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## LPV FORUM

# Communication aids for people with aphasia

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In principle, aphasia is a disability to use language. No wonder therefore, that most aphasiologists both in research and in therapy tend to focus mainly on linguistic function. The most prominent symptom of aphasia usually is a deficiency of speech, and many laymen believe that speech exercises should be the therapy of choice, which is not always correct. However, to those suffering from aphasia their disorder first of all means restricted communication and thereby a risk of becoming isolated. Therefore, besides language and speech therapy, people with aphasia have an urgent need of compensations or substitutes for their loss of communication. The number and variation of available communication aids for aphasia is rapidly increasing, mainly because of almost general use of computerized techniques. The following text wants to draw attention not only to software and hardware useful to aiding communication in aphasia, but also to the large amount of helpful information available from the Internet. Last but not least, access to the Internet as such may become an important tool to breaking isolation. A person with aphasia may need special arrangements and support, however, to be able to use her/his computer to this end, e.g. for e-mailing, web-surfing or chatting.

Before the computers came into common use, a number of low-tech devices to aid communication were available. Amongst them may be mentioned letter boards, personal 'passports' for presentation of the owner and information about his/her problem, and photo albums used, for example, to raise new topics in a conversation. Comprehensive so-called communication books are described in detail by Millar (1,2). They may contain generalized picture and/or symbol vocabularies, guidance for

conversation partners, index pages, etc., besides personal material such as photos, drawings, or newspaper cuttings. For different reasons, well discussed by van de Sandt-Konderman (3), low-tech communication aids for people with aphasia have not become very popular. One reason could be that much of the material is designed to suit mainly children or aims foremost at other types of communication problems than aphasia, such as dysarthria (see for example (4,5)).

Unfortunately this seems to be the case also for a number of high-tech communication aids. These are basically machines that can talk, either by a digitized or by a synthesized speech output. Digitized speech may be used to play back previously recorded entire messages. Synthesized speech has a lower quality but is more flexible, so that new messages may be phrased, as long as the user is able to do this and also to master correct spelling. The input to the aids may be indicated either by text or by graphics such as symbols, icons or pictures. The market abounds with this type of devices and the Swedish Institute for Handicap has listed no less than 36 such electrical speech aids (6–9).

High-tech aids specifically designed for aphasia may be divided in disorder oriented, 'prosthetic' systems, aiding specific problems such as those of word finding or sentence construction, and genuine conversation aids aiming at communicative function as a whole (3). Similar to the above mentioned communication books these later aids may be used to fulfil a number of different communicative needs such as presentation, claiming needs, asking questions, raising conversation topics, etc. Typically, these devices consist of a computer showing

pre-stored pictures, icons, symbols or scripts on its screen. By clicking these items (with the mouse or directly on a touch screen) the computer is made 'to talk' by delivering a pre-recorded digital or synthesized speech output, or to change the screen, so it is possible to step forwards or backwards in the program (like turning the pages of a book). Usually two levels in the software may be distinguished. On the author level all the visual graphical and written items may be stored in combination with the auditory recordings, and the entire material may be organized into a logical, often hierarchical structure easing the access of the single items. On the user level the different frames of the program can be made to appear, and the items on each frame may be activated as explained above. In certain software a distinction is made between an author program (sometimes called emulator or designer) and a user program, so it may be possible to accomplish rather similar user programs with different author programs.

Similar software is available, either to be purchased from commercial providers, or as part of common general software packages, or even to be downloaded from the Internet for free. The obvious advantages of such software are the multimedia function of easily combining visual and auditory material. It is also easy to add or change items of the user program, which in this way may be adapted to the needs of individual subjects and changed when necessary. A typical such software is called Touchspeak. It is based on the results of an international EU project, PCAD (Portable Communication Assistant for People with Acquired Dysphasia) (10). Besides the mentioned multimedia functions it includes a hierarchically organized general vocabulary consisting of a large number of pictures and auditory recordings from which individually useful items may be chosen, but it is also possible to include private files (text, images or sounds) into the user program. One experience of the international PCAD project was that it may sometimes be problematic to use multimedia material from a foreign country: a typical beer may be a pint in England but a bottle in Denmark, for instance, and if there is a written label on the Danish bottle, it will have to be translated to be usable in Germany (11). Touchspeak includes other different options like typing, drawing and phonemic cueing. A multi-case study in the PCAD project showed that of 22 persons with aphasia all could learn to use the aid, and 17 continued to use it in every day conversation or in pre-figured situations such as shopping or answering the telephone. Some users did not like the speech output but used the device for preparing certain communicative situations in advance by typing specific messages (3). In combination with different hardware (see below)

Touchspeak is commercially available in the UK, the Netherlands and Germany (12).

A similar software is called 'Gus! Pocket Communicator for Pocket PCs'. It may be purchased as such or in combination with different palmtop computers or personal digital assistants (PDAs). In combination with PDAs the program is provided together with other software, such as a keyboard with word prediction, a symbol set, or a multimedia speech system for MS Windows (13).

Another multimedia system for aphasic persons is called Computerized Visual Communication (C-VIC) (14). It has been developed as a tool both for aphasia therapy and as a communication device; there is a commercial version called Lingraphica (15). The access to its vocabulary is eased by a number of its items being displayed in familiar environments, such as a kitchen with a stove, a fridge, a sink, etc. Images may be combined on a so-called 'storyboard' to construct entire phrases, and personal material may be added to fit individual users. As a complement to ordinary aphasia therapy, the device also contains clinical exercises for articulation, categorization, spelling and naming, etc. It works on a desktop or laptop, the weight of which may restrict its usefulness as a communication aid.

'Resound' is another software combining pictures, sound and writing to aid aphasic communication. Its vocabulary consists of more than 1000 selected words which may be reached from different windows representing specific environments such as a house, a garden, etc., and which may be combined to construct sentences. The software exists in different versions and it works on Windows based PCs (3,16,17).

Some persons with aphasia may find it easier to communicate by complete pre-constructed (spoken and/or written) sentences and utterances to be used in situations they expect to meet, such as visiting their doctor, ordering in a restaurant, starting a telephone call, etc. This need is met by software called ScripTalker, which has a Dutch, an English and a German version. It has a graphical interface with symbols or images for users who are not able to read and it is supplied with a chat mode. It works only on Windows desktops or laptops (18,19). Script Author is an authoring program which facilitates the script development process, so that new 'situations' can be added for individual users. ScripTalker and Script Author were developed in the EU project REACT (20,21).

Digital techniques have revolutionized photography, and presently the number of digital cameras in the market is exceeding that of older equipment which uses film. Pictures may be produced at almost no cost and with no delay, and they may be easily

transferred to many media, from a computer screen to paper prints and to other printed material, to overhead projections, to TV-presentations, and even to T-shirts. No wonder then, that this almost unlimited access to pictures has stimulated their use for aiding communication, according to the saying that one picture can tell more than thousand words. To those with problems of using words, especially the cognitively disabled, the advent of digital pictures has been of great help and in certain cases it has literally meant a new life (22,23). However, handling a large number of images and other digitized material may cause a problem for disabled users, forcing them to depend on a helper and thereby questioning the autonomy which the use of pictures was meant to establish in the first place.

To solve this problem a special database software called Isaac may be helpful. Essentially, Isaac is an ongoing project lasting for more than ten years (24) with the aim of enabling persons with communication problems. The project may be seen as a unique example of a prosperous development based on the continuous and intertwined collaboration between disabled users and technological experts (25). One result of the project is the software, recently accessible on the Internet without cost (26) and in itself representing an implementation of user experiences accumulated over the years. In the software, the user interface is a metaphorical study with a bookshelf on the left including a number of binders and with two tables on the right on which to 'work'. 'Work' means creating so-called picture packages consisting of a picture in combination with (or without) a sound and/or text. The picture packages are put in suitable order on flap-marked pages in a binder. Here they may be easily retrieved as the program has an automatic save function for each most recent operation. The picture packages may be organized and used in many ways more or less like the vocabulary of a communication device. As an option, they may be copied to be used in different connections (i.e., to be sorted into several different binders), and their order may be arbitrarily changed by the user. Furthermore, the pictures may be zoomed in on, to be studied in detail, and they may be combined to create slide shows. In the user interface, the metaphorical study, instructions are not written out in words but an illiterate user may do all the mentioned 'work' without help from others. He may also import pictures from a camera or from the hard disk, or record sounds by just clicking some icons or buttons. Preliminary studies show that Isaac may be successfully used also in cases of aphasia.

An obvious drawback, however, is that Isaac does not work on portable 'pocket' computers, formerly called palmtops and nowadays most often coming as

personal digital assistants (PDAs) and including a number of additional functions besides their basic operational system. Being designed as a smart and powerful portable office for busy professionals on the move, such a device may typically contain functions to manage contacts, send and receive e-mails, exchange data via the internet, etc., and it may be used as a dictaphone, recording and playing back sounds such as spoken messages. Software like the above mentioned Touchspeak or Gus! Communicator is designed to function on a PDA, and typically the software is combined with a PDA into a portable communication aid by the providers. For a communication aid, portability means a clear advantage together with the fact that a PDA as a high tech device gives the owner a certain prestige and does not define him as disabled. Contrary to ordinary computers, a PDA can be used without a keyboard as it is equipped with a so-called touch screen which is activated by contact with a special stylus or even with just a fingernail. Some PDAs may even include a function for handwriting recognition and transformation of the written text into print.

When choosing a PDA to be used as a communication aid one should ensure that the operating time of the batteries and the storage capacity of the computer memory are sufficient. Likewise the recording and especially the play-back facility of the device should be checked carefully. A failing microphone may easily be replaced by an external one, but an insufficient auditory output severely hampers the PDA as a communication aid. To overcome this problem the Gus! devices are also available equipped with a special carrying case or wallet containing an external loudspeaker. Besides the portability and 'smart' looks, a great advantage of the PDAs is that they are flexible and easily given a special configuration to suit individual users. Furthermore, the same device may be used for different tasks and it happens that aphasic persons want to use some of the above mentioned additional options of their PDA besides the communication aid function. Certain portable computers used as communication aids may even work as portable telephones (Gus! SGD Phone). On the other hand, certain portable telephones may be programmed with basic vocabularies to function as communication aids (reference: personal communication from F-J Stachowiak, 2003). So in the field of computerized communication, the difference between everyday personal devices and specialized aids for the disabled are dwindling.

This may be the reason for the lack of public recognition of the fact that it is nowadays easy for a reasonably computer literate person to put together a functioning portable communication aid with

Table I. Equipment to aid communication for people with aphasia.

Name	Technology and function	Special features	Provider
Touchspeak	<i>Complete portable communication aid</i> on PDA with specially developed software. Hierarchical organization of items (text, images, sounds), large item database included. Individual programming eased by special author interface (Designer) for Windows PC.	Software and general function favourably <i>tested</i> in EU project. Available in three languages. Additional features: phonemic cueing, communicative drawing, message bar.	GB: gjb@dial.pipex.com NL: RDG Kompagne, Postbus 310, NL7500 AH ENSCHEDE D: Phoenix Software, Adolf Hombitzer Str. 12, D 53227 BONN
Gus! EasyTalk	<i>Complete portable communication aid</i> on PDA, several various models including portable call phone. Software may be provided separately. Includes so-called Emulator as user interface and eleven different lay-out options for supplied 2500 communication symbols	Keyboard with word prediction and special wallet with sound amplifier available. <i>Versatile</i> as various hardware and software may be combined so suit individual needs and budgets. Useful for people who want other PDA functions besides communication aid.	Gus Communications Inc., 1006 Lonetree Court, Bellingham, WA, 98229, USA
Lingraphica (C-VIC)	Specially developed <i>software</i> , functioning on Windows PC (laptop or desktop). 'Picture galleries' with items in familiar environment, such as e.g. kitchen. Images movable to 'story board' to construct sentences	Large sample vocabulary: 2200 words and communication phrases included. Software aimed not only to aid communication, includes also more than 140 clinical <i>therapeutic exercises</i> for individual training.	Lingraphicare, Inc., 580 Second St., Suite 210, Oakland, CA 94607, USA
Genlyd (Resound) (Phrase-it)	Specially developed <i>software</i> , functioning on Windows PC (laptop or desktop; earlier versions on Macintosh or W 95 not supported). Includes grammatical constructions. Items chosen from action areas can be combined to messages. Special Editing mode as author interface.	Three different versions with increasing complexity. <i>Vocabulary semantically structured</i> with increasing environmental levels (town, house, room, cupboard). Animation of verbs.	C-Innovation Schleppegnellsgade 30, DK 9000 AALBORG, Denmark
ScripTalker	<i>Software</i> , Windows PC (laptop or desktop). Developed in EU project in collaboration with presumptive users. Entire phrases or sentences (scripts) are played back. Scripts are accessed from pictures on (touch-)screen. Author interface called ScriptAuthor.	Specially designed to support simple conversation, delivering typical standard phrases in every-day situations. Aimed at aiding people with total loss of speech to <i>participate</i> in contacts, i.e. to ease pragmatics. Available in Dutch and German.	Department of Applied Computing University of Dundee, DUNDEE, Scotland, UK DD1 4HN
Isaac	<i>Software</i> , Windows PC (laptop or desktop). Developed in collaboration with people with learning difficulties. Functions as very easily handled database. 'Picture packages' (images, sounds and texts) are combined on desks and put into or retrieved from binders. Automatic Save function. Special author interface for more sophisticated programming.	'Picture packages' may easily function as items of a communication aid. Pictures (digital photos) and sounds will have to be imported. Program controls recording from microphone. Slideshows may be constructed and items may be sent as e-mail from the program.	Free download from Internet: <a href="http://www.isaac.certec.lth.se">www.isaac.certec.lth.se</a>
PowerPoint	<i>Software</i> in common use as presentation program. Author interface on Windows PC. Prepared presentation may be transferred to PDA to be used as <i>portable communication aid</i> .	Program often already <i>available</i> and well known to many younger 'helpers'. Presentations may function well as communication aids.	Part of Microsoft program package available from computer providers.

material daily at hand. As software, snapshots from a digital camera may be combined with sound- and text-files in a PowerPoint presentation. This may be transferred to a PDA used as communication aid. The Internet site Afasignal shows such a presentation which includes three short sections, one for presentation, one for asking questions or expressing wishes, and the third containing a vocabulary of two rudimentary hierarchies, food in the fridge, and objects in the kitchen cupboard (27).

PowerPoint presentations and PDAs are commonplace and used by thousands of people nowadays. They are mentioned here to make the point that surprising and conspicuous as it may be, technology as such should not mainly be in focus when it comes to finding suitable computerized communication aids for aphasic persons. Rather the following factors should be stressed:

1. Checking out the communicative needs and difficulties of the client, preferably by thorough interviews, and also involving people near to her/him.
2. Finding an empathetic, dedicated and computer interested helper to personalize the computer software and to update it from time to time. (In this connection it may be pointed out that when choosing the software, the preferences of the helper as to the author interface are rather more important than the looks of the user interface. The latter will be easy to change to suit the individual user, but the former cannot be changed and it may for different reasons be more or less preferred by the helper.)
3. Recognizing that no aid will ever be of adequate help for a user without much initial work and training, which costs a tremendous amount of time. And no aid will have but an augmentative, complementary function; it will never be an alternative being able to fully replace verbal speech.

To conclude, it seems clear that not only special devices but also many items of general computerized electronic communication technology may be of help for aphasic persons. However, the technology is developing so fast, that it is difficult to get an overview and to evaluate different available useful communication systems. World Wide Web portals in the Internet such as aphasiahelp.org, aphasiker.de, hi.se, etc., may offer a great deal information in this field but will in many cases be too difficult to read for aphasic persons themselves.

This leads to a final remark. Even if not an aid, the Internet represents a wonderful tool to overcoming the threatening isolation of communicatively

disabled persons by offering access to web-surfing, e-mailing, or chatting, etc. People too disabled to use these facilities are said to be caught behind a 'digital divide' (watershed). To overcome this, Internet training material for persons with aphasia has been developed in Australia and it is available as a free download from the internet (28,29).

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