

Augmentative Communication News

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UPFRONT

The goal of this issue is to consider the relationship between augmentative and alternative communication (AAC) and the Internet. Some ACN subscribers know a great deal about both topics and have considered how the Internet can benefit people who use AAC, as well as those who support them. Most of us, however, haven't really focused on the Internet as an augmentative communication tool for AAC users (or ourselves).

I'm an embarrassed neophyte. Although I have been using e-mail for several years, I only recently

bought a computer with enough memory and speed to "get on the Web." I was amazed to discover what I've been missing. In preparing this issue I had much help from my colleagues Dagmar Amtmann and Patricia Dowden from the University of Washington and Linda Petty from the University of Toronto. Most of our collaboration was online. See page 8 for a list of **Resources, References** and "sites" to visit. **Clinical News** focuses on some history and a few basics about the Internet. **For Consumers** provides information about how people with various functional limitations access the Internet. **Governmental** (cont. on page 2)



Clinical News

The Internet: What's the big deal?

The Internet has been around since the 1970's. It originally developed out of the U.S. Department of Defense's ARPA network of computers that were interconnected in a variety of ways. In 1984 there were 1000 Internet host computers that were used primarily by scientists and academics.¹

Today there are over 3 million host computers that comprise the Internet. No one (or government) owns the Internet, and an estimated 30 million people from 146 different countries use it. People say the Internet:

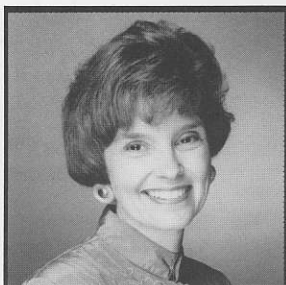
is the most important thing to happen to self expression since the invention of the printing press.²

represents the growth of a new society within the old.³

is the greatest free marketplace of ideas that has ever existed.³

What happened?

In the late 1980's, commercial companies known as Internet service providers (ISPs) proliferated (e.g., CompuServe, Microsoft Network, Prodigy, GENie Net). The real explosion came in the 1990's with the multimedia revolution and point and click access. It all began when Tim Berners-Lee wrote the software that forms the basis of the World Wide Web (WWW). The first WWW server was built by CERN (the European Laboratory for Particle (cont. on page 2)



(UPFRONT *cont. from page 1*)

focuses on my recent trip to Chile and discusses the potential of online communication in areas where AAC is emerging. **University/Research** describes the use of the Internet as a virtual classroom and powerful new educational resource in AAC. Finally, **Equipment** considers accessible Web browsers for AAC users. Today, the Internet is a powerful tool for people with well

developed literacy and computer skills. Unfortunately, many AAC users are not literate and/or do not have access to computers. Also, many AAC professionals do not yet appreciate the Internet. I've learned a great deal in preparing this issue and am convinced that the AAC community needs to be proactive in paving a path to the Internet for AAC users. We need to get online and help others do so.

Thank you for your support of ACN and AS in 1996. We wish each of you a very happy and fulfilling 1997. Please keep in touch. sarahblack@aol.com is my e-mail address. Yes, you can expect to see an ACI web page in 1997.

Sarah Blackstone, Ph.D., CCC-SP

Clinical News (*cont. from page 1*)

Physics).⁴ Servers store the files, or Web pages, that people can access using a computer. The search engines index websites by keywords to make them searchable by all networked computers. Today's sites are becoming progressively richer in graphics, video clips, sound and animation. It's been said that:

In 1990 a few people noticed that the Web might be better than Gopher. But now, with web browsers like Mosaic and Netscape, several million [have] noticed that the Web might be better than sex.⁵

The Internet revolution is exciting, but not for those who are excluded. See **For Consumers** for a discussion.

Reasons to use the Internet

The Internet ignores constraints imposed by time—you can sign on anytime; and space—you can easily and quickly communicate across distances. Also, it makes all kinds of information and

people more accessible. The parent of a child with severe disabilities writes:

I truly value the ability to [get] information at hours that make it possible for me to balance this need with the other demands of family and community.⁶

Today, the primary reasons people use the Internet are: (1) to send and receive electronic mail; and (2) to access the Web.

Electronic mail (e-mail). E-mail is for one-on-one communication and/or for participation in discussions with many participants. Users can send messages locally and across the globe in seconds and transfer computer files (including images and sounds) to friends or colleagues, which they can save to a disk or otherwise manipulate outside of the e-mail context.

Educational institutions often provide free Internet access to faculty and students, and many communities have local e-mail

and Bulletin boards available at no cost. However, most people must subscribe to a commercial Internet service provider (ISP) in order to send and receive e-mail and/or use other e-mail services like those described below:

(a) *Electronic mailing lists or LISTSERVs* distribute e-mail messages automatically to all subscribers' mail boxes. They allow subscribers with similar interests to participate in (or simply monitor) ongoing discussions. To join a LISTSERV you have to send a particular e-mail message to the listserver, a computer that automates the subscription process. To do this successfully, you need to know the LISTSERV address and how to make the request, usually, "subscribe [name of LISTSERV],, then [Your FirstName and LastName.]"⁷ See page 8 for examples.

(b) *Newsgroups or USENET networks* store messages for users with specific interests. They function like an electronic bulletin board; however, messages are not routinely delivered to your e-mail box. To take part in a newsgroup you have to find the address for the group (through a friend, publication or an Internet browser). If the newsgroup resides on the Web, your browser may let you click on a link to get there. If it does not, you may have to contact your ISP for access instructions.⁸

World Wide Web (WWW, the Web). The Web is a multi-modal information system that runs text, sound, graphics and video over the Internet, which multimedia capable desktop systems can display using "plug-in" software programs which run with the browser.⁹ You can get text-only with older, slower computers. Users of the Web are able to search for information, connect with people of similar interests and concerns, take courses, read the newspaper, trade stocks, shop, play games and carry out daily transactions (pay bills, reserve tickets, order clothes). People create their own web pages about their hobbies, lifestyles and places

TABLE I. Gaining access to the power of the WWW
adapted from *Exceptional Parent Magazine* ¹³

COMPUTER	MODEM	SOFTWARE	PHONE SERVICE	INTERNET CONNECTION	WEB BROWSERS
PC Platform: 486 or better 16 MB of RAM; 5MB of Hard disk space; VGA Monitor; Windows 3.1 or 95 Operating system (OS) Mac Platform: 68040 Processing chip or better; 16 MB RAM; 5 MB of Hard disk space; 256k Monitor or better; MacOS 7.1 (or better).	28,800 bits per second (bps) or 33.6 kbps (internal or external)	PPP or SLIP software is needed to connect to the WWW. This can be downloaded from the Internet (or purchased for \$30 US)	Local access numbers to your Internet Service Provider (ISP) are available, or you will need to place a toll call to connect to an Internet service.	Online Services providing access to the Internet include: America Online: 800-827-6364 CompuServ: 800 848-8199 Delphi: 800-695-4005 Microsoft: 800-386-5550 Prodigy Online: 800Prodigy Ask them the questions below	Navigator (\$45US) and Internet Explorer (free w/ Windows 95) make it easier to use the Net. Also available are Lynx, Mosaic, PW Webspeak, DOSLynx.

they live. They can also put their own writing, artwork and music on their Web page.

The birth of the Web turned the Internet—an already powerful communication and research tool—into a popular commercial tool for information exchange, education and recreation, as well as a new way to publish, meet people and advertise. Estimates are that between 1000 and 5000 new people subscribe to the WWW each hour.¹⁰

How to "get on"

The Internet is accessible to anyone who has: (1) a way to read and write text; (2) a computer, modem and communication software; (3) access to a phone line; and (4) an Internet service provider.¹¹

E-mail: To get an e-mail account you just need a computer (almost any unsophisticated computer equipment will do); a modem (any modem and the software provided with it will work) and an ISP provider (consult the phone book and/or the reference desk at your local library.) E-mail services can be free or you can subscribe to basic Internet services for about \$10 US per month.¹² E-mail is useful to literate children and adults. It is a perfect reason to say "yes" to anyone who offers to donate an older computer.

WWW: Gaining access to the WWW requires much more. For full access to Web features, you

need to consider getting a computer that can handle graphics/pictures/video and sound, a very fast modem, software to get connected to the WWW, fast telephone connections (the faster the better) and a web browser like Netscape Navigator or Explorer. See Table I for equipment that will allow you to take full advantage of the Web using PC and Mac platforms.¹³ Even if your system is not sophisticated, you can still access all the text information on the WWW using a text-based browser like Lynx or DOSLynx. Unlike the graphical browsers, however, Lynx has to be installed on the computer system of your Internet provider. Check with your ISP to see if it is available.⁹

Internet Service Provider (ISP):

A monthly charge and sometimes an hourly user fee are common. Before you decide on an ISP, compare the answers you get to the following questions:⁹

- How long have you been in business? How many subscribers do you have?
- Do you include dial-up services (SLP or PPP software), a web browser and e-mail software?
- What is your top dial-up speed? What is your maximum band width?
- What is the subscriber-to-line ratio? Do you have local phone access?
- How many technical support staff do you have? What are your technical support hours?
- What is your cost structure? Start up fee? Time allotment per month? Hourly fee?

- Can you store a personal web page? At what cost? What is the maximum size for a web page?

If you don't have a computer (or want to try before you buy), check out your public library. You might be able to access the Internet free of charge and even gain access to the Web. Also, there are *Electronic Cafes* in some cities that offer Internet-ready terminals for customers, low cost e-mail accounts and access to the Web for a relatively higher fee.¹²

Web surfing. Check it out!

Information that was once limited to space available in professional publications or at conferences and conventions is now available to anyone with Internet access; or to anyone who belongs to a support group or professional organization where one member has that Internet access.⁶

The information available on the Web is truly awesome. Just type in keywords and explore, or go directly to a web site by typing in the address (accurately). Be aware that surfing can be frustrating, especially when sites are unavailable or web pages take a long time (like forever!) to appear. Also, be critical of what you find. Good web pages provide you with lots of information and link you to other websites with related information. You shouldn't believe everything you read (or see) on the Web. Critique each site you visit, and don't forget, "Buyer beware." Examples of AAC related websites are listed throughout the issue and on page 8.



For Consumers

Part I: The challenge of getting online

In many areas of the world, universal access is a growing concern. In fact, legislation in some countries now extends the concept of access well beyond curb cuts and mandates equal access for citizens with disabilities to all parts of mainstream society (e.g., public buildings, transportation, housing, telecommunications and information).

Access to the Internet may not be important for everyone; however, features of e-mail and the World Wide Web (WWW) make the Internet a particularly powerful communication medium for individuals who use AAC. Among the features are:¹⁴

- E-mail allows AAC users to be in touch with others—without someone else being present.
- E-mail allows AAC users to communicate messages without having to “hurry up.” Also, partners do not have to wait for messages to be generated.
- AAC users who choose not to reveal their disability over e-mail report they enjoy establishing relationships with people who experience them first as a person and only later, if ever, as a person with a disability.
- E-mail allows people who have difficulty getting out, or who live in rural areas, to stay in contact with others who have similar interests.
- Chat groups and LISTSERVs can help AAC users share information, solve problems and become effective self-advocates. See Table II for some Do’s and Don’ts in managing online discussions.
- The WWW connects people with similar interests as well as provides ready access to information.
- The Web may ultimately allow AAC users to become more independent and more easily bank, read, research academic papers, make travel plans, etc.

Table II. Guidelines for managing online discussions in AAC

Adapted from Pat Dowden, 1996¹⁶

DO's	DON'Ts
Ask questions about local resources, e.g., Where can I buy/rent? Who knows a lot about? What are some local agencies that might fund?	Don't ask for recommendations of equipment for an individual. AT is successful when technology is selected and customized to fit the individual.
Ask questions about commonly used products, e.g., What are advantages and disadvantages of? How does compare to? Is compatible with?	Don't ask for step-by-step guidance through a problem. List serves are not designed to accommodate ongoing problem solving.
Ask questions about non-local resources for information, e.g. Is there a national bulletin board or forum to discuss? My child has. How can I find other parents who have children with similar problems?	Don't post complaints about local services or vendors. It is better to complain directly to the professional or manufacturer. If you write something negative, say it politely. Rude comments will drive away other network users.
Ask about common problems, e.g., What are rules about aides in the classroom? What should I expect at an IEP meeting? My sister has ALS and is having more trouble speaking, is there anything that can help her?	Don't post urgent problems with equipment. Responses can be slow and local communities are unlikely to have answers to equipment problems. Contact the vendor or manufacturer in question.

- The Internet provides multiple opportunities to read and write. By using the Net, AAC users' literacy skills can improve.

Access to the Internet

Functional limitations can preclude people from using e-mail and/or the Web. In fact, most individuals who use AAC devices and techniques will require special technology and training to use the Internet. Because AAC users often have multiple disabilities, these adaptations usually are complex.¹⁵ For example:

Literacy. A majority of AAC users are not literate and communicate using graphic symbols. Since the Internet is text-based, most people who do not read and write well do not use it. Access is likely to increase because the WWW is graphically based and offers a multi-media environment. AAC users who need some assistance with reading and writing can benefit from using: (1) linguistic prediction software [Scanning WSKE, WIVIK, Co-writer] and coding systems (Liberator, DeltaTalker) to increase intelligibility; and (2) text-to-speech and screen-reading software, which can read aloud from the computer monitor. Programs range from the \$50US SmartVoices (Macintosh only) text-to-speech program, to screen readers that read all menus, dialogue boxes, etc. like Jaws for Windows from Henter Joyce or WinVision from Arctic, for over \$500US.^{7,8,9}

Severe Motor Impairment. Individuals with severe upper extremity problems often rely on a single body part to control a switch to access a computer. They can benefit from: (1) linguistic prediction programs or coding systems to enhance rate and reduce fatigue; (2) ISPs with unlimited Internet access; and (3) browsers and/or assistive technologies that allow for mouse emulation to navigate through web pages.^{7,8,9}

Visual Impairments. Some AAC users have severe visual impairments. They require screen enlargement programs to magnify what is on the monitor, or screen reading programs to read aloud page contents and software functions. Most screen reading software uses the numeric keypad for mouse emulation, however, finding and accessing the hypertext links, scroll bars, toolbars, etc. can be slow and difficult. The programming language of HTML allows authors to add alternative text, or ALT text with each graphic or graphical hypertext link on a Web page, but does not force them to do so. This ALT text can be read by screen readers, or users surfing with images turned off for greater speed. Unfortunately, not all sites include ALT text for images, and few consider the need for text equivalents of animation or videoclips. People with visual problems may require: (1) screen readers and text-to-speech programs; (2) text-based browsers and (3) web pages that have a text description of the graphical, video and sound files.^{7,8,9}

(cont. on page 5)

Part II: Designing accessible Web pages with Dagmar Amtmann

Well-designed web pages increase access. Unfortunately, many web masters and web designers forget there are people with older, slower computers, low speed modems and regular phone lines that access the Web. Also, many don't realize that some people use text browsers. Web publishers can take simple steps to make web pages more accessible.

1. Make link text descriptive (but not too wordy). Because many users set the screen reader software to read the links only, "click here" isn't enough for those tabbing through and hearing the links read aloud out of context. Well designed and descriptive links benefit all visitors to a web page, not just those who use screen readers.
2. Use ALT text (alternative text description) to provide a short

text description of a sound, photograph or image link.

3. Make sure forms can be downloaded, then printed or e-mailed in addition to being completed online.
4. Make sure navigational buttons in graphic form have alternative text tags. If placed at the beginning and end of documents, visitors can find the home page, relevant subdirectory or get help.
5. Use plain backgrounds so people with low vision or visual perceptual problems can easily read the foreground information.
6. Use caution when using tables. Tables are read in a linear fashion by screen readers, so avoid them. If you include one, provide the table (not the whole web site) as a text only document. The link to the text only version should appear above the table.
7. Consider offering a text-only version of web pages. However, be aware that universal design is our goal. We want designers to offer more, not fewer choices. Currently, only tables and frames cannot be programmed in an accessible way without creat-

ing a separate document. Text descriptions of graphics make them accessible and make the site more fun. If a text-only version is offered, viewers should be able to switch back and forth between the graphic and text versions.

In summary, consistency of design, use of universally recognized HTML tags and testing your pages with a variety of browsers and computers will increase accessibility. Join others in insisting that web pages be accessible. We need inclusive systems that are user-friendly, informative and fun to use.

You can learn more about designing for universal access on the Net from:

- The Washington Assitive Technology Alliance: <http://weber/u.washington.edu/~atrc>
- Adaptive Technology Resource Centre: <http://www/pscfpc.gc.ca/>
- Trace Center: <http://www.trace.wisc.edu/world/web/index.html>



Governmental AAC in Latin America

I recently returned from Chile and the lovely west coast of South America—a beautiful country with warm, wonderful people. I was honored to speak at the *Second Iberoamerican Augmentative and Alternative Communication Congress* in Viña del Mar, a resort on the Pacific coast, 120 km from Santiago, the capitol of Chile. Approximately 300 service providers, parents, educators, researchers, engineers, computer scientists and one consumer participated in this exciting event. Delegates came from Latin America (Argentina, Brazil, Chile, Colombia, Paraguay and Uruguay), North America (Mexico and U.S.), Portugal and Spain.

On the first day, Luis Azevedo (Portugal), Carmen Basil (Spain) and Margarida Nunes da Ponte (Portugal) gave a course on AAC. Delegates presented research, clinical reports and poster sessions on days two and three. Coffee breaks offered delegates opportunities to meet others with similar interests. For example, I spoke with some colleagues from Santiago about AAC service delivery issues and the problems others have experienced with center-based service delivery models and mobile vans. I also discussed strategies with a

talented team of professionals and the mother of a young child with AAC needs from Mexico.

Getting Connected

I was surprised to learn how many delegates actively use the Internet. E-mail can make it possible for colleagues to support each other from afar. With e-mail, LISTSERVs and the Web, a clinician or family member who is beginning to learn about AAC, can ask questions and get answers from colleagues around the world.

Latin America is a large, multi-national continent. AAC leaders are taking a collaborative approach to the development of AAC for Spanish and Portuguese speaking people in South, Central and North America. Their Spanish and Portuguese speaking partners in Europe are particularly active and supportive. For example, Carmen Basil has compiled a bibliography of AAC publications in Spanish which is available through ISAAC (the International Society for Augmentative and Alternative Communication).¹⁷ A similar list will soon be available from ISAAC for Portuguese readers. If you'd like to help support emerging AAC in South and Central America, e-mail:

Luis Azevedo pelma@lfa.ist.utl.pt; Jaime Sanchez jsanchez@dcc.uchile.cl; Carmen Basil cbasil@psi.ub.es; or you can e-mail me sarahblack@aol.com
Remember, many people read English so don't feel you have to be able to write Spanish or Portuguese.



University & Research

with Patricia Dowden
Education online

Access to interactive educational experiences with AAC stakeholders and current information are key to improvement of our clinical practices, successful application of AAC technologies and development of collaborative research agendas in AAC. In fact, nurturing the next generation of AAC professionals, educators and entrepreneurs and maintaining the overall health of the field will depend upon information sharing and educational opportunities. Distance education over the Internet and educational resources on the WWW may provide at least a partial answer for the dilemma many face, *i.e.*, taking a course at a university or attending a workshop can involve travel, time, money and considerable pre-planning, which many individuals feel they can not manage to do.

Online education via the Internet can maintain characteristics of a traditional classroom (teachers, students, assignments, exams and grades) without the walls, desks or class times. Instead these courses bring students and faculty together via e-mail and LISTSERV technology. Students from a variety of states and countries can contribute their perspectives to a course, and local AAC teams who are craving education can receive training. The virtual classroom has obvious advantages—overcoming geographical barriers (reaching rural communities) and freedom from personal and professional time constraints (participants sign on when it is convenient). In addition, an online AAC course can have other advantages:

1. It can bring major AAC stakeholders together (service providers, researchers, consumers, manufacturers, family members) from many countries to learn from each other, as well as from faculty. University courses rarely get this mix of individuals and experience.
2. Relationships formed during the course create a virtual community. After it ends, course participants can easily stay connected.
3. Online coursework can bring more expertise and materials to students and can supplement existing on-campus course offerings. University faculty can collaborate with others with complementary expertise, develop a course and then offer it to a broader audience.
4. A virtual course does not provide hands-on experience with AAC devices. However, it can focus on practical problem solving and intervention strategies, which may ultimately determine success with AAC, perhaps even more than technology.

AAC's virtual classroom

At this time, there is only one Internet course in AAC, developed by Patricia Dowden at the University of Washington in Seattle—*Communication Augmentation for Non-Speaking Individuals*.¹⁸ It combines the expertise of Dr. Dowden, with Drs. David Beukelman,

Kathryn Yorkston, Nola Marriner, Pat Mirenda and other lecturers, including AAC users. The course is designed to be a rigorous, 3-credit university course, as well as a lively online community with intense discussion of clinical issues. The focus is on clinical strategies, especially how to take AAC resources and use them to enhance participation in daily activities for AAC users. The intensive portion of the course lasts nine weeks. Each week focuses on a major topic, such as vocabulary selection, participation strategies, motor access and emerging communicators. Students receive four or five e-mail lectures per week and then contribute to an online discussion. For full credit in the course, students must complete three assignments and a final exam online. They also have two written projects focusing on an AAC user of their choice, which must be completed within six months.

The future is now!

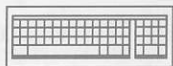
Online technology may well precipitate a rapid expansion of educational resources in at least two ways:

Courses: The number of courses available for many professionals, families and consumers to choose from may increase. Both general courses, similar to that now taught by Dowden *et. al.*, and shorter, more focused courses on narrow, complex topics may emerge. Examples are: a course on literacy issues for young AAC users, a course on vocabulary selection techniques or a course on AAC users in intensive care units.

The WWW. The Web provides powerful tools that enhance our educational resources in AAC. Websites focusing on particular topics may spring up. For example, Dr. Beukelman has considered developing a site on vocabulary selection issues, based on his many years of research on this topic. See <http://129.93.94.121.AAC.html> for a preview of an impressive work in progress. If leaders in the field develop sites in their area of specialization, instructors and professionals around the world could utilize these resources to complement their own teaching, whether traditional or through distance learning technology.

Working together, we can become a stronger, better informed and therefore, a more successful community in our delivery of AAC services. As we explore Internet courses and discover the potential of the WWW, let's also remember to address some of these unanswered questions about online education:

- What learning styles can best be accommodated using the virtual classroom? Which are less well addressed? How can instructors accommodate for diversity?
- Does distance learning allow for things you can't do in a conventional classroom or workshop? What are the most valuable things that are lost?
- What are the best type(s) of activities to assign using distance learning activities?
- How can the outcomes of distance learning activities be best documented, measured and evaluated?
- What are long term outcomes of distance learning activities? How do they compare with other learning environments?
- How can authors and researchers protect their work?



Equipment

with Linda Petty
Access to the Web

This section discusses strategies AAC users may need to "surf" the World Wide Web.¹⁵ As the contents of web pages are increasingly graphical, they are best viewed with web browser software that runs on the graphical user interfaces (GUI) of, for example, a Macintosh or Windows computer system. An AAC user needs to have full mouse emulation for navigation, as well as the ability to enter text for site addresses, forms or e-mail. While the use of graphics and audio clips can be helpful to most people, particularly those with limited literacy, these features pose problems for those with limited hearing or vision. For example:

- Hypertext links, which are connections to other files of information, usually have to be selected by clicking on them with a mouse.
- Some browser functions depicted as buttons do not have equivalent keyboard or menu commands and so require mouse clicks for selection or activation.
- Frames are used to separate areas of a web page. They require mouse selection before the user can access them.
- Additional, free software "plug-ins" such as Live3D, Real-Audio, or Talker are activated as required on web pages and play audio/visual components or 3D animation. These plug-ins generally require full mouse control to operate and offer no text-based feedback of on-screen activity. The control of browser plug-ins via assistive technology will become increasingly more important as they are added to more websites.

Non-graphical, text-based web browsers, such as Lynx and DOSLynx, are available. These, however, will not transmit the content of sites that rely on

graphics, sound and animation. Ideally, AAC users should be able to access a web browser with built-in accessibility, or use popular web browsers with their existing computer access technology. The most recent release of Microsoft Internet Explorer incorporates keyboard equivalents of TAB and SHIFT-TAB to move forward and backward through the hypertext links on a web page. With ENTER, the AAC user can select the link CTRL-TAB, and CTRL-SHIFT-TAB moves the focus between frames on a web page. This allows users of programmable keyboards, Morse code or scan lines to be more effective "surfers." Strong lobbying efforts are being made to add similar features to Netscape Navigator.

Alternative keyboards. Keyboards with built-in mouse emulation and "sticky keys" [e.g., Intellikeys, the TASH Mini and King keyboards] allow users to press the ALT key, then a letter key to access browser menus. Mouse emulators can access button bars and toolbars, but this is slower and more difficult to control than selecting the functions from the menus. Screen size can be optimized by using the menu functions and not showing the button bars and toolbars. Standard Windows keyboard commands such as arrow keys, TAB and SHIFT-TAB, can be used to move through forms. In the Macintosh environment, mouse emulation is sometimes required to move the cursor to select or fill in the appropriate location on a form and to access Netscape hypertext links, or TAB/SHIFT-TAB for Internet Explorer. Netscape can be somewhat slow or frustrating, depending on the user's control of the various keyboard equivalents for mouse movements. However, overlays can be programmed for Intellikeys to allow single key control for accessing menu functions and hypertext links.

Single switch scanning arrays can be created for programmable interfaces such as Ke:nx, to give the user control of menu functions and mouse movements. Several branching menus can be used to give text input for forms or URLs, or for page navigation.

Non-programmable single switch interfaces such as WiViK or EZKeys for Windows can input keystrokes for menu access and text ENTRY. Mouse movement control is still required for selecting an alternative frame of a web page, except when browsing with Internet Explorer. Word prediction is helpful to complete forms or send e-mail.

Morse Code can be used for text input and menu control; however, the effectiveness of the interface is dependent on the effectiveness of its mouse emulation capabilities.

Voice Recognition products vary in their available voice macros for menu access and ease of mouse emulation.

Text-to-speech. Many users benefit from having web page text read to them. Not all web page text is accessible, as products such as Adobe Acrobat post text as a graphic image. However, if the text on a web page is selectable with a mouse, it can be read by a text-to-speech program such as Smart Voices (Macintosh) or TextAssist (Windows), or by a screen reader. Screen reading software varies considerably in the ability to read aloud web pages, particularly when text is broken into columns or by graphics, or with frames.

Visual Enhancements. Web browsers can be configured to display text in preferred sizes, colors and fonts, on preferred background colors. A large monitor is generally required with text enlargement to prevent extensive scrolling or give a page overview. Screen enlargement software programs can run in conjunction with a browser to provide more extensive magnification or magnification of only certain areas of text.

This information was researched by the Adaptive Technology Resource Centre: <http://www.utoronto.ca/atrc/> and the Diversity Management Directorate, Public Service Commission: <http://www.psc-cfp.gc.ca/> Check out their website to learn more about:

- keyboard equivalents for some of the most popular web browsers;
- strengths and weaknesses of some adaptive technologies in controlling browser functions
- customization required for effective use of enabling technology products with identified web browsers.
- glossary of assistive technology and web terminology and a user comments section complete the sites.

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⁸ Dagmar Amtmann. (December, 1996). Personal communication.

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¹¹ Amtmann, D. & Dowden, P. (August, 1996). Think globally, network locally: Developing online communities to make a difference. Presented at the 7th Biennial Conference of the International Society for Augmentative and Alternative Communication. Vancouver, B.C.

¹² Patricia Dowden. (October, 1996). Personal communication.

¹³ Perry, B. (1996). Got what it takes to get online? *Exceptional Parent*. 26:11, 38-43.

¹⁴ Dowden, P. (August, 1996). Top ten reasons to use the Internet/WWW. Handout at the 7th Biennial Conference of the International Society for Augmentative and Alternative Communication. Vancouver, B.C.

¹⁵ Petty, L. (August, 1996). Access to the WWW. Presented at the 7th Biennial Conference of the International Society for Augmentative and Alternative Communication. Vancouver, B.C.

¹⁶ Dowden, P. (1996). How to use the online discussion forums in AT/AAC. Available from author.

¹⁷ ISAAC, P.O. Box 1762, Station R, Toronto, Ontario, Canada M4G4A3. Phone: 905-737-9308; Fax: 905-737-0624; e-mail liz_baer@mail.cepp.org

¹⁸ For more information about Dowden's AAC course (SPHSC C453

Website accessibility: Bobby can help!

Bobby is a product developed by CAST (the Center for Applied Special Technology) that helps website designers make web pages accessible. Bobby identifies design problems that can prevent pages from being displayed properly on various browsers—America Online, Netscape Navigator, Lynx, Microsoft Explorer. It also performs a series of tests to catch and correct problems that make sites inaccessible to people who are blind, deaf or have other disabilities.

Contact Chuck Hitchcock, Universal Design Lab, CAST, 39 Cross Street, Peabody, MA 01960. Phone 508-531-8555. Fax 508-531-0192; e-mail CHITCHCOCK@CAST.ORG

or REHAB C458), contact Distance Learning at the University of Washington. Phone: 206-543-2320; E-mail: distance@u.washington.edu; Site: <http://weber.u.washington.edu/~instudy/SPHSC453/index.html>

RESOURCES

Many, many thanks to:
Dagmar Amtmann, Project Manager, Assistive Technology Resource Center, University of Washington, Box 357920, Department of Rehabilitation Medicine and UAP, Seattle, WA 09195-7920. Phone: 206-685-4181 e-mail: dagmara@u.washington.edu

Patricia Dowden, Asst. Professor, Speech and Hearing Sciences, University of Washington; and Coordinator, Children's Adaptive Technology Service, Children's Hospital & Medical Center, CH-89, 4900 Sand Point Way, Seattle, WA 98105. Phone: 206-526-2104 e-mail: dowden@u.washington.edu

Linda Petty, Assistant Manager, Adaptive Technology Resource Centre, University of Toronto Information Commons, 130 St. George St., Toronto, ON M5S 3H1. Phone: 416-978-0734 e-mail: linda.petty@utoronto.ca

WEBSITES

AAC Companies. A few AAC companies have sites with technology and product information. Remember they are advertising as well as providing valuable information. Examples are:

Don Johnston	http://www.donjohnston.com/
Gus, Inc	http://www.gusinc.com/
Intellitools	http://www.intellitools.com/
Prentke Romich	http://dialup.oar.net/~Pprco/index.html/

Universities/Assistive Technology Centers. AT centers and universities with AAC programs can provide valuable information. In addition to those suggested earlier, check these out:

Princeton University. Keyboard Alternatives: <http://www.cs.princeton.edu/~dwallach/tifaq/keyboards.html> for:

- ☐ a glimpse of what is possible in AAC for presenting equipment options via the WWW
- ☐ information about disability groups.

University of Kansas. Virtual Assistive Tech Center: <http://www.sped.ukans.edu/~dlance/atech.html>

- ☐ Shareware and freeware for Macintosh computers.

University of Nebraska. David Beukelman. <http://129-93-94.121/AAC.html>

- ☐ vocabulary selection research
- ☐ links to AAC manufacturers webpages
- ☐ information about the AAC Journal, ISAAC and more

University of West Virginia. RRTC. <http://www.icdi.wvu.edu/>

- ☐ Links to other resources in rehabilitation.

University of Wisconsin. Trace Center. <http://trace.wisc.edu/trace/computer/comp access.html>

- ☐ software tool kits for mac, dos, windows, etc. of shareware and freeware including text to speech word prediction, voice output.
- ☐ CONET online, a searchable data base for AT centers and services

Assistive Technology Funding and Systems Change Project. <http://www.ucpa.org/atfsc.html>

- ☐ Great information on funding issues, problems and solutions in US

Call Centre (Scotland). <http://call-centre.cogsci.ed.ac.uk/callhome>

- ☐ research and development information
- ☐ articles

Virginia Tech et al. Training and Technical Assistance Center <http://tac.elps.vt.edu/Home.html>

- ☐ AAC chart of speech output devices

LISTSERVS

ACOLUG. The only AAC LISTSERV. For AAC consumers. To subscribe, send e-mail to listserv@vm.temple.edu. Leave subject line blank. Message=subscribe acolug [firstname lastname]

EASI. An electronic center for disability and rehabilitation services. To subscribe, send e-mail to listserv@sjvm.stjohns.edu. Message=sub easi [firstname lastname]

UACCESS-1. Discussion of universal access to information systems. To subscribe send e-mail to listserv@trace.wisc.edu. Message=subscribe access-1 [first name lastname].