several thousands of entries with synthetic options as well as convert text to speech if the user has good literacy skills. Predictive typing and word processing types of options save effort and fatigue and can successfully speed up the process of communication. Whether using text or word/message recall, the user can create sentences and phrases with naturalistic stress and intonation patterns. Singing can also become a skill as with perfect pitch and timing, the DECTalk synthesizer can sing better than a human voice! Or so it is claimed.

VOCABULARY SELECTION

Vocabulary selection is a crucial issue when it comes to using a communication aid. Often the arrival of the device is regarded as the solution to all problems, when in reality it is usually the beginning. Inappropriate vocabulary selection may lead to lack of motivation and interest on the part of the user, who may well reject the system if it is not perceived as being advantageous. The golden rule is that if a device is not being used, one should first look at the vocabulary stored within it. Speech and language therapists often find it difficult to select vocabulary. The anomaly with AAC work is that word selection by the therapist is not an issue in all other areas of therapy. Traditionally the therapist is involved in facilitating the physical production of speech, given that their client is aware of what they wish to say.

A non-literate client using a VOCA may only use the words and phrases pre-selected by someone else. This is a problem because it is very difficult to predict everything which someone wishes to say! The largest English dictionaries consist of around half a million words, seven or eight thousand of which are said to be in everyday use. A recent study suggested that normal adolescents use about three to five thousand words per day. Communication aids are already able to store several thousand entries, but the selection of these words remains essential to successful use of the device. Research points to provision of a core vocabulary, which sounds ideal, but in practice does not prove to be as useful as one might expect. A core vocabulary needs to be individually tailored to suit the needs of the user if it is to be productive.

For many users and therapists the acquisition of a system is no longer sufficient. With little in expertise and time to set up equipment the emphasis for the development of a variety of linguistic software is being expected from the communication aid suppliers. There is a growing trend that people are more likely to select a system if a language package is available to complement it.

ACCESS

Access to a communication aid remains a further issue, often beyond the brief of a speech and language therapists. It is likely to involve other disciplines such as orthopaedics, physiotherapy and occupational therapy. Isolating a reliable and consistent movement from a severely physically disabled person can be the key to success. Once a switch can be operated it is possible to open up a whole new world of communication, technology and environmental control to enhance a person's lifestyle. It is important to remember that access may change. For someone with a progressive degenerative disorder, initial direct selection may become difficult, and so an indirect method such as switching and

scanning may be used. On the other hand, a young child may develop more accurate and reliable motor control which will allow them to use a keyboard more readily.

FUNDING OF EQUIPMENT

The major problems facing someone who may be interested in using a communication aid are assessment and funding of equipment. There are several national Communication Aid Centres located around the country. Initially these were health service based, but they now have established contractual arrangements for their services with health trusts. Having identified a suitable communication system there is no clear path for acquiring general funding. Such devices can cost between £1,000 and £6,000. Occasionally, through statementing for special education, a child may receive funding for communication equipment which will allow them to access their proposed curriculum. However for the majority of children and adults alike, the coveted communication system is usually gained following a lengthy fundraising or charitable initiative.

LANCASTER UNIVERSITY

Locally, Lancaster University manufactures and develops a communication aid called ORAC. The production of ORAC has been successful enough to encourage the university to turn an initial research project into a business venture known as MARDIS. Here six people are employed in developing and researching a communication system which allows variable access and gives the user choices of both digital and synthetic speech. Back up support and training for therapists, parents, teachers and carers is provided from the MARDIS team. Recently Lancaster has become the national focal point for AAC activity having hosted the National Communication Matters Conference last autumn, and plans to repeat this success in 1995.

Part of the MARDIS success story lies in its philosophy – that communication is a fundamental human right which should be exposed to no commercial exploitation. The aim of the company is to supply competitive technology at realistic prices to allow such equipment to be acquired by those who need it most. A covenant agreement allows a percentage of profits to be channelled back into the university to provide services to students on campus who have a disability. In recognition for this work and its philosophy to help those with a disability, the university has recently been awarded the Queen's Prize. As work on communication systems continues, the outlook for non-speaking people is encouragingly optimistic and should continue to be so in the twenty first century.

FURTHER INFORMATION

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