

DISABLING DISABILITIES WITH TECHNOLOGY

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According to the National Institute On Disability and Rehabilitation Research, the 1993, United States' population is in excess of 251.8 million, and there are 48.9 million Americans with disabilities. There are over 13.2 million Americans requiring assistance in instrumental daily activities, with 3.9 million inside the home and 8.7 million outside the home. There are 12.8 million Americans with a severe work disability, ages 16 through 64 years, 5.5 million persons with a severe mobility disability over the age of 15. There are 4.0 million permanent users of canes, crutches, and walkers, and over 1.5 million wheelchair users. There are 1.8 million school children with a physical and/or learning disability.



This is why we need Assistive Technology. Technology for the able-bodied makes things easier. Technology for people with disabilities makes things possible. Safko International, based in Tempe, Arizona, is a company that provides technology to the disabled community, nationally and internationally. Their new SenSei® System (pronounced 'sen say', meaning master / teacher), allows even the severely disabled, affordable, unassisted access to computer technology for greater independence.

Assistive technology provides progressive independence by using a computer to control

the environment, the telephone, remote control media devices, speaking, electronic hospital beds, and the keyboard—thus accessing most commercial software—all hands-free. Through these easy-to-use controls, the disabled can work, complete their education, and experience greater freedom for themselves and their care providers. Safko has been providing assistive technology since 1985, when they introduced the world's first voice-activated environmental control system for the physically disabled. Safko has been improving upon that technology ever since.

All disabilities fall into one or more of five categories: physical, cognitive, hearing, visual, and communicative. For the

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physically impaired, the system can be operated totally hands-free by using a variety of innovative input devices. For an input device to be a practical solution, it must be economically feasible, require little or no training, be easily installed, and work with all applications. The result was the development of several types of input devices that provide a higher level of application to more types of disabilities at a quarter of the cost. These devices include a puff-activated joystick on an adjustable platform, headmouse, touch screen, and a modified trackball and joystick with a jack that can accommodate a series of single switch input devices. This technology

provides an interface for anyone who has physical disabilities from rheumatoid arthritis to complete quadriplegia.

The major advantage to these types of mechanical input de-

This reduces the amount of input while increasing the user's efficiency.

By definition, most severely disabled users have never used a computer before because of their



The SenSei computer system, home navigation screen.

vices is that they can be accessed immediately. These mechanical devices do not suffer from some support issues and limitations that other forms of input do. Voice recognition for example requires hours of training and retraining, and is susceptible to background noise. It is also very limited in performing the typical clicks and drags of drawing graphics and other mouse functions.

With hands-free input and an on-screen keyboard, one can easily



access any commercially-available software, including accounting, engineering, graphic arts, educational and recreational programs. The word prediction feature allows users to type over 40 words a minute. Providing an on-screen word list that automatically types a word when it is clicked on.

disability. Operating systems can be very difficult for the novice to use, especially DOS. When you throw into the equation, cognitive disability, head trauma, computer novice, physical disability, medication, stress, frustration, and DOS, it equals a very unsuccessful application of technology.

Even window-based operating systems were not the answer because of its software incompatibilities, unreliability and input device difficulties. SenSei's new operating system, copyrighted and under development since 1988, allows access to all the computer's applications through the use of easy-to-recognize pictures. This approach has been very effective to access computer control.

The cognitively impaired person, or the computer novice can become productive almost immediately. Every task the computer can perform is represented in an easy to understand picture. If you want to use the phone, you

simply click on the phone. If you want to control a light, select the light, click on or off and it just happens. This also allows people how are illiterate, or do not speak English and head trauma patients access to all its functions with little or no training.

For the visually impaired or blind, these graphic icons can be set to automatically verbalize or speak the options available as the cursor is moved across them on the screen. This allows for complete navigation of the system and all its functions. The system comes with over a dozen classic novels for users to read in either standard or larger print, or have it read to them. It also offers the ability to access other books on-line or on CD, including textbooks, reference manuals and books for leisure.

For the hearing impaired, the system will flash the menu bar to alert the user that a sound has been initiated. There is also a standard RJ-11 telephone jack provided on the Server™ for a flashing light signal to be connected to replace the standard ringer or TDD unit.

If client transportation and mobility is an obstacle, the SenSei system provides the opportunity for a very productive home office. An excellent example is Ms. Liz Jiminez, one of Safko's favorite clients. About sixteen years ago, Liz was diagnosed with Multiple Sclerosis and is now a complete quadriplegic. With the SenSei technology Ms. Jiminez can now lock and unlock her front door, adjust her heating and air conditioning, turn the TV on and off and change the channels. She has recently completed her 17th chapter of a book she is writing about her life story. Ms. Jiminez keeps the family finances, writes the checks, and is Safko's newest client service rep-

resentative. Ms. Jiminez contacts each client weekly, logs conversations and comments into her data base, and sends that information via modem to our office, all from her virtual office in her home. She shares her experiences with the system and helps others discover their new found independence and productivity.

This same disabled person could go back to school. By using the Apple® PowerBook™ and the SenSei software, users can physically navigate through their school while navigating through the computer. They can access word processing for note-

Through federal grants and Title 19, schools receive I.E.P. (Individual Education Program), funding for "providing necessary equipment to facilitate a disabled student." This technology has had success in every type of school from preschool, through elementary school, to high schools throughout the U.S. There have several disabled students who have completed their high school educations by using assistive technology.

The SenSei system hardware consists of a small device called the Server. The Server looks similar to an external hard drive. When connected to a Macintosh

Server sends the appropriate signal to turn it on, off or even dim it.

This system, once plugged into the telephone line, allows users to place and receive phone calls. They can dial 911, utilize speed dialing, a directory with nearly unlimited capacity, and control telephone volume. The system will even flash for call waiting. This system can send or receive faxes and access Internet or other on-line services and E-mail, all hands-free.

With the Server's IR capabilities, it also can control almost every infrared remote control media device available today. It will operate nearly every function of every make, model and manufacturer of TVs, VCRs, cable converters, satellite dishes, CD players, video disks, stereos. And it does this all through its infrared sender, a little bulb the size of a pencil eraser that sticks to the wall. The media control operates just like any hand-held remote at home, only hands-free.

With the optional interface, this system will operate most electronic hospital beds, adjusting the height, head, and knee positions. SenSei can also be connected to a hospital, rehabilitation facility or home nurse call alarm.

For the communicatively impaired or nonverbal user, the system has built-in capabilities for converting text to speech, with over a dozen different voices from which to choose. The text-to-speech software even works in conjunction with the telephone. For people who have difficulty producing text for example, children requiring an augmentative communication device, or those with aphasia or other cognitive disabilities, the picture-driven communication software Speaking Dynamically and



Ms. Liz Jiminez using the SenSei computer system.

and test-taking, as well as data base, spread sheet, and other education software available to the Mac. This also will allow the education facility the opportunity to satisfy its obligations to pro-

Ms. Jiminez keeps the family finances, writes the checks, and is our newest Client Service Representative.

vide an equal education to all students despite their disability, as mandated in the 504 Amendment of the Equal Rights Act of 1972, passed by congress on May 29, 1989.

computer, it provides complete environmental control, and access to telephone, remote control media controls, hospital bed, and nurse call.

SenSei includes full environmental control and will automatically control up to 256 different lamps and appliances, heating and air conditioning, security and door locks, all through the easy-to-use interface. This control is accomplished without any special wiring, through closed circuit radio signals passed through the building's own wiring. A little receiver module is plugged into the socket and the lamp or appliance is plugged into it. The

Boardmaker from Mayer Johnson Company provides the solution.

The serviceability of the system is one of its greatest benefits. With the modem provided with each system, Safko can assist with any problem by getting on-line with the client. Safko can provide additional training, install software updates, or simply correct the problem instantly over the phone.

To summarize what this technology can do, a C-3 quadriplegic with a mild head trauma and no computer experience can access word processing, data base, spread sheet, computer aided design, graphics, desk top publishing, or any commercially available application almost immediately. This allows the disabled access to employment, while also allowing the employer access to a valuable resource, the human resource. It also provides corporations the opportunity to satisfy the "reasonable accommodations" requirement under

Assistive Technology provides an opportunity for progressive independence.

ADA, (Americans with Disabilities Act) in hiring the disabled.

Local and state governments usually provide some assistance in the purchasing of assistive technology. Most states have the equivalent to a Department of Vocational Rehabilitation or Developmental Disabilities that will provide partial or total reimbursement for equipment, and usually 100% of the associated training expense. The federal government has several programs to assist large and small business with credits to offset expense in providing accommodations for the disabled. In the

1994 Internal Revenue Service tax guides, there are three different tax credits available, Costs of Removing Barrier to the Disabled and Elderly, Disabled Access Credit, and Jobs Credit.

The Costs of Removing Barriers states that when a business incurs an expense to improve a "piece of equipment" to make it



Franklin typing with head movement in his office.

more accessible to the disabled, it can "deduct each year up to \$15,000 of the cost of that improvement." The Disabled Access Credit states that when a small business, "Incurs an expense to buy or modify equipment for persons with disabilities," they can receive a tax credit of 50% of expense up to \$10,250. The Jobs Credit states that when a "Certified," "Vocational Rehabilitation Referral" is hired, the IRS will allow a credit on the disabled employee's wages through "File Form 5884", of 40%, up to \$6,000 per year.

Franklin, a quadriplegic, Native American, is a practical example of aiding the disabled in reentering the work force. SenSei helped him go from a nursing home where he was a ward of the state, to full time employment at a major university. Here, he is responsible for designing catalogs, correspondence, and curriculum materials.

He has also recently won an international art contest.

Within the insurance industry, SenSei enables the disabled to control their environment for greater freedom for themselves, their family members, and their care providers. The ability to lock and unlock the doors, to control their TV and heating, and

or the power of the human mind. Technology is now available and affordable to those who need its assistance. Let's assist our disabled back into the mainstream of work, school and provide better rehabilitation and independence in the home. Let's assist the disabled in becoming more self-sufficient and provide an opportunity for progressive independent by providing cost effective technical solutions. Can we really put a value on the contribution to society of a willing, able, productive mind? ■

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dial 911, allows the disabled the opportunity to be left alone for short periods of time each day. The opportunity for a client to remain unattended for several hours in the morning, afternoon and at night, has proven to be a valuable savings of continuous care costs to the insurance companies and state and federal agencies. It also relieves the time and emotional burden on the family and other care providers.

With the client's greater independence, and an ability to reenter the workplace, complete their education, the rehabilitation process is often shortened and enhanced through a more positive outlook toward the future. In addition, Assistive Technology often creates a revenue stream for the hospital or rehabilitation facility by the ability to bill back the use of this technology as a rehabilitative device.

In summary, never underestimate the power of technology