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Incorporating Accessibility for People with Disabilities

A Presentation by:

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U. S. Department of Education

To the: **President's Information Technology Advisory Committee**

May 18, 2000

Good Morning. I would like to thank the members of Presidents' Information Technology Advisory Committee and Dr. Comedy for inviting me to speak here today. First I will describe the U.S. Department of Education for those of you who may not be familiar with us and comment on the PITAC report of February 1999. I will then review briefly how the research efforts concerning disability have produced useful technologies for all people, and examine how a focus on disability might help the nation's Information Technology (IT) Research and Development (R&D) effort in the coming years. I will also review some of the legislation that has provided access to IT for people with disabilities and some current efforts to make IT accessible. To conclude my talk, I will recommend ways that PITAC could help improve accessibility.

1. **Education, OSERS, and NIDRR**

   The U.S. Department of Education contributes a substantial amount to the federal research investment for people with disabilities. One example of this commitment is an award-winning Assistive Technology Program, developed by the Office of the Chief Information Officer (OCIO). This program is a model for federal agencies seeking to meet requirements under Section 508 of the Rehabilitation Act, which I will say more about later.

   Also our Office of Special Education and Rehabilitative Services (OSERS) supports programs that educate children with special needs, rehabilitate youth and adults with disabilities, and conduct research to improve the lives of individuals with disabilities of all ages.

   One of the components of OSERS is the National Institute on Disability and Rehabilitation Research (NIDRR), which conducts comprehensive and coordinated programs of research and related activities to maximize the inclusion,

social integration, employment, and independent living of disabled individuals of throughout life. Balanced between the scientific and consumer communities, NIDRR plays a unique role in federally funded research activities related to disability. NIDRR represents the largest concentration of such research in the government. In addition, NIDRR's work helps to more fully integrate disability research into the mainstream of our nation's policies regarding science and technology, health care, and economics.

Our lives are increasingly linked to IT. That is one of the main reasons I am here this morning and the specific topic I will address.

2. **Comments on the PITAC Report**

I would like to complement PITAC on its February 1999 report, and the vision expressed therein. I would also like to highlight some sections of the report that I found compelling.

"Finally, Federal budgets must continue to ensure that advances in information technology work to benefit all Americans and that all Americans have the education and training needed to prosper in a world that will increasingly depend on information technology. "Information technology will significantly improve the flow of information to all people and institutions in the Nation, and could be a powerful tool for democratization."

Under the heading *"The Government's Essential Role,"* the report notes:
"Enormous societal gains can be reaped from advances in information technology. Only through research on a scale substantially greater than is being carried out today can we build an infrastructure that will be available, affordable and usable by all citizens--one that can support the compelling "transformations" discussed in the next chapter of this report. "The benefits that the transformations described in the next chapter of this report can have for our Nation's future are extraordinary. A networked society can reach out to all its citizens, and can bring our Nation closer together and address many societal issues. While it cannot resolve all these issues, information technology can give us leverage toward their solution."

We need to ask: *"What does all mean in these paragraphs?"* It appears to mean everybody except certain groups. Does all mean everybody except the blind, who that cannot use a Graphical User Interface (GUI)? Does all mean everybody except individuals with a mobility impairment who can't use a keyboard and mouse?

Further, the report correctly notes:
"Information technology will...make government more responsive and accessible to the needs of our citizens."

and

"Current cross-agency coordination mechanisms are working well, but they suffer from the lack of well-defined responsibilities for ensuring that key areas are not overlooked."

and finally,

"The Federal government should: ... Expand the participation of underrepresented minorities and women in computer and information technology careers. "

The key issue that the PITAC report overlooks is that accessibility for all people includes people with disabilities. The essential question is: "What is meant by accessibility?" The PITAC has correctly identified the need to increase the representation and participation of women and minorities in the nation's IT R&D effort. Similarly, the nation needs to focus its efforts on access and participation in IT R&D by individuals with disabilities.

Clearly, the bulk of the future federal expenditures in IT R&D will be spent on solving complex technical problems such as increased computing speed, higher bandwidth, and, I hope, improved accessibility. In addition to these technical problems, I agree with the PITAC report that some research must be done on the socioeconomic impact of these rapid changes in IT.

3. **Research for the Disabled: How Some "Mainstream" Products Originated**

Many technologies that we now take for granted originated from research efforts to make information available to individuals with disabilities. Bell invented the telephone while he was working at a school for deaf. Cassette tapes were developed in a books-for-the-blind program in the United Kingdom, as it was difficult for blind people to use reel-to-reel tape recorders. Closed-caption TV, at first available only as an expensive "add-on" for individuals who were deaf, is now a feature in all televisions. Many people who are not deaf find closed-caption TV useful in noisy rooms, for example, at a bar or in a health club while on a treadmill. Communication via Internet chat rooms is very similar to communication over the now old-fashioned TTY. The Kurzweil Scanner and optical character recognition were originally developed to enable the blind to "read."

Some of these research efforts, such as captioning, were supported by the public sector and others, such as TTY were supported by the private sector (e.g. TTY). The model of taking what we call "orphan technology" (technology that has only a small user population) and moving it into the mainstream may be important to future IT innovations where IT infrastructure and technology are designed to be accessible by all from the initial design phases. A second model that can contribute to future innovations in IT is the process of universal design.

A major point here is that our research investments specifically targeted to people with disabilities has paid off: technologies have been developed that were ultimately beneficial to many nondisabled people.

4. **How Can a Focus on Disability Help the Nation's IT Effort?**

There are three main ways that focusing on disability can help the nation's IT R&D efforts: by increasing innovation, responding to changing demographics, and reducing the need for future federal regulatory intervention.

Innovation:
Why should we be interested in access to IT for individuals with disabilities? When a research community is presented with truly difficult and challenging problems, and given the time and resources it needs to work on them, the results are often innovative solutions. One widely accepted example of this is the Human Genome Project. What would have been unthinkable 20 years ago is now almost a reality, thanks to many biomedical and technical innovations over the past decade, made possible by both federal and private research investments.

There is a desire to increase innovation in IT research. One area, identified by the

PITAC Report, is the Human Computer Interface:
"Specifically, the Federal program should support fundamental research in human-computer interfaces and interaction."

When the challenges and problems posed by disabilities are presented to the research community, it is very likely to result in remarkable innovations. Here are some possibilities:
Can you find ways other than using a keyboard and mouse to enter information into a computer? In addition to making communication possible for people who cannot use a keyboard or mouse, wouldn't an alternate method have the potential to decrease the incidence of carpal tunnel syndrome and repetitive motion injuries? Isn't it possible that alternates to the keyboard and mouse could actually be faster and enable people to be even more productive? Speech recognition technologies still have some way to go, but is speech the only possible alternative? And what about people who cannot speak? Might some breakthrough in speech recognition make it possible for these individuals to use computers of the future? The potential for a breakthrough in how people input information into computers is enormous.

Can you find ways other than reading the visual screen or printer page to get information from a computer? As the population ages, more people are loosing visual acuity--a significant issue. It has also been suggested that a computer screen is an extremely low-resolution way of conveying information in the first place.

As the age of ubiquitous or pervasive computing dawns, can computers be made smart enough to sense the capabilities of a user and to adjust their input/output accordingly? Can you find better ways to organize, sort, and filter information so you get what you want quickly and are not burdened with information you don't need? Some people with disabilities typically have low bandwidth input capability. To be productive, they really can't waste time sorting through irrelevant information. How could new search engine technologies and ways of organizing and summarizing information be developed?

Bringing engineers who know about accessibility issues on-board in the early stages of infrastructure and technology development is important. Bringing consumers into the decision-making stages at certain points along the development cycle is also helpful.

Changing Demographics:
Important issues concerning market size and demographics will change the IT user population, particularly the elderly. There is likely to be a strong association between computer use and functional disabilities. The key role of function cannot be underestimated. There is a strong correlation between aging and disability, especially in hearing and vision. The median age of workers was 38 years in 1994. It will be 41 by the year 2005. The number of workers age 55 and older may approach 22.2 million in 2005. The increase of older workers is likely due to a longer life expectancy, better health and fitness, and economic necessity. More people keep working through their 60s and early 70s. Little is known about how they will cope with work, and many of them will probably be working in IT-related jobs. Also, IT may play a role in providing medical care in the home, through Telemedicine and Telerehabilitation.

The term *"digital divide"* initially referred to the gap in IT due to socioeconomic or racial differences. The notion of a "digital divide," however, applies even more to individuals with disabilities. How can an individual who cannot see possibly use a GUI? How can a person who cannot move his or her hands possibly use a

keyboard or mouse? A recent report by

H. Stephen Kaye found that people with disabilities are less than half as likely to have access to a home computer than their nondisabled peers, and nondisabled individuals are three times more likely to have access to the Internet than individuals with disabilities. Education has a much bigger impact on labor force participation for individuals with disabilities than for their nondisabled counterparts. Because education is becoming more and more dependent on IT, accessibility again looms large in importance as a tool for conquering the digital divide.

Reducing the Potential for Future Federal Regulatory Intervention

Most members of the Internet Community do not support federal regulation of the Internet. *"Hands off the Internet"* is a common phrase. There is at least some probability that federal regulatory intervention to secure accessibility of the Internet will occur in the future. However, if accessibility issues are resolved, at an early stage of IT R&D before the new technologies becomes widely used, federal intervention is less likely. There would be no need to regulate if access were already there.

Obsolescence is a major problem for specialized software and devices for people with disabilities as technology changes. The solution seems to be to make accessibility part of the design process at the earliest possible stages. The concept of universal access or universal design is a possible solution to this problem. In universal design, the capabilities and needs of all possible users are considered, so that the final product can be used just as easily by people with disabilities as those without disabilities. Also the principles of universal design need to be introduced into the classroom, which is a significant educational challenge. Incorporating accessibility from the beginning is the only workable strategy. The PITAC report notes:
"The information technology industry expends the bulk of its resources, both financial and human, on rapidly bringing products to market...Delivery product cycles are as short as every three to six months. The company that fails here misses the next short-term cycle and will not be successful."

A significant dissemination and training effort is needed to bring accessibility engineering into the IT community. This is particularly important for schools and universities, as well as for many of the small start-up companies that are such driving forces in innovation. This training is one way to help ensure that accessibility is included from the earliest stages of design.

5. **Universal Design and Civil Rights Issues**

Another approach to making the nation's IT infrastructure accessible to individuals with disabilities is to look at the civil rights issues involved.

In the Television Decoder Circuitry Act of 1990, Congress decided that to the fullest extent possible, deaf and hearing-impaired people should have equal access to television. Prior to the passage of this act, a consumer had to buy a TeleCaption decoder and connect the decoder to a television set to display the closed-captioning. When a deaf consumer was in a public place or at a friend's house watching TV, there would be no captioning. Congress noted that in 1990, technology was now available to enable closed-caption decoding capability to be built into new television sets during manufacture at a nominal cost; and the availability of decoder-equipped television sets would significantly increase the

audience that could be served. This is a sterling example of universal design, anyone getting on treadmill in a noisy health club can watch TV while they work out.

On February 8, 1996, the President signed the Telecommunications Act of 1996. This act charges the Access Board with responsibility for developing accessibility guidelines for telecommunications equipment and customer premises equipment. The guidelines are required to principally address the access needs of individuals with disabilities affecting hearing, vision, movement, manipulation, speech, and interpretation of information. Section 255 provides that manufacturers shall ensure that the equipment is designed, developed, and fabricated to be accessible to and usable by individuals with disabilities, if readily achievable. A provider of telecommunications services shall ensure that the service is accessible to and usable by individuals with disabilities, if readily achievable.

In 1998, Congress amended the Rehabilitation Act. As amended, section 508 of the act requires that electronic and information technology that is developed, procured, maintained, or used by federal departments or agencies be accessible to people with disabilities. The law covers all types of electronic and information technology in the federal sector and is not limited to Assistive Technologies used by people with disabilities. Federal agencies must ensure that this technology is accessible to employees and members of the public unless it would pose an "undue burden" to do so. The law directed the Access Board to develop access standards for this technology; these standards will become part of the federal procurement regulations.

6. **Current Efforts to Provide Accessible IT**

There are many examples of IT R&D efforts today that are addressing the issue of access for individuals with disabilities-more than I could possibly mention in this presentation. For example, Sun has disability access support built into the Java® Platform. This includes screen readers, screen magnifiers, speech recognition systems, and Braille terminals. IBM has a special-needs system, which includes a home page reader for Windows®. Microsoft has worked with the NIDRR-funded Rehabilitation Engineering Research Center at the Trace Center at the University of Wisconsin in Madison to develop accessibility features for Windows®. Microsoft has also made innovative accessibility grant awards for promising research ideas. MCI provides communications services that give people with hearing or speech disabilities the freedom to communicate without limits. MCI TeleRelay Service allows people who use voice telephones and people who use text telephones (TTY) to communicate easily through specially trained communications assistants. Many major universities, such as Stanford and Carnegie Mellon, have human computer interaction programs that are doing research that could prove very valuable to individuals with disabilities.

However, in spite of all these and other efforts, much remains to be done.

7. **Conclusion and Recommendations**

Due to the substantial and long-term investment in IT advocated by PITAC, there is an urgent and compelling need to raise the issue of accessibility for individuals with disabilities and make resolving this issue a visible and integral part of this effort.

If some web-based entity suddenly announced a policy that no women could use the Internet because they were not as "good at computers" as men, that

statement would produce outrage and be quickly reversed. There is nothing less outrageous than continuing to build a system that individuals with disabilities cannot access, and by silently ignoring the problem, say that there is nothing wrong with this.

It can be said that technology, and in particular IT, is so pervasive and essential that one really cannot be a citizen without full access. The PITAC report notes the importance of all citizens having access to IT resources. Research and development can make this a reality.

The goals stated in the PITAC report largely hope to translate the nation's investment in IT research into public good, especially by creating jobs. This is good for the government, nation, economy, and most important, all citizens. Individuals with disabilities historically have one of the highest rates of unemployment, and accessible IT holds tremendous potential to address this problem.

Recommendations

There is an enormous and compelling need to include disability issues in future IT R&D at a national level.

PITAC should incorporate language in its reports that make it clear that accessibility specifically includes people with disabilities.

PITAC should encourage industrial consortia to take up the issue of accessibility for individuals with disabilities in all new infrastructure, product development and upgrades.

PITAC should encourage the adoption of universal design principles in the future basic IT R&D efforts that will be federally supported at the national level.

PITAC should encourage dissemination of information, curricula, and training materials about accessibility.

PITAC should support the development of the field of access engineering and capacity-building in this field.

PITAC should encourage the exchange of information on accessibility across federal agencies using existing interagency mechanisms, such as the Interagency Committee on Disability Research and the Human Computer Interface and Information Management (HCI & IM) Coordinating Group.

Contact person at NIDRR:
Robert J. Jaeger, Ph.D. phone 202.205.8061 e-mail Robert_Jaeger@ed.gov

8. **Reference Web Pages**

IT-Related Web Sites

Web Accessibility Initiative
http://www.w3.org/WAI/

Bobby Approved Web Site Tool

http://www.cast.com

Trace Center - IT Accessibility and Universal Design
http://trace.wisc.edu/

Access Board
http://www.access-board.gov/

The Association of Access Engineering Specialists
http://www.narte.org/AAES

Telecommunications Act of 1996, section 255(e)
http://www.fcc.gov/telecom.html

Television Decoder Circuitry Act of 1990
http://www.captions.com/circuit.html

Section 508 of the Rehabilitation Act
http://www.usdoj.gov/crt/508/508home.html

Background and Related Web Sites

Office of Special Education and Rehabilitative Services
http://www.ed.gov/offices/OSERS/

National Institute on Disability and Rehabilitation Research
http://www.ed.gov/offices/OSERS/NIDRR/

National Center for Dissemination of Disability Research
http://www.ncddr.org/

National Rehabilitation Information Center (NARIC)
http://www.naric.com/

Rehabilitation Engineering Society of North America
http://www.resna.org/

ABLEDATA
http://www.abledata.com/

Report on Computer use by People with Disabilities
http://dsc.ucsf.edu/UCSF/
Look for Report 13, Computer and Internet Use Among People with Disabilities, by H. Stephen Kaye, Ph.D.

Telerehabilitation
http://www.hctr.be.cua.edu/RERC/

Telemedicine
http:// www.tmgateway.org

Home Care Technologies
http:// www.hctr.be.cua.edu/HCTworkshop/HCTs_recom.htm

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http://www.ncddr.org/new/speeches/000518pitac.html
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Public Law 105-394

105th Congress

An Act

To support programs of grants to States to address the assistive technology needs of individuals with disabilities, and for other purposes. <<NOTE: Nov. 13, 1998 - [S. 2432]>>

Be it enacted by the Senate and House of Representatives of the United States of America in Congress <<NOTE: Assistive Technology Act of 1998.>> assembled,

SECTION 1. SHORT <<NOTE: 29 USC 3001 note.>> TITLE; TABLE OF CONTENTS.

(a) Short Title.--This Act may be cited as the ``Assistive Technology Act of 1998''.

(b) Table of Contents.--The table of contents for this Act is as follows:

Sec. 1. Short title; table of contents.
Sec. 2. Findings and purposes.
Sec. 3. Definitions and rule.

TITLE I--STATE GRANT PROGRAMS

Sec. 101. Continuity grants for States that received funding for a limited period for technology-related assistance.
Sec. 102. State grants for protection and advocacy related to assistive technology.
Sec. 103. Administrative provisions.
Sec. 104. Technical assistance program.
Sec. 105. Authorization of appropriations.

TITLE II--NATIONAL ACTIVITIES

Subtitle A--Rehabilitation Act of 1973

Sec. 201. Coordination of Federal research efforts.

Sec. 202. National Council on Disability.

Sec. 203. Architectural and Transportation Barriers Compliance Board.

Subtitle B--Other National Activities

Sec. 211. Small business incentives.

Sec. 212. Technology transfer and universal design.

Sec. 213. Universal design in products and the built environment.

Sec. 214. Outreach.

Sec. 215. Training pertaining to rehabilitation engineers and technicians.

Sec. 216. President's Committee on Employment of People With Disabilities.

Sec. 217. Authorization of appropriations.

TITLE III--ALTERNATIVE FINANCING MECHANISMS

Sec. 301. General authority.

Sec. 302. Amount of grants.

Sec. 303. Applications and procedures.

Sec. 304. Contracts with community-based organizations.

Sec. 305. Grant administration requirements.

Sec. 306. Information and technical assistance.

Sec. 307. Annual report.

Sec. 308. Authorization of appropriations.

TITLE IV--REPEAL AND CONFORMING AMENDMENTS

Sec. 401. Repeal.

Sec. 402. Conforming amendments.

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SEC. 2. FINDINGS <<NOTE: 29 USC 3001.>> AND PURPOSES.

(a) Findings.--Congress finds the following:

(1) Disability is a natural part of the human experience and in no way diminishes the right of individuals to--

(A) live independently;

(B) enjoy self-determination and make choices;

(C) benefit from an education;

(D) pursue meaningful careers; and

(E) enjoy full inclusion and integration in the economic, political, social, cultural, and educational mainstream of society in the United States.

(2) Technology has become one of the primary engines for economic activity, education, and innovation in the Nation, and throughout the world. The commitment of the United States to the development and utilization of technology is one of the main factors underlying the strength and vibrancy of the economy of the United States.

(3) As technology has come to play an increasingly important role in the lives of all persons in the United States, in the conduct of business, in the functioning of government, in the fostering of communication, in the conduct of commerce, and in the provision of education, its impact upon the lives of the more than 50,000,000 individuals with disabilities in the United States has been comparable to its impact upon the remainder of the citizens of the United States. Any development in mainstream technology would have profound implications for individuals with disabilities in the United States.

(4) Substantial progress has been made in the development of assistive technology devices, including adaptations to existing devices that facilitate activities of daily living, that significantly benefit individuals with disabilities of all ages.

Such devices and adaptations increase the involvement of such individuals in, and reduce expenditures associated with, programs and activities such as early intervention, education, rehabilitation and training, employment, residential living, independent living, and recreation programs and activities, and other aspects of daily living.

(5) All States have comprehensive statewide programs of technology-related assistance. Federal support for such programs should continue, strengthening the capacity of each State to assist individuals with disabilities of all ages with their assistive technology needs.

(6) Notwithstanding the efforts of such State programs, there is still a lack of--

(A) resources to pay for assistive technology devices and assistive technology services;

(B) trained personnel to assist individuals with disabilities to use such devices and services;

(C) information among targeted individuals about the availability and potential benefit of technology for individuals with disabilities;

(D) outreach to underrepresented populations and rural populations;

(E) systems that ensure timely acquisition and delivery of assistive technology devices and assistive technology services;

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(F) coordination among State human services programs, and between such programs and private entities, particularly with respect to transitions between such programs and entities; and

(G) capacity in such programs to provide the necessary technology-related assistance.

(7) In the current technological environment, the line of demarcation between assistive technology and mainstream technology is becoming ever more difficult to draw.

(8) Many individuals with disabilities cannot access existing telecommunications and information technologies and are at risk of not being able to access developing technologies. The failure of Federal and State governments, hardware manufacturers, software designers, information systems managers, and telecommunications service providers to account for the specific needs of individuals with disabilities in the design, manufacture, and procurement of telecommunications and information technologies results in the exclusion of such individuals from the use of telecommunications and information technologies and results in unnecessary costs associated with the retrofitting of devices and product systems.

(9) There are insufficient incentives for Federal contractors and other manufacturers of technology to address the application of technology advances to meet the needs of individuals with disabilities of all ages for assistive technology devices and assistive technology services.

(10) The use of universal design principles reduces the need for many specific kinds of assistive technology devices and assistive technology services by building in accommodations for individuals with disabilities before rather than after production. The use of universal design principles also increases the likelihood that products (including services) will be compatible with existing assistive technologies. These principles are increasingly important to enhance access to information technology, telecommunications, transportation, physical structures, and consumer products. There are insufficient incentives for commercial manufacturers to incorporate universal design principles into the design and

manufacturing of technology products, including devices of daily living, that could expand their immediate use by individuals with disabilities of all ages.

(11) There are insufficient incentives for commercial pursuit of the application of technology devices to meet the needs of individuals with disabilities, because of the perception that such individuals constitute a limited market.

(12) At the Federal level, the Federal Laboratories, the National Aeronautics and Space Administration, and other similar entities do not recognize the value of, or commit resources on an ongoing basis to, technology transfer initiatives that would benefit, and especially increase the independence of, individuals with disabilities.

(13) At the Federal level, there is a lack of coordination among agencies that provide or pay for the provision of assistive technology devices and assistive technology services. In addition, the Federal Government does not provide adequate assistance and information with respect to the quality and use of assistive technology devices and assistive technology services to targeted individuals.

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(14) There are changes in the delivery of assistive technology devices and assistive technology services, including--

(A) the impact of the increased prevalence of managed care entities as payors for assistive technology devices and assistive technology services;

(B) an increased focus on universal design;

(C) the increased importance of assistive technology in employment, as more individuals with disabilities move from public assistance to work through training and on-the-job accommodations;

(D) the role and impact that new technologies have on how individuals with disabilities will learn about, access, and participate in programs or services that will affect their lives; and

(E) the increased role that telecommunications play in education, employment, health care, and social activities.

(b) Purposes.--The purposes of this Act are--

(1) to provide financial assistance to States to undertake activities that assist each State in maintaining and strengthening a permanent comprehensive statewide program of technology-related assistance, for individuals with disabilities of all ages, that is designed to--

(A) increase the availability of, funding for, access to, and provision of, assistive technology devices and assistive technology services;

(B) increase the active involvement of individuals with disabilities and their family members, guardians, advocates, and authorized representatives, in the maintenance, improvement, and evaluation of such a program;

(C) increase the involvement of individuals with disabilities and, if appropriate, their family members, guardians, advocates, and authorized representatives, in decisions related to the provision of assistive technology devices and assistive technology services;

(D) increase the provision of outreach to underrepresented populations and rural populations, to enable the two populations to enjoy the benefits of activities carried out under this Act to the same extent as other populations;

(E) increase and promote coordination among State

agencies, between State and local agencies, among local agencies, and between State and local agencies and private entities (such as managed care providers), that are involved or are eligible to be involved in carrying out activities under this Act;

(F)(i) increase the awareness of laws, regulations, policies, practices, procedures, and organizational structures, that facilitate the availability or provision of assistive technology devices and assistive technology services; and

(ii) facilitate the change of laws, regulations, policies, practices, procedures, and organizational structures, to obtain increased availability or provision of assistive technology devices and assistive technology services;

(G) increase the probability that individuals with disabilities of all ages will, to the extent appropriate, be able to secure and maintain possession of assistive technology devices as such individuals make the transition between services offered by human service agencies or

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between settings of daily living (for example, between home and work);

(H) enhance the skills and competencies of individuals involved in providing assistive technology devices and assistive technology services;

(I) increase awareness and knowledge of the benefits of assistive technology devices and assistive technology services among targeted individuals;

(J) increase the awareness of the needs of

individuals with disabilities of all ages for assistive technology devices and for assistive technology services; and

(K) increase the capacity of public agencies and private entities to provide and pay for assistive technology devices and assistive technology services on a statewide basis for individuals with disabilities of all ages;

(2) to identify Federal policies that facilitate payment for assistive technology devices and assistive technology services, to identify those Federal policies that impede such payment, and to eliminate inappropriate barriers to such payment; and

(3) to enhance the ability of the Federal Government to--

(A) provide States with financial assistance that supports--

(i) information and public awareness programs relating to the provision of assistive technology devices and assistive technology services;

(ii) improved interagency and public-private coordination, especially through new and improved policies, that result in increased availability of assistive technology devices and assistive technology services; and

(iii) technical assistance and training in the provision or use of assistive technology devices and assistive technology services; and

(B) fund national, regional, State, and local targeted initiatives that promote understanding of and access to assistive technology devices and assistive technology services for targeted individuals.

SEC. 3. DEFINITIONS <<NOTE: 29 USC 3002.>> AND RULE.

(a) Definitions.--In this Act:

(1) Advocacy services.--The term ``advocacy services'', except as used as part of the term ``protection and advocacy services'', means services provided to assist individuals with disabilities and their family members, guardians, advocates, and authorized representatives in accessing assistive technology devices and assistive technology services.

(2) Assistive technology.--The term ``assistive technology'' means technology designed to be utilized in an assistive technology device or assistive technology service.

(3) Assistive technology device.--The term ``assistive technology device'' means any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.

(4) Assistive technology service.--The term ``assistive technology service'' means any service that directly assists an

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individual with a disability in the selection, acquisition, or use of an assistive technology device. Such term includes--

(A) the evaluation of the assistive technology needs of an individual with a disability, including a functional evaluation of the impact of the provision of appropriate assistive technology and appropriate services to the individual in the customary environment of the individual;

(B) services consisting of purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by individuals with disabilities;

(C) services consisting of selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices;

(D) coordination and use of necessary therapies, interventions, or services with assistive technology devices, such as therapies, interventions, or services associated with education and rehabilitation plans and programs;

(E) training or technical assistance for an individual with disabilities, or, where appropriate, the family members, guardians, advocates, or authorized representatives of such an individual; and

(F) training or technical assistance for professionals (including individuals providing education and rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of individuals with disabilities.

(5) Capacity building and advocacy activities.--The term ``capacity building and advocacy activities'' means efforts that--

(A) result in laws, regulations, policies, practices, procedures, or organizational structures that promote consumer-responsive programs or entities; and

(B) facilitate and increase access to, provision of, and funding for, assistive technology devices and assistive technology services,

in order to empower individuals with disabilities to achieve greater independence, productivity, and integration and inclusion within the community and the workforce.

(6) Comprehensive statewide program of technology-related assistance.--The term ``comprehensive statewide program of technology-related assistance'' means a consumer-responsive program of technology-related assistance for individuals with disabilities, implemented by a State, and equally available to all individuals with disabilities residing in the State,

regardless of their type of disability, age, income level, or location of residence in the State, or the type of assistive technology device or assistive technology service required.

(7) Consumer-responsive.--The term ``consumer-responsive''--

(A) with regard to policies, means that the policies are consistent with the principles of--

(i) respect for individual dignity, personal responsibility, self-determination, and pursuit of meaningful careers, based on informed choice, of individuals with disabilities;

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(ii) respect for the privacy, rights, and equal access (including the use of accessible formats) of such individuals;

(iii) inclusion, integration, and full participation of such individuals in society;

(iv) support for the involvement in decisions of a family member, a guardian, an advocate, or an authorized representative, if an individual with a disability requests, desires, or needs such involvement; and

(v) support for individual and systems advocacy and community involvement; and

(B) with respect to an entity, program, or activity, means that the entity, program, or activity--

(i) is easily accessible to, and usable by, individuals with disabilities and, when appropriate, their family members, guardians, advocates, or authorized representatives;

(ii) responds to the needs of individuals with disabilities in a timely and appropriate manner;

and

(iii) facilitates the full and meaningful participation of individuals with disabilities (including individuals from underrepresented populations and rural populations) and their family members, guardians, advocates, and authorized representatives, in--

(I) decisions relating to the provision of assistive technology devices and assistive technology services to such individuals; and

(II) decisions related to the maintenance, improvement, and evaluation of the comprehensive statewide program of technology-related assistance, including decisions that affect advocacy, capacity building, and capacity building and advocacy activities.

(8) Disability.--The term ``disability'' means a condition of an individual that is considered to be a disability or handicap for the purposes of any Federal law other than this Act or for the purposes of the law of the State in which the individual resides.

(9) Individual with a disability; individuals with disabilities.--

(A) Individual with a disability.--The term ``individual with a disability'' means any individual of any age, race, or ethnicity--

(i) who has a disability; and

(ii) who is or would be enabled by an assistive technology device or an assistive technology service to minimize deterioration in

functioning, to maintain a level of functioning, or to achieve a greater level of functioning in any major life activity.

(B) Individuals with disabilities.--The term ``individuals with disabilities'' means more than one individual with a disability.

(10) Institution of higher education.--The term ``institution of higher education'' has the meaning given such term in section 1201(a) of the Higher Education Act of 1965 (20 U.S.C. 1141(a)), and includes a community college receiving

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funding under the Tribally Controlled Community College Assistance Act of 1978 (25 U.S.C. 1801 et seq.).

(11) Protection and advocacy services.--The term ``protection and advocacy services'' means services that--

(A) are described in part C of the Developmental Disabilities Assistance and Bill of Rights Act (42 U.S.C. 6041 et seq.), the Protection and Advocacy for Mentally Ill Individuals Act of 1986 (42 U.S.C. 10801 et seq.), or section 509 of the Rehabilitation Act of 1973; and

(B) assist individuals with disabilities with respect to assistive technology devices and assistive technology services.

(12) Secretary.--The term ``Secretary'' means the Secretary of Education.

(13) State.--

(A) In general.--Except as provided in subparagraph (B) and section 302, the term ``State'' means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the United

States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

(B) Outlying areas.--In sections 101(c) and 102(b):

(i) Outlying area.--The term ``outlying area'' means the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

(ii) State.--The term ``State'' does not include the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

(14) Targeted individuals.--The term ``targeted individuals'' means--

(A) individuals with disabilities of all ages and their family members, guardians, advocates, and authorized representatives;

(B) individuals who work for public or private entities (including insurers or managed care providers), that have contact with individuals with disabilities;

(C) educators and related services personnel;

(D) technology experts (including engineers);

(E) health and allied health professionals;

(F) employers; and

(G) other appropriate individuals and entities.

(15) Technology-related assistance.--The term ``technology-related assistance'' means assistance provided through capacity building and advocacy activities that accomplish the purposes described in any of subparagraphs (A) through (K) of section 2(b)(1).

(16) Underrepresented population.--The term ``underrepresented population'' means a population that is typically underrepresented in service provision, and includes populations such as persons who have low-incidence disabilities,

persons who are minorities, poor persons, persons with limited-English proficiency, older individuals, or persons from rural areas.

(17) Universal design.--The term ``universal design'' means a concept or philosophy for designing and delivering products and services that are usable by people with the widest

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possible range of functional capabilities, which include products and services that are directly usable (without requiring assistive technologies) and products and services that are made usable with assistive technologies.

(b) References.--References in this Act to a provision of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 shall be considered to be references to such provision as in effect on the day before the date of enactment of this Act.

TITLE I--STATE GRANT PROGRAMS

SEC. 101. CONTINUITY <<NOTE: 29 USC 3011.>> GRANTS FOR STATES THAT RECEIVED FUNDING FOR A LIMITED PERIOD FOR TECHNOLOGY-RELATED ASSISTANCE.

(a) Grants to States.--

(1) In general.--The Secretary shall award grants, in accordance with this section, to eligible States to support capacity building and advocacy activities, designed to assist the States in maintaining permanent comprehensive statewide programs of technology-related assistance that accomplish the purposes described in section 2(b)(1).

(2) Eligible states.--To be eligible to receive a grant under this section a State shall be a State that received grants for less than 10 years under title I of the Technology-Related

Assistance for Individuals With Disabilities Act of 1988.

(b) Use of Funds.--

(1) In general.--Any State that receives a grant under this section shall use the funds made available through the grant to carry out the activities described in paragraph (2) and may use the funds to carry out the activities described in paragraph (3).

(2) Required activities.--

(A) Public awareness program.--

(i) In general.--The State shall support a public awareness program designed to provide information to targeted individuals relating to the availability and benefits of assistive technology devices and assistive technology services.

(ii) Link.--Such a public awareness program shall have an electronic link to the National Public Internet Site authorized under section 104(c)(1).

(iii) Contents.--The public awareness program may include--

(I) the development and dissemination of information relating to--

(aa) the nature of assistive technology devices and assistive technology services;

(bb) the appropriateness of, cost of, availability of, evaluation of, and access to, assistive technology devices and assistive technology services;

and

(cc) the benefits of assistive technology devices and assistive technology services with respect to enhancing the capacity of individuals with disabilities of all ages to perform activities of daily living;

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(II) the development of procedures for providing direct communication between providers of assistive technology and targeted individuals; and

(III) the development and dissemination, to targeted individuals, of information about State efforts related to assistive technology.

(B) Interagency coordination.--

(i) In general.--The State shall develop and promote the adoption of policies that improve access to assistive technology devices and assistive technology services for individuals with disabilities of all ages in the State and that result in improved coordination among public and private entities that are responsible or have the authority to be responsible, for policies, procedures, or funding for, or the provision of assistive technology devices and assistive technology services to, such individuals.

(ii) Appointment to certain information technology panels.--The State shall appoint the

director of the lead agency described in subsection (d) or the designee of the director, to any committee, council, or similar organization created by the State to assist the State in the development of the information technology policy of the State.

(iii) Coordination activities.--The development and promotion described in clause (i) may include support for--

(I) policies that result in improved coordination, including coordination between public and private entities--

(aa) in the application of Federal and State policies;

(bb) in the use of resources and services relating to the provision of assistive technology devices and assistive technology services, including the use of interagency agreements; and

(cc) in the improvement of access to assistive technology devices and assistive technology services for individuals with disabilities of all ages in the State;

(II) convening interagency work groups, involving public and private entities, to identify, create, or expand funding options, and coordinate access to funding, for assistive technology

devices and assistive technology services for individuals with disabilities of all ages; or

(III) documenting and disseminating information about interagency activities that promote coordination, including coordination between public and private entities, with respect to assistive technology devices and assistive technology services.

(C) Technical assistance and training.--The State shall carry out directly, or provide support to public or private entities to carry out, technical assistance and training activities for targeted individuals, including--

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(i) the development and implementation of laws, regulations, policies, practices, procedures, or organizational structures that promote access to assistive technology devices and assistive technology services for individuals with disabilities in education, health care, employment, and community living contexts, and in other contexts such as the use of telecommunications;

(ii)(I) the development of training materials and the conduct of training in the use of assistive technology devices and assistive technology services; and

(II) the provision of technical assistance, including technical assistance concerning how--

(aa) to consider the needs of an

individual with a disability for assistive technology devices and assistive technology services in developing any individualized plan or program authorized under Federal or State law;

(bb) the rights of targeted individuals to assistive technology devices and assistive technology services are addressed under laws other than this Act, to promote fuller independence, productivity, and inclusion in and integration into society of such individuals; or

(cc) to increase consumer participation in the identification, planning, use, delivery, and evaluation of assistive technology devices and assistive technology services; and

(iii) the enhancement of the assistive technology skills and competencies of--

(I) individuals who work for public or private entities (including insurers and managed care providers), who have contact with individuals with disabilities;

(II) educators and related services personnel;

(III) technology experts (including engineers);

(IV) health and allied health professionals;

(V) employers; and

(VI) other appropriate personnel.

(D) Outreach.--The State shall provide support to statewide and community-based organizations that provide assistive technology devices and assistive technology services to individuals with disabilities or that assist individuals with disabilities in using assistive technology devices and assistive technology services, including a focus on organizations assisting individuals from underrepresented populations and rural populations. Such support may include outreach to consumer organizations and groups in the State to coordinate efforts to assist individuals with disabilities of all ages and their family members, guardians, advocates, or authorized representatives, to obtain funding for, access to, and information on evaluation of assistive technology devices and assistive technology services.

(3) Discretionary activities.--

(A) Alternative state-financed systems.--The State may support activities to increase access to, and funding for, assistive technology devices and assistive technology services, including--

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(i) the development of systems that provide assistive technology devices and assistive technology services to individuals with disabilities of all ages, and that pay for such devices and services, such as--

(I) the development of systems for the purchase, lease, other acquisition, or payment for the provision, of assistive technology devices and

assistive technology services; or

(II) the establishment of alternative State or privately financed systems of subsidies for the provision of assistive technology devices and assistive technology services, such as--

(aa) a low-interest loan fund;

(bb) an interest buy-down program;

(cc) a revolving loan fund;

(dd) a loan guarantee or insurance program;

(ee) a program operated by a partnership among private entities for the purchase, lease, or other acquisition of assistive technology devices or assistive technology services; or

(ff) another mechanism that meets the requirements of title III and is approved by the Secretary;

(ii) the short-term loan of assistive technology devices to individuals, employers, public agencies, or public accommodations seeking strategies to comply with the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) and section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794); or

(iii) the maintenance of information about,

and recycling centers for, the redistribution of assistive technology devices and equipment, which may include redistribution through device and equipment loans, rentals, or gifts.

(B) Demonstrations.--The State, in collaboration with other entities in established, recognized community settings (such as nonprofit organizations, libraries, schools, community-based employer organizations, churches, and entities operating senior citizen centers, shopping malls, and health clinics), may demonstrate assistive technology devices in settings where targeted individuals can see and try out assistive technology devices, and learn more about the devices from personnel who are familiar with such devices and their applications or can be referred to other entities who have information on the devices.

(C) Options for securing devices and services.--The State, through public agencies or nonprofit organizations, may support assistance to individuals with disabilities and their family members, guardians, advocates, and authorized representatives about options for securing assistive technology devices and assistive technology services that would meet individual needs for such assistive technology devices and assistive technology services. Such assistance shall not include direct payment for an assistive technology device.

(D) Technology-related information.--

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(i) In general.--The State may operate and expand a system for public access to information concerning an activity carried out under another paragraph of this subsection, including

information about assistive technology devices and assistive technology services, funding sources and costs of such devices and services, and individuals, organizations, and agencies capable of carrying out such an activity for individuals with disabilities. The system shall be part of, and complement the information that is available through a link to, the National Public Internet Site described in section 104(c)(1).

(ii) Access.--Access to the system may be provided through community-based locations, including public libraries, centers for independent living (as defined in section 702 of the Rehabilitation Act of 1973), locations of community rehabilitation programs (as defined in section 7 of such Act), schools, senior citizen centers, State vocational rehabilitation offices, other State workforce offices, and other locations frequented or used by the public.

(iii) Information collection and preparation.--In operating or expanding a system described in subparagraph (A), the State may--

(I) develop, compile, and categorize print, large print, braille, audio, and video materials, computer disks, compact discs (including compact discs formatted with read-only memory), information in alternative formats that can be used in telephone-based information systems, and materials using such other media as technological innovation may make appropriate;

(II) identify and classify funding sources for obtaining assistive technology devices and assistive technology services, and the conditions of and criteria for access to such sources, including any funding mechanisms or strategies developed by the State;

(III) identify support groups and systems designed to help individuals with disabilities make effective use of an activity carried out under another paragraph of this subsection, including groups that provide evaluations of assistive technology devices and assistive technology services; and

(IV) maintain a record of the extent to which citizens of the State use or make inquiries of the system established in clause (i), and of the nature of such inquiries.

(E) Interstate activities.--

(i) In <<NOTE: Contracts.>> general.--The State may enter into cooperative agreements with other States to expand the capacity of the States involved to assist individuals with disabilities of all ages to learn about, acquire, use, maintain, adapt, and upgrade assistive technology devices and assistive technology services that such

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individuals need at home, at school, at work, or

in other environments that are part of daily living.

(ii) Electronic communication.--The State may operate or participate in an electronic information exchange through which the State may communicate with other States to gain technical assistance in a timely fashion and to avoid the duplication of efforts already undertaken in other States.

(F) Partnerships and cooperative initiatives.--The State may support partnerships and cooperative initiatives between the public sector and the private sector to promote greater participation by business and industry in--

(i) the development, demonstration, and dissemination of assistive technology devices; and

(ii) the ongoing provision of information about new products to assist individuals with disabilities.

(G) Expenses.--The State may pay for expenses, including travel expenses, and services, including services of qualified interpreters, readers, and personal care assistants, that may be necessary to ensure access to the comprehensive statewide program of technology-related assistance by individuals with disabilities who are determined by the State to be in financial need and not eligible for such payments or services through another public agency or private entity.

(H) Advocacy services.--The State may provide advocacy services.

(c) Amount of Financial Assistance.--

(1) Grants to outlying areas.--From the funds appropriated under section 105(a) and reserved under section 105(b)(1)(A) for any fiscal year for grants under this section, the Secretary shall make a grant in an amount of not more than $105,000 to each eligible outlying area.

(2) Grants to states.--From the funds described in paragraph (1) that are not used to make grants under paragraph (1), the Secretary shall make grants to States in accordance with the requirements described in paragraph (3).

(3) Calculation of state grants.--

(A) Calculations for grants in the second or third year of a second extension grant.--For any fiscal year, the Secretary shall calculate the amount of a grant under paragraph (2) for each eligible State that would be in the second or third year of a second extension grant made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, if that Act had been reauthorized for that fiscal year.

(B) Calculations for grants in the fourth or fifth year of a second extension grant.--

(i) Fourth year.--An eligible State that would have been in the fourth year of a second extension grant made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 during a fiscal year, if that Act had been reauthorized for that fiscal year, shall receive under paragraph (2) a grant in an amount equal to 75 percent of the funding that the State received in the prior

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fiscal year under section 103 of that Act or under this section, as appropriate.

(ii) Fifth year.--An eligible State that would have been in the fifth year of a second extension grant made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 during a fiscal year, if that Act had been reauthorized for that fiscal year, shall receive under paragraph (2) a grant in an amount equal to 50 percent of the funding that the State received in the third year of a second extension grant under section 103 of that Act or under this section, as appropriate.

(C) Prohibition on funds after fifth year of a second extension grant.--Except as provided in subsection (f), an eligible State that would have been in the fifth year of a second extension grant made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 during a fiscal year, if that Act had been reauthorized for that fiscal year, may not receive any Federal funds under this title for any fiscal year after such fiscal year.

(D) Additional states.--

(i) In general.--For purposes of this paragraph, the Secretary shall treat a State described in clause (ii)--

(I) for fiscal years 1999 through 2001, as if the State were a State described in subparagraph (A); and

(II) for fiscal year 2002 or 2003, as if the State were a State described in clause (i) or (ii), respectively, of subparagraph (B).

(ii) State.--A State referred to in clause (i) shall be a State that--

(I) in fiscal year 1998, was in the second year of an initial extension grant made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988; and

(II) meets such terms and conditions as the Secretary shall determine to be appropriate.

(d) Lead Agency.--

(1) Identification.--

(A) In general.--To be eligible to receive a grant under this section, a State shall designate a lead agency to carry out appropriate State functions under this section. The lead agency shall be the current agency (as of the date of submission of the application supplement described in subsection (e)) administering the grant awarded to the State for fiscal year 1998 under title I of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, except as provided in subparagraph (B).

(B) Change in agency.--The Governor may change the lead agency if the Governor shows good cause to the Secretary why the designated lead agency should be changed, in the application supplement described in subsection (e), and obtains approval of the supplement.

(2) Duties of the lead agency.--The duties of the lead agency shall include--

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(A) submitting the application supplement described in subsection (e) on behalf of the State;

(B) administering and supervising the use of amounts made available under the grant received by the State under this section;

(C)(i) coordinating efforts related to, and supervising the preparation of, the application supplement described in subsection (e);

(ii) continuing the coordination of the maintenance and evaluation of the comprehensive statewide program of technology-related assistance among public agencies and between public agencies and private entities, including coordinating efforts related to entering into interagency agreements; and

(iii) continuing the coordination of efforts, especially efforts carried out with entities that provide protection and advocacy services described in section 102, related to the active, timely, and meaningful participation by individuals with disabilities and their family members, guardians, advocates, or authorized representatives, and other appropriate individuals, with respect to activities carried out under the grant; and

(D) the delegation, in whole or in part, of any responsibilities described in subparagraph (A), (B), or (C) to one or more appropriate offices, agencies, entities, or individuals.

(e) Application Supplement.--

(1) Submission.--Any State that desires to receive a grant under this section shall submit to the Secretary an application supplement to the application the State submitted under section 103 of the Technology-Related Assistance for Individuals With

Disabilities Act of 1988, at such time, in such manner, and for such period as the Secretary may specify, that contains the following information:

(A) Goals and activities.--A description of--

(i) the goals the State has set, for addressing the assistive technology needs of individuals with disabilities in the State, including any related to--

(I) health care;

(II) education;

(III) employment, including goals involving the State vocational rehabilitation program carried out under title I of the Rehabilitation Act of 1973;

(IV) telecommunication and information technology; or

(V) community living; and

(ii) the activities the State will undertake to achieve such goals, in accordance with the requirements of subsection (b).

(B) Measures of goal achievement.--A description of how the State will measure whether the goals set by the State have been achieved.

(C) Involvement of individuals with disabilities of all ages and their families.--A description of how individuals with disabilities of all ages and their families--

(i) were involved in selecting--

(I) the goals;

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(II) the activities to be undertaken in achieving the goals; and

(III) the measures to be used in judging if the goals have been achieved; and

(ii) will be involved in measuring whether the goals have been achieved.

(D) Redesignation of the lead agency.--If the Governor elects to change the lead agency, the following information:

(i) With regard to the original lead agency, a description of the deficiencies of the agency.

(ii) With regard to the new lead agency, a description of--

(I) the capacity of the new lead agency to administer and conduct activities described in subsection (b) and this paragraph; and

(II) the procedures that the State will implement to avoid the deficiencies, described in clause (i), of the original lead agency.

(iii) Information identifying which agency prepared the application supplement.

(2) Interim <<NOTE: Notification. Applicability.>> status of state obligations.--Except as provided in subsection (f)(2), when the Secretary notifies a State that the State shall submit the application supplement to the application the State submitted under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, the Secretary shall specify in the notification the time period for which the application supplement shall apply, consistent with paragraph (4).

(3) Continuing obligations.--Each State that receives a grant under this section shall continue to abide by the assurances the State made in the application the State submitted under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 and continue to comply with reporting requirements under that Act.

(4) Duration of application supplement.--

(A) Determination.--The Secretary shall determine and specify to the State the time period for which the application supplement shall apply, in accordance with subparagraph (B).

(B) Limit.--Such time period for any State shall not extend beyond the year that would have been the fifth year of a second extension grant made for that State under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, if the Act had been reauthorized through that year.

(f) Extension of Funding.--

(1) In general.--In the case of a State that was in the fifth year of a second extension grant in fiscal year 1998 or is in the fifth year of a second extension grant in any of the fiscal years 1999 through 2004 made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, or made under this section, as appropriate, the Secretary may, in the discretion of the Secretary, award a 3-year extension of the grant to such State if the State submits an application supplement under subsection (e)

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and meets other related requirements for a State seeking a grant under this section.

(2) Amount.--A State that receives an extension of a grant

under paragraph (1), shall receive through the grant, for each of fiscal years of the extension of the grant, an amount equivalent to the amount the State received for the fifth year of a second extension grant made under section 103 of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, or made under this section, as appropriate, from funds appropriated under section 105(a) and reserved under section 105(b)(1)(A) for grants under this section.

(3) Limitation.--A State may not receive amounts under an extension of a grant under paragraph (1) after September 30, 2004.

SEC. 102. STATE <<NOTE: 29 USC 3012.>> GRANTS FOR PROTECTION AND ADVOCACY RELATED TO ASSISTIVE TECHNOLOGY.

(a) Grants to States.--

(1) In general.--On the appropriation of funds under section 105, the Secretary shall make a grant to an entity in each State to support protection and advocacy services through the systems established to provide protection and advocacy services under the Developmental Disabilities Assistance and Bill of Rights Act (42 U.S.C. 6000 et seq.) for the purposes of assisting in the acquisition, utilization, or maintenance of assistive technology or assistive technology services for individuals with disabilities.

(2) Certain states.--Notwithstanding paragraph (1), for a State that, on the day before the date of enactment of this Act, was described in section 102(f)(1) of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, the Secretary shall make the grant to the lead agency designated under section 101(d). The lead agency shall determine how the funds made available under this section shall be divided among the entities that were providing protection and advocacy services in that State on that day, and distribute the funds to

the entities. In distributing the funds, the lead agency shall not establish any further eligibility or procedural requirements for an entity in that State that supports protection and advocacy services through the systems established to provide protection and advocacy services under the Developmental Disabilities Assistance and Bill of Rights Act (42 U.S.C. 6000 et seq.). Such an entity shall comply with the same requirements (including reporting and enforcement requirements) as any other entity that receives funding under paragraph (1).

(3) Periods.--The Secretary shall provide assistance through such a grant to a State for 6 years.

(b) Amount of Financial Assistance.--

(1) Grants to outlying areas.--From the funds appropriated under section 105(a) and reserved under section 105(b)(1)(A) for any fiscal year, the Secretary shall make a grant in an amount of not more than $30,000 to each eligible system within an outlying area.

(2) Grants to states.--For any fiscal year, after reserving funds to make grants under paragraph (1), the Secretary shall make allotments from the remainder of the funds described in paragraph (1) in accordance with paragraph (3) to eligible

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systems within States to support protection and advocacy services as described in subsection (a). The Secretary shall make grants to the eligible systems from the allotments.

(3) Systems within states.--

(A) Population basis.--Except as provided in subparagraph (B), from such remainder for each fiscal year, the Secretary shall make an allotment to the eligible system within a State of an amount bearing the same ratio to such remainder as the population of the

State bears to the population of all States.

(B) Minimums.--Subject to the availability of appropriations to carry out this section, the allotment to any system under subparagraph (A) shall be not less than $50,000, and the allotment to any system under this paragraph for any fiscal year that is less than $50,000 shall be increased to $50,000.

(4) Reallotment.--Whenever the Secretary determines that any amount of an allotment under paragraph (3) to a system within a State for any fiscal year will not be expended by such system in carrying out the provisions of this section, the Secretary shall make such amount available for carrying out the provisions of this section to one or more of the systems that the Secretary determines will be able to use additional amounts during such year for carrying out such provisions. Any amount made available to a system for any fiscal year pursuant to the preceding sentence shall, for the purposes of this section, be regarded as an increase in the allotment of the system (as determined under the preceding provisions of this section) for such year.

(c) Report to Secretary.--An entity that receives a grant under this section shall annually prepare and submit to the Secretary a report that contains such information as the Secretary may require, including documentation of the progress of the entity in--

(1) conducting consumer-responsive activities, including activities that will lead to increased access, for individuals with disabilities, to funding for assistive technology devices and assistive technology services;

(2) engaging in informal advocacy to assist in securing assistive technology and assistive technology services for individuals with disabilities;

(3) engaging in formal representation for individuals with disabilities to secure systems change, and in advocacy

activities to secure assistive technology and assistive technology services for individuals with disabilities;

(4) developing and implementing strategies to enhance the long-term abilities of individuals with disabilities and their family members, guardians, advocates, and authorized representatives to advocate the provision of assistive technology devices and assistive technology services to which the individuals with disabilities are entitled under law other than this Act; and

(5) coordinating activities with protection and advocacy services funded through sources other than this title, and coordinating activities with the capacity building and advocacy activities carried out by the lead agency.

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(d) Reports and Updates to State Agencies.--An entity that receives a grant under this section shall prepare and submit to the lead agency the report described in subsection (c) and quarterly updates concerning the activities described in subsection (c).

(e) Coordination.--On making a grant under this section to an entity in a State, the Secretary shall solicit and consider the opinions of the lead agency of the State designated under section 101(d) with respect to efforts at coordination, collaboration, and promoting outcomes between the lead agency and the entity that receives the grant under this section.

SEC. 103. ADMINISTRATIVE <<NOTE: 29 USC 3013.>> PROVISIONS.

(a) Review of Participating Entities.--

(1) In general.--The Secretary shall assess the extent to which entities that receive grants pursuant to this title are complying with the applicable requirements of this title and achieving the goals that are consistent with the requirements of

the grant programs under which the entities applied for the grants.

(2) Onsite visits of states receiving certain grants.--

(A) In general.--The Secretary shall conduct an onsite visit for each State that receives a grant under section 101 and that would have been in the third or fourth year of a second extension grant under the Technology-Related Assistance for Individuals With Disabilities Act of 1988 if that Act had been reauthorized for that fiscal year, prior to the end of that year.

(B) Unnecessary visits.--The Secretary shall not be required to conduct a visit of a State described in subparagraph (A) if the Secretary determines that the visit is not necessary to assess whether the State is making significant progress toward development and implementation of a comprehensive statewide program of technology-related assistance.

(3) Advance public notice.--The Secretary shall provide advance public notice of an onsite visit conducted under paragraph (2) and solicit public comment through such notice from targeted individuals, regarding State goals and related activities to achieve such goals funded through a grant made under section 101.

(4) Minimum requirements.--At a minimum, the visit shall allow the Secretary to determine the extent to which the State is making progress in meeting State goals and maintaining a comprehensive statewide program of technology-related assistance consistent with the purposes described in section 2(b)(1).

(5) Provision of information.--To assist the Secretary in carrying out the responsibilities of the Secretary under this section, the Secretary may require States to provide relevant information.

(b) Corrective Action and Sanctions.--

(1) Corrective action.--If the Secretary determines that an entity fails to substantially comply with the requirements of this title with respect to a grant program, the Secretary shall assist the entity through technical assistance funded under section 104 or other means, within 90 days after such determination, to develop a corrective action plan.

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(2) Sanctions.--An entity that fails to develop and comply with a corrective action plan as described in paragraph (1) during a fiscal year shall be subject to one of the following corrective actions selected by the Secretary:

(A) Partial or complete fund termination under the grant program.

(B) Ineligibility to participate in the grant program in the following year.

(C) Reduction in funding for the following year under the grant program.

(D) Required redesignation of the lead agency designated under section 101(d) or an entity responsible for administering the grant program.

(3) Appeals procedures.--The Secretary shall establish appeals procedures for entities that are found to be in noncompliance with the requirements of this title.

(c) Annual Report.--

(1) In general.--Not <<NOTE: Deadline.>> later than December 31 of each year, the Secretary shall prepare, and submit to the President and to Congress, a report on the activities funded under this Act, to improve the access of individuals with disabilities to assistive technology devices

and assistive technology services.

(2) Contents.--Such report shall include information on--

(A) the demonstrated successes of the funded activities in improving interagency coordination relating to assistive technology, streamlining access to funding for assistive technology, and producing beneficial outcomes for users of assistive technology;

(B) the demonstration activities carried out through the funded activities to--

(i) promote access to such funding in public programs that were in existence on the date of the initiation of the demonstration activities; and

(ii) establish additional options for obtaining such funding;

(C) the education and training activities carried out through the funded activities to educate and train targeted individuals about assistive technology, including increasing awareness of funding through public programs for assistive technology;

(D) the research activities carried out through the funded activities to improve understanding of the costs and benefits of access to assistive technology for individuals with disabilities who represent a variety of ages and types of disabilities;

(E) the program outreach activities to rural and inner-city areas that are carried out through the funded activities;

(F) the activities carried out through the funded activities that are targeted to reach underrepresented populations and rural populations; and

(G) the consumer involvement activities carried out through the funded activities.

(3) Availability of assistive technology devices and

assistive technology services.--As soon as practicable, the Secretary shall include in the annual report required by this subsection information on the availability of assistive technology devices and assistive technology services.

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(d) Effect on Other Assistance.--This title may not be construed as authorizing a Federal or a State agency to reduce medical or other assistance available, or to alter eligibility for a benefit or service, under any other Federal law.

SEC. 104. TECHNICAL <<NOTE: 29 USC 3014.>> SSISTANCE PROGRAM.

(a) In General.--Through grants, contracts, or cooperative agreements, awarded on a competitive basis, the Secretary is authorized to fund a technical assistance program to provide technical assistance to entities, principally entities funded under section 101 or 102.

(b) Input.--In designing the program to be funded under this section, and in deciding the differences in function between national and regionally based technical assistance efforts carried out through the program, the Secretary shall consider the input of the directors of comprehensive statewide programs of technology-related assistance and other individuals the Secretary determines to be appropriate, especially--

(1) individuals with disabilities who use assistive technology and understand the barriers to the acquisition of such technology and assistive technology services;

(2) family members, guardians, advocates, and authorized representatives of such individuals; and

(3) individuals employed by protection and advocacy systems funded under section 102.

(c) Scope of Technical Assistance.--

(1) National public internet site.--

(A) Establishment of internet site.--The Secretary shall fund the establishment and maintenance of a National Public Internet Site for the purposes of providing to individuals with disabilities and the general public technical assistance and information on increased access to assistive technology devices, assistive technology services, and other disability-related resources.

(B) Eligible entity.--To be eligible to receive a grant or enter into a contract or cooperative agreement under subsection (a) to establish and maintain the Internet site, an entity shall be an institution of higher education that emphasizes research and engineering, has a multidisciplinary research center, and has demonstrated expertise in--

(i) working with assistive technology and intelligent agent interactive information dissemination systems;

(ii) managing libraries of assistive technology and disability-related resources;

(iii) delivering education, information, and referral services to individuals with disabilities, including technology-based curriculum development services for adults with low-level reading skills;

(iv) developing cooperative partnerships with the private sector, particularly with private sector computer software, hardware, and Internet services entities; and

(v) developing and designing advanced Internet sites.

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(C) Features of internet site.--The National Public Internet Site described in subparagraph (A) shall contain the following features:

(i) Availability of information at any time.--The site shall be designed so that any member of the public may obtain information posted on the site at any time.

(ii) Innovative automated intelligent agent.--The site shall be constructed with an innovative automated intelligent agent that is a diagnostic tool for assisting users in problem definition and the selection of appropriate assistive technology devices and assistive technology services resources.

(iii) Resources.--

(I) Library on assistive technology.--The site shall include access to a comprehensive working library on assistive technology for all environments, including home, workplace, transportation, and other environments.

(II) Resources for a number of disabilities.--The site shall include resources relating to the largest possible number of disabilities, including resources relating to low-level reading skills.

(iv) Links to private sector resources and information.--To the extent feasible, the site shall be linked to relevant private sector resources and information, under agreements developed between the institution of higher

education and cooperating private sector entities.

(D) Minimum library components.--At a minimum, the Internet site shall maintain updated information on--

(i) how to plan, develop, implement, and evaluate activities to further extend comprehensive statewide programs of technology-related assistance, including the development and replication of effective approaches to--

(I) providing information and referral services;

(II) promoting interagency coordination of training and service delivery among public and private entities;

(III) conducting outreach to underrepresented populations and rural populations;

(IV) mounting successful public awareness activities;

(V) improving capacity building in service delivery;

(VI) training personnel from a variety of disciplines; and

(VII) improving evaluation strategies, research, and data collection;

(ii) effective approaches to the development of consumer-controlled systems that increase access to, funding for, and awareness of, assistive technology devices and assistive technology services;

(iii) successful approaches to increasing the

availability of public and private funding for and access

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to the provision of assistive technology devices and assistive technology services by appropriate State agencies; and

(iv) demonstration sites where individuals may try out assistive technology.

(2) Technical assistance efforts.--In carrying out the technical assistance program, taking into account the input required under subsection (b), the Secretary shall ensure that entities--

(A) address State-specific information requests concerning assistive technology from other entities funded under this title and public entities not funded under this title, including--

(i) requests for state-of-the-art, or model, Federal, State, and local laws, regulations, policies, practices, procedures, and organizational structures, that facilitate, and overcome barriers to, funding for, and access to, assistive technology devices and assistive technology services;

(ii) requests for examples of policies, practices, procedures, regulations, administrative hearing decisions, or legal actions, that have enhanced or may enhance access to funding for assistive technology devices and assistive technology services for individuals with disabilities;

(iii) requests for information on effective approaches to Federal-State coordination of

programs for individuals with disabilities, related to improving funding for or access to assistive technology devices and assistive technology services for individuals with disabilities of all ages;

(iv) requests for information on effective approaches to the development of consumer-controlled systems that increase access to, funding for, and awareness of, assistive technology devices and assistive technology services;

(v) other requests for technical assistance from other entities funded under this title and public entities not funded under this title; and

(vi) other assignments specified by the Secretary, including assisting entities described in section 103(b) to develop corrective action plans; and

(B) assist targeted individuals by disseminating information about--

(i) Federal, State, and local laws, regulations, policies, practices, procedures, and organizational structures, that facilitate, and overcome barriers to, funding for, and access to, assistive technology devices and assistive technology services, to promote fuller independence, productivity, and inclusion in society for individuals with disabilities of all ages; and

(ii) technical assistance activities undertaken under subparagraph (A).

(d) Eligible Entities.--To be eligible to compete for grants,

contracts, and cooperative agreements under this section, entities shall have documented experience with and expertise in assistive

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technology service delivery or systems, interagency coordination, and capacity building and advocacy activities.

(e) Application.--To be eligible to receive a grant, contract, or cooperative agreement under this section, an entity shall submit an application to the Secretary at such time, in such manner, and containing such information as the Secretary may require.

SEC. 105. AUTHORIZATION OF APPROPRIATIONS.

(a) In General.--There are authorized to be appropriated to carry out this title $36,000,000 for fiscal year 1999 and such sums as may be necessary for each of fiscal years 2000 through 2004.

(b) Reservations of Funds.--

(1) In general.--Except as provided in paragraphs (2) and (3), of the amount appropriated under subsection (a) for a fiscal year--

(A) 87.5 percent of the amount shall be reserved to fund grants under section 101;

(B) 7.9 percent shall be reserved to fund grants under section 102; and

(C) 4.6 percent shall be reserved for activities funded under section 104.

(2) Reservation for continuation of technical assistance initiatives.--For fiscal year 1999, the Secretary may use funds reserved under subparagraph (C) of paragraph (1) to continue funding technical assistance initiatives that were funded in fiscal year 1998 under the Technology-Related Assistance for Individuals With Disabilities Act of 1988.

(3) Reservation for onsite visits.--The Secretary may

reserve, from the amount appropriated under subsection (a) for any fiscal year, such sums as the Secretary considers to be necessary for the purposes of conducting onsite visits as required by section 103(a)(2).

TITLE II--NATIONAL ACTIVITIES

Subtitle A--Rehabilitation Act of 1973

SEC. 201. COORDINATION OF FEDERAL RESEARCH EFFORTS.

Section 203 of the Rehabilitation Act of 1973 (as amended by section 405 of the Workforce Investment Act of 1988) <<NOTE: 29 USC 763.>> is amended--

(1) in subsection (a)(1), by inserting after ``programs,'' insert ``including programs relating to assistive technology research and research that incorporates the principles of universal design,'';

(2) in subsection (b)--

(A) by inserting ``(1)'' before ``After receiving'';

(B) by striking ``from individuals with disabilities and the individuals' representatives'' and inserting ``from targeted individuals'';

(C) by inserting after ``research'' the following: ``(including assistive technology research and research that incorporates the principles of universal design)''; and

(D) by adding at the end the following:

``(2) In carrying out its duties with respect to the conduct of Federal research (including assistive technology research and

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research that incorporates the principles of universal design) related to rehabilitation of individuals with disabilities, the Committee

shall--

``(A) share information regarding the range of assistive technology research, and research that incorporates the principles of universal design, that is being carried out by members of the Committee and other Federal departments and organizations;

``(B) identify, and make efforts to address, gaps in assistive technology research and research that incorporates the principles of universal design that are not being adequately addressed;

``(C) identify, and establish, clear research priorities related to assistive technology research and research that incorporates the principles of universal design for the Federal Government;

``(D) promote interagency collaboration and joint research activities relating to assistive technology research and research that incorporates the principles of universal design at the Federal level, and reduce unnecessary duplication of effort regarding these types of research within the Federal Government; and

``(E) optimize the productivity of Committee members through resource sharing and other cost-saving activities, related to assistive technology research and research that incorporates the principles of universal design.'';

(3) by striking subsection (c) and inserting the following:

``(c) Not later <<NOTE: Deadline. Reports.>> than December 31 of each year, the Committee shall prepare and submit, to the President and to the Committee on Education and the Workforce of the House of Representatives and the Committee on Labor and Human Resources of the Senate, a report that--

``(1) describes the progress of the Committee in fulfilling the duties described in subsection (b);

``(2) makes such recommendations as the Committee determines to be appropriate with respect to coordination of policy and development of objectives and priorities for all Federal programs relating to the conduct of research (including assistive technology research and research that incorporates the principles of universal design) related to rehabilitation of individuals with disabilities; and

``(3) describes the activities that the Committee recommended to be funded through grants, contracts, cooperative agreements, and other mechanisms, for assistive technology research and development and research and development that incorporates the principles of universal design.''; and

(4) by adding at the end the following:

``(d)(1) In order to promote coordination and cooperation among Federal departments and agencies conducting assistive technology research programs, to reduce duplication of effort among the programs, and to increase the availability of assistive technology for individuals with disabilities, the Committee may recommend activities to be funded through grants, contracts or cooperative agreements, or other mechanisms--

``(A) in joint research projects for assistive technology research and research that incorporates the principles of universal design; and

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``(B) in other programs designed to promote a cohesive, strategic Federal program of research described in subparagraph (A).

``(2) The projects and programs described in paragraph (1) shall be jointly administered by at least 2 agencies or departments with representatives on the Committee.

``(3) In recommending activities to be funded in the projects and

programs, the Committee shall obtain input from targeted individuals, and other organizations and individuals the Committee determines to be appropriate, concerning the availability and potential of technology for individuals with disabilities.

``(e) In this section, the terms `assistive technology', `targeted individuals', and `universal design' have the meanings given the terms in section 3 of the Assistive Technology Act of 1998.''.

SEC. 202. NATIONAL COUNCIL ON DISABILITY.

Section 401 of the Rehabilitation Act of 1973 (as amended by section 407 of the Workforce Investment Act of 1998) <<NOTE: 29 USC 781.>> is amended by adding at the end the following:

``(c)(1) Not <<NOTE: Deadline. Reports.>> later than December 31, 1999, the Council shall prepare a report describing the barriers in Federal assistive technology policy to increasing the availability of and access to assistive technology devices and assistive technology services for individuals with disabilities.

``(2) In preparing the report, the Council shall obtain input from the National Institute on Disability and Rehabilitation Research and the Association of Tech Act Projects, and from targeted individuals, as defined in section 3 of the Assistive Technology Act of 1998.

``(3) The Council shall submit the report, along with such recommendations as the Council determines to be appropriate, to the Committee on Labor and Human Resources of the Senate and the Committee on Education and the Workforce of the House of Representatives.''.

SEC. 203. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD.

(a) In General.--Section 502 of the Rehabilitation Act of 1973 (29 U.S.C. 792) is amended--

(1) by redesignating subsections (d) through (i) as subsections (e) through (j), respectively;

(2) by inserting after subsection (c) the following:

``(d) Beginning <<NOTE: Effective date.>> in fiscal year 2000, the Access Board, after consultation with the Secretary, representatives of such public and private entities as the Access Board determines to be appropriate (including the electronic and information technology industry), targeted individuals (as defined in section 3 of the Assistive Technology Act of 1998), and State information technology officers, shall provide training for Federal and State employees on any obligations related to section 508 of the Rehabilitation Act of 1973.''; and

(3) in the second sentence of paragraph (1) of subsection (e) (as redesignated in paragraph (1)), by striking ``subsection (e)'' and inserting ``subsection (f)''.

(b) Conforming Amendment.--Section 506(c) of the Rehabilitation Act of 1973 (29 U.S.C. 794(c)) <<NOTE: 29 USC 794b.>> is amended by striking ``section 502(h)(1)'' and inserting ``section 502(i)(1)''.

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Subtitle B--Other National Activities

SEC. 211. SMALL <<NOTE: 29 USC 3031.>> BUSINESS INCENTIVES.

(a) Definition.--In this section, the term ``small business'' means a small-business concern, as described in section 3(a) of the Small Business Act (15 U.S.C. 632(a)).

(b) Contracts for Design, Development, and Marketing.--

(1) In general.--The Secretary may enter into contracts with small businesses, to assist such businesses to design, develop, and market assistive technology devices or assistive technology services. In entering into the contracts, the Secretary may give preference to businesses owned or operated by individuals with disabilities.

(2) Small business innovative research program.--Contracts entered into pursuant to paragraph (1) shall be administered in accordance with the contract administration requirements applicable to the Department of Education under the Small Business Innovative Research Program, as described in section 9(g) of the Small Business Act (15 U.S.C. 638(g)). Contracts entered into pursuant to paragraph (1) shall not be included in the calculation of the required expenditures of the Department under section 9(f) of such Act (15 U.S.C. 638(f)).

(c) Grants for Evaluation and Dissemination of Information on Effects of Technology Transfer.--The Secretary may make grants to small businesses to enable such businesses--

(1) to work with any entity funded by the Secretary to evaluate and disseminate information on the effects of technology transfer on the lives of individuals with disabilities;

(2) to benefit from the experience and expertise of such entities, in conducting such evaluation and dissemination; and

(3) to utilize any technology transfer and market research services such entities provide, to bring new assistive technology devices and assistive technology services into commerce.

SEC. 212. TECHNOLOGY <<NOTE: 29 USC 3032.>> TRANSFER AND UNIVERSAL DESIGN.

(a) In General.--The Director of the National Institute on Disability and Rehabilitation Research may collaborate with the Federal Laboratory Consortium for Technology Transfer established under section 11(e) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710(e)), to promote technology transfer that will further development of assistive technology and products that incorporate the principles of universal design.

(b) Collaboration.--In promoting the technology transfer, the Director and the Consortium described in subsection (a) may collaborate--

(1) to enable the National Institute on Disability and Rehabilitation Research to work more effectively with the Consortium, and to enable the Consortium to fulfill the responsibilities of the Consortium to assist Federal agencies with technology transfer under the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq);

(2) to increase the awareness of staff members of the Federal Laboratories regarding assistive technology issues and the principles of universal design;

(3) to compile a compendium of current and projected Federal Laboratory technologies and projects that have or will

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have an intended or recognized impact on the available range of assistive technology for individuals with disabilities, including technologies and projects that incorporate the principles of universal design, as appropriate;

(4) to develop strategies for applying developments in assistive technology and universal design to mainstream technology, to improve economies of scale and commercial incentives for assistive technology; and

(5) to cultivate developments in assistive technology and universal design through demonstration projects and evaluations, conducted with assistive technology professionals and potential users of assistive technology.

(c) Grants, Contracts, and Cooperative Agreements.--The Secretary may make grants to or enter into contracts or cooperative agreements with commercial, nonprofit, or other organizations, including institutions of higher education, to facilitate interaction with the

Consortium to achieve the objectives of this section.

(d) Responsibilities of Consortium.--Section 11(e)(1) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710(e)(1)) is amended--

(1) in subparagraph (I), by striking ``; and'' and inserting a semicolon;

(2) in subparagraph (J), by striking the period and inserting ``; and''; and

(3) by adding at the end the following:

``(K) work with the Director of the National Institute on Disability and Rehabilitation Research to compile a compendium of current and projected Federal Laboratory technologies and projects that have or will have an intended or recognized impact on the available range of assistive technology for individuals with disabilities (as defined in section 3 of the Assistive Technology Act of 1998), including technologies and projects that incorporate the principles of universal design (as defined in section 3 of such Act), as appropriate.''.

SEC. 213. UNIVERSAL <<NOTE: 29 USC 3033.>> DESIGN IN PRODUCTS AND THE BUILT ENVIRONMENT.

The Secretary may make grants to commercial or other enterprises and institutions of higher education for the research and development of universal design concepts for products (including information technology) and the built environment. In making such grants, the Secretary shall give consideration to enterprises and institutions that are owned or operated by individuals with disabilities. The Secretary shall define the term ``built environment'' for purposes of this section.

SEC. 214. <<NOTE: 29 USC 3034.>> OUTREACH.

(a) Assistive Technology in Rural or Impoverished Urban Areas.--The Secretary may make grants, enter into cooperative agreements, or provide

financial assistance through other mechanisms, for projects designed to increase the availability of assistive technology for rural and impoverished urban populations, by determining the unmet assistive technology needs of such populations, and designing and implementing programs to meet such needs.

(b) Assistive Technology for Children and Older Individuals.--The Secretary may make grants, enter into cooperative agreements, or provide financial assistance through other mechanisms, for projects designed to increase the availability of assistive

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technology for populations of children and older individuals, by determining the unmet assistive technology needs of such populations, and designing and implementing programs to meet such needs.

SEC. 215. TRAINING <<NOTE: 29 USC 3035.>> PERTAINING TO REHABILITATION ENGINEERS AND TECHNICIANS.

(a) Grants and Contracts.--The Secretary shall make grants, or enter into contracts with, public and private agencies and organizations, including institutions of higher education, to help prepare students, including students preparing to be rehabilitation technicians, and faculty working in the field of rehabilitation engineering, for careers related to the provision of assistive technology devices and assistive technology services.

(b) Activities.--An agency or organization that receives a grant or contract under subsection (a) may use the funds made available through the grant or contract--

(1) to provide training programs for individuals employed or seeking employment in the field of rehabilitation engineering, including postsecondary education programs;

(2) to provide workshops, seminars, and conferences concerning rehabilitation engineering that relate to the use of assistive technology devices and assistive technology services

to improve the lives of individuals with disabilities; and

(3) to design, develop, and disseminate curricular materials to be used in the training programs, workshops, seminars, and conferences described in paragraphs (1) and (2).

SEC. 216. PRESIDENT'S <<NOTE: 29 USC 3036.>> COMMITTEE ON EMPLOYMENT OF PEOPLE WITH DISABILITIES.

(a) Programs.--The President's Committee on Employment of People With Disabilities (referred to in this section as ``the Committee'') may design, develop, and implement programs to increase the voluntary participation of the private sector in making information technology accessible to individuals with disabilities, including increasing the involvement of individuals with disabilities in the design, development, and manufacturing of information technology.

(b) Activities.--The Committee may carry out activities through the programs that may include--

(1) the development and coordination of a task force, which--

(A) shall develop and disseminate information on voluntary best practices for universal accessibility in information technology; and

(B) shall consist of members of the public and private sectors, including--

(i) representatives of organizations representing individuals with disabilities; and

(ii) individuals with disabilities; and

(2) the design, development, and implementation of outreach programs to promote the adoption of best practices referred to in paragraph (1)(B).

(c) Coordination.--The Committee shall coordinate the activities of the Committee under this section, as appropriate, with the activities of the National Institute on Disability and Rehabilitation Research and the activities of the Department of Labor.

(d) Technical Assistance.--The Committee may provide technical assistance concerning the programs carried out under this

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section and may reserve such portion of the funds appropriated to carry out this section as the Committee determines to be necessary to provide the technical assistance.

(e) Definition.--In this section, the term ``information technology'' means any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information, including a computer, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.

SEC. 217. AUTHORIZATION <<NOTE: 29 USC 3037.>> OF APPROPRIATIONS.

There are authorized to be appropriated to carry out this title, and the provisions of section 203 of the Rehabilitation Act of 1973 that relate to research described in section 203(b)(2)(A) of such Act, $10,000,000 for fiscal year 1999, and such sums as may be necessary for fiscal year 2000.

TITLE III--ALTERNATIVE FINANCING MECHANISMS

SEC. 301. GENERAL <<NOTE: 29 USC 3051.>> AUTHORITY.

(a) In General.--The Secretary shall award grants to States to pay for the Federal share of the cost of the establishment and administration of, or the expansion and administration of, an alternative financing program featuring one or more alternative financing mechanisms to allow individuals with disabilities and their family members, guardians, advocates, and authorized representatives to purchase assistive technology devices and assistive technology services

(referred to individually in this title as an ``alternative financing mechanism'').

(b) Mechanisms.--The alternative financing mechanisms may include--

(1) a low-interest loan fund;

(2) an interest buy-down program;

(3) a revolving loan fund;

(4) a loan guarantee or insurance program;

(5) a program operated by a partnership among private entities for the purchase, lease, or other acquisition of assistive technology devices or assistive technology services; or

(6) another mechanism that meets the requirements of this title and is approved by the Secretary.

(c) Requirements.--

(1) Period.--The Secretary may award grants under this title for periods of 1 year.

(2) Limitation.--No State may receive more than one grant under this title.

(d) Federal Share.--The Federal share of the cost of the alternative financing program shall not be more than 50 percent.

(e) Construction.--Nothing in this section shall be construed as affecting the authority of a State to establish an alternative financing program under title I.

SEC. 302. AMOUNT <<NOTE: 29 USC 3052.>> OF GRANTS.

(a) In General.--

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(1) Grants to outlying areas.--From the funds appropriated under section 308 for any fiscal year that are not reserved under section 308(b), the Secretary shall make a grant in an

amount of not more than $105,000 to each eligible outlying area.

(2) Grants to states.--From the funds described in paragraph (1) that are not used to make grants under paragraph (1), the Secretary shall make grants to States from allotments made in accordance with the requirements described in paragraph (3).

(3) Allotments.--From the funds described in paragraph (1) that are not used to make grants under paragraph (1)--

(A) the Secretary shall allot $500,000 to each State; and

(B) from the remainder of the funds--

(i) the Secretary shall allot to each State an amount that bears the same ratio to 80 percent of the remainder as the population of the State bears to the population of all States; and

(ii) the Secretary shall allot to each State with a population density that is not more than 10 percent greater than the population density of the United States (according to the most recently available census data) an equal share from 20 percent of the remainder.

(b) Insufficient Funds.--If the funds appropriated under this title for a fiscal year are insufficient to fund the activities described in the acceptable applications submitted under this title for such year, a State whose application was approved for such year but that did not receive a grant under this title may update the application for the succeeding fiscal year. Priority shall be given in such succeeding fiscal year to such updated applications, if acceptable.

(c) Definitions.--In subsection (a):

(1) Outlying area.--The term ``outlying area'' means the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

(2) State.--The term ``State'' does not include the United

States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

SEC. 303. APPLICATIONS <<NOTE: 29 USC 3053.>> AND PROCEDURES.

(a) Eligibility.--States that receive or have received grants under section 101 and comply with subsection (b) shall be eligible to compete for grants under this title.

(b) Application.--To be eligible to compete for a grant under this title, a State shall submit an application to the Secretary at such time, in such manner, and containing such information as the Secretary may require, including--

(1) an assurance that the State will provide the non-Federal share of the cost of the alternative financing program in cash, from State, local, or private sources;

(2) an assurance that the alternative financing program will continue on a permanent basis;

(3) an assurance that, and information describing the manner in which, the alternative financing program will expand and emphasize consumer choice and control;

(4) an assurance that the funds made available through the grant to support the alternative financing program will

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be used to supplement and not supplant other Federal, State, and local public funds expended to provide alternative financing mechanisms;

(5) an assurance that the State will ensure that--

(A) all funds that support the alternative financing program, including funds repaid during the life of the program, will be placed in a permanent separate account and identified and accounted for separately from any other fund;

(B) if the organization administering the program

invests funds within this account, the organization will invest the funds in low-risk securities in which a regulated insurance company may invest under the law of the State; and

(C) the organization will administer the funds with the same judgment and care that a person of prudence, discretion, and intelligence would exercise in the management of the financial affairs of such person;

(6) an assurance that--

(A) funds comprised of the principal and interest from the account described in paragraph (5) will be available to support the alternative financing program; and

(B) any interest or investment income that accrues on or derives from such funds after such funds have been placed under the control of the organization administering the alternative financing program, but before such funds are distributed for purposes of supporting the program, will be the property of the organization administering the program; and

(7) an assurance that the percentage of the funds made available through the grant that is used for indirect costs shall not exceed 10 percent.

(c) Limit.--The interest and income described in subsection (b)(6)(B) shall not be taken into account by any officer or employee of the Federal Government for purposes of determining eligibility for any Federal program.

SEC. 304. CONTRACTS <<NOTE: 29 USC 3054.>> WITH COMMUNITY-BASED ORGANIZATIONS.

(a) In General.--A State that receives a grant under this title shall enter into a contract with a community-based organization

(including a group of such organizations) that has individuals with disabilities involved in organizational decisionmaking at all organizational levels, to administer the alternative financing program.

(b) Provisions.--The contract shall--

(1) include a provision requiring that the program funds, including the Federal and non-Federal shares of the cost of the program, be administered in a manner consistent with the provisions of this title;

(2) include any provision the Secretary requires concerning oversight and evaluation necessary to protect Federal financial interests; and

(3) require the community-based organization to enter into a contract, to expand opportunities under this title and facilitate administration of the alternative financing program, with--

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(A) commercial lending institutions or organizations; or

(B) State financing agencies.

SEC. 305. GRANT <<NOTE: 29 USC 3055.>> ADMINISTRATION REQUIREMENTS.

A State that receives a grant under this title and any community-based organization that enters into a contract with the State under this title, shall submit to the Secretary, pursuant to a schedule established by the Secretary (or if the Secretary does not establish a schedule, within 12 months after the date that the State receives the grant), each of the following policies or procedures for administration of the alternative financing program:

(1) A procedure to review and process in a timely manner requests for financial assistance for immediate and potential technology needs, including consideration of methods to reduce

paperwork and duplication of effort, particularly relating to need, eligibility, and determination of the specific assistive technology device or service to be financed through the program.

(2) A policy and procedure to assure that access to the alternative financing program shall be given to consumers regardless of type of disability, age, income level, location of residence in the State, or type of assistive technology device or assistive technology service for which financing is requested through the program.

(3) A procedure to assure consumer-controlled oversight of the program.

SEC. 306. INFORMATION <<NOTE: 29 USC 3056.>> AND TECHNICAL ASSISTANCE.

(a) In General.--The Secretary shall provide information and technical assistance to States under this title, which shall include--

(1) providing assistance in preparing applications for grants under this title;

(2) assisting grant recipients under this title to develop and implement alternative financing programs; and

(3) providing any other information and technical assistance the Secretary determines to be appropriate to assist States to achieve the objectives of this title.

(b) Grants, Contracts, and Cooperative Agreements.--The Secretary shall provide the information and technical assistance described in subsection (a) through grants, contracts, and cooperative agreements with public or private agencies and organizations, including institutions of higher education, with sufficient documented experience, expertise, and capacity to assist States in the development and implementation of the alternative financing programs carried out under this title.

SEC. 307. ANNUAL <<NOTE: 29 USC 3057.>> REPORT.

Not later <<NOTE: Deadline.>> than December 31 of each year, the Secretary shall submit a report to the Committee on Education and the Workforce of the House of Representatives and the Committee on Labor and Human Resources of the Senate describing the progress of each alternative financing program funded under this title toward achieving the objectives of this title. The report shall include information on--

(1) the number of grant applications received and approved by the Secretary under this title, and the amount of each grant awarded under this title;

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(2) the ratio of funds provided by each State for the alternative financing program of the State to funds provided by the Federal Government for the program;

(3) the type of alternative financing mechanisms used by each State and the community-based organization with which each State entered into a contract, under the program; and

(4) the amount of assistance given to consumers through the program (who shall be classified by age, type of disability, type of assistive technology device or assistive technology service financed through the program, geographic distribution within the State, gender, and whether the consumers are part of an underrepresented population or rural population).

SEC. 308. AUTHORIZATION <<NOTE: 29 USC 3058.>> OF APPROPRIATIONS.

(a) In General.--There are authorized to be appropriated to carry out this title $10,000,000 for fiscal year 1999 and such sums as may be necessary for fiscal year 2000.

(b) Reservation.--Of the amounts appropriated under subsection (a) for a fiscal year, the Secretary shall reserve 2 percent for the purpose of providing information and technical assistance to States under section 306.

TITLE IV--REPEAL AND CONFORMING AMENDMENTS

SEC. 401. REPEAL.

The Technology-Related Assistance for Individuals With Disabilities Act of 1988 (29 U.S.C. 2201 et seq.) is repealed.

SEC. 402. CONFORMING AMENDMENTS.

(a) Definitions.--Section 6 of the Rehabilitation Act of 1973 (as amended by section 403 of the Workforce Investment Act of 1998) is <<NOTE: 29 USC 705.>> amended--

(1) in paragraph (3), by striking ``section 3(2) of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 (29 U.S.C. 2202(2))'' and inserting ``section 3 of the Assistive Technology Act of 1998''; and

(2) in paragraph (4), by striking ``section 3(3) of the Technology-Related Assistance for Individuals With Disabilities Act of 1988 (29 U.S.C. 2202(3))'' and inserting ``section 3 of the Assistive Technology Act of 1998''.

(b) Research and Other Covered Activities.--Section 204(b)(3) of the Rehabilitation Act of 1973 (as amended by section 405 of the Workforce <<NOTE: 29 USC 764.>> Investment Act of 1998) is amended--

(1) in subparagraph (C)(i), by striking ``the Technology-Related Assistance for Individuals With Disabilities Act of 1988 (29 U.S.C. 2201 et seq.)'' and inserting ``the Assistive Technology Act of 1998''; and

(2) in subparagraph (G)(i), by striking ``the Technology-Related Assistance for Individuals With Disabilities Act of 1988 (29 U.S.C. 2201 et seq.

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Assistive Technology for Students with Mild Disabilities. ERIC Digest E529.

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Technology is bursting into the classroom at all levels, as a tool for teachers to develop, monitor, and provide instructions, and for students to access and engage in learning. P.L. 100-407, The Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act) was designed to enhance the availability and quality of assistive technology (AT) devices and services to all individuals and their families throughout the United States.

WHAT ARE ASSISTIVE TECHNOLOGY (AT) DEVICES?

The Tech Act defines AT devices as any item, piece of equipment, or product system (whether acquired off the shelf, modified, or customized) that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. AT devices may be categorized as high technology and low technology. Many low-tech devices can be purchased at a hardware store, selected from a catalog, or fabricated using tools and materials found in home workshops (Franklin, 1991). Examples might be note-taking cassette recorders, pencil grips, NCR paper/copy machine, simple switches, head pointers, picture boards, taped instructions, or workbooks. High-tech devices frequently incorporate some type of computer chip, such as a hand-held calculator or a "talking clock." Examples might be optical character recognition (OCR) calculators, word processors with spelling and grammar checking, word prediction, voice recognition, speech synthesizers, augmentative communication devices, alternative keyboards, or instructional software.

HOW CAN AT BE APPLIED IN INSTRUCTION?

Lahm and Morrissette (1994) outlined seven areas of instruction where AT could assist students with mild disabilities. These areas include organization, note taking, writing assistance, productivity, access to reference materials, cognitive assistance, and materials modification. A number of approaches are available to assist students with mild disabilities in these areas of instruction.

ORGANIZATION: Low-tech solutions include teaching students to organize their thoughts or work using flow charting, task analysis, webbing or networking ideas, and outlining. These strategies can be accomplished using graphic organizers to visually assist students in developing and structuring ideas. A high-tech solution might be the outline function of word processing software, which lets students set out major ideas or topics and then add subcategories of information.

NOTE TAKING: A simple approach is for the teacher to provide copies of structured outlines for students to use in filling in information. A high-tech approach might include optical character

recognition, which is software that can transform typewritten material into computer-readable text using a scanner.

A teacher's typewritten notes can be duplicated using either NCR paper (carbonless copies) or a copy machine. A slightly more high-tech method is to use microcassette recorders. Or, notes can be read by a voice synthesizer, allowing students with reading difficulty to review the notes much the same as reviewing a tape recording. Recorders are beneficial for students with auditory receptive strength, but they may be less useful for those needing visual input. Videotaping class sessions may be helpful for visual learners who pick up on images or body language, or for students who are unable to attend class for extended periods of time.

Laptop or notebook computers can provide high-tech note taking for many students with disabilities. An inexpensive alternative to a full-function portable computer is the portable keyboard. The limitations of these keyboards are in formatting information and a screen display limited to four lines of text.

WRITING ASSISTANCE: Word processing may be the most important application of assistive technology for students with mild disabilities. Many of these students have been identified as needing assistance in the language arts, specifically in writing. Computers and word processing software enable students to put ideas on paper without the barriers imposed by paper and pencil. Writing barriers for students with mild disabilities include mechanics: spelling, grammar and punctuation errors; process: generating ideas, organizing, drafting, editing, and revising; and motivation: clarity and neatness of final copy, reading ability, and interest in writing.

Grammar/spellcheckers, dictionaries, and thesaurus programs assist in the mechanics of writing. Macros, a feature that allows keystrokes to be recorded in a file that can be used over and over, also assist in mechanics. Macros can be used for spelling difficult text, for repetitive strings of words, or for formatting paragraphs and pages. Macros also save time for students who have difficulty with either the cognitive or motor (keyboarding) requirements of writing. Word prediction is assistive software that functions similarly to macros. If a student has difficulty with word recall or spelling and cannot easily use the dictionary or thesaurus feature, then word prediction software offers several choices of words that can be selected.

Teachers can use the editing capabilities of the word processor during the writing process, making electronic suggestions on the student's disk. If the computer is on a network, students can read each other's work and make comments for revision. Painter (1994) indicated that peer feedback was an effective way to assist students in generating and revising text. Computer editing also reduces or eliminates problems such as multiple erasures, torn papers, poor handwriting, and the need to constantly rewrite text that needs only minor modifications. The final copy is neat and legible.

Motivation is often increased through the desktop-publishing and multimedia capabilities of newer computers. A variety of fonts and styles are available, allowing students to customize their writing and highlight important features. Graphic images, drawings, and even video and audio can be added to the project to provide interest or highlight ideas. Multimedia often gives the student the means and the motivation to generate new and more complex ideas.

PRODUCTIVITY: Assistive productivity tools can be hardware-based, software-based, or both. Calculators, for example, can be the credit-card type or software based, which can be popped up and used during word processing. Spreadsheets, databases, and graphics software also offer productivity tools, enabling students to work on math or other subjects that may require calculating, categorizing, grouping, and predicting events. Productivity tools also can be found in small, portable devices called personal digital assistants (PDAs). Newer PDAs can be used as notetaking devices via a small keyboard or graphics-based pen input. Some PDAs can translate words printed with the pen input device to computer-readable text, which can then be edited with the word processor and transmitted to a full function computer.

ACCESS TO REFERENCE MATERIALS: Many students with mild disabilities have difficulty gathering and synthesizing information for their academic work. In this arena, telecommunications and multimedia are providing new learning tools for the students.

A computer and a modem can transport students beyond their physical environment to access electronic information. This is particularly appropriate for individuals who are easily distracted when going to new and busy environments such as the library. Telecommunications networks offer access to the information superhighway. Students can establish "CompuPals" with other students, which often motivates them to generate more text and thus gain more experience in writing. Students can also access electronic encyclopedias, library references, and online publications. However, these experiences should be structured, because the information highway is complex and it is easy to get distracted or lost as opportunities are explored.

Multimedia-based tools are another way in which information can be made accessible to students. Multimedia's use of text, speech, graphics, pictures, audio, and video in reference-based software is especially effective in meeting the heterogeneous learning needs of students with mild disabilities.

COGNITIVE ASSISTANCE: A vast array of application program software is available for instructing students through tutorials, drill and practice, problem-solving, and simulations. Many of the assistive technologies described previously can be combined with instructional programs to develop and improve cognitive and problem-solving skills.

Multimedia CD-ROM-based application programs offer another tool for assisted reading. Similar to talking word processors, CD-based books include high-interest stories that use the power of multimedia to motivate students to read. These books read each page of the story, highlighting the words as they are read. Additional clicks of the mouse result in pronunciation of syllables and a definition of the word. When the student clicks on a picture, a label appears. A verbal pronunciation of the label is offered when the student clicks the mouse again. These books are available in both English and Spanish, so students can read in their native language while being exposed to a second language.

MATERIALS MODIFICATION: Special educators are familiar with the need to create instructional materials or customize materials to meet the varied needs of students with disabilities. Today there are powerful multimedia authoring and presentation tools that educators can use to develop and modify computer-based instructional materials for students with mild disabilities, providing a learning tool that these students can access and use to balance their weak areas of learning with their strong areas.

Authoring software allows teachers and students to develop instructional software that can incorporate video, pictures, animation, and text into hypermedia-based instruction. Multimedia authoring software is very easy to learn and use. In fact, authoring software packages are even available for young children. For example, if the objective is to teach map reading, an image of a local map can be scanned in and specific locations can be made into buttons that the students can click on, causing a short video clip playing of the familiar location. A set of questions might be asked using both text and synthesized speech to have students give directions on how to get the location shown on the video. Students could then write directions (or draw their own map). Digitized pictures of landmarks could also be incorporated into the directions. These directions, along with the images, could then be printed for use in completing the assignment. Without the ability to author and incorporate multimedia easily into instructional software, such computer-based training would be impossible because of the need to incorporate the shared learning concepts inherent in local environments into the assisted-learning process. Such instruction can make learning more efficient and certainly more real for students for whom abstract learning and generalization may be difficult.

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ELECTRONIC RESOURCES

Digests published by the ERIC Clearinghouse on Disabilities and Gifted Education are available for downloading or online reading on the AskERIC Virtual Library <ericir.syr.edu>.

The following Internet sites provide additional information on assistive technology for students with disabilities:

Gopher sites: gopher sjuvm.stjohns.edu

- St. John's University

- Electronic Rehabilitation Resource Center

gopher hawking.u.washington.edu

- University of Washington

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UNDERSTANDING THE DIGITAL ECONOMY
Data, Tools and Research

May 25 and 26, 1999
US Department of Commerce
Washington DC

THE GROWING DIGITAL DIVIDE IN ACCESS FOR PEOPLE WITH DISABILITIES:

OVERCOMING BARRIERS TO PARTICIPATION

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The Growing Digital Divide in Access for People with Disabilities: Overcoming Barriers to Participation in the Digital Economy

By Cynthia D. Waddell, JD

I. Introduction

II. Multiple Methods for Access Benefit Everyone

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V. Additional Problems Expanding the Digital Divide

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VII. Accessibility Rules and Research for the Digital Economy

I. Introduction

This White Paper was commissioned by the National Science Foundation to be presented on May 25, 1999 at the "Understanding the Digital Economy" conference; a public conference convened in response to a directive from the President of the United States to the National Economic Council, in consultation with executive branch agencies.[1]

The conference is timely because there are significant law and policy issues impacting the community of people with disabilities in their ability to overcome digital barriers and participate in the digital economy. The growth and success of the emerging digital economy requires that attention be paid to the mechanism for enabling dynamic participation. Unless the civil rights of America's 54 million[2] people with disabilities are addressed during this period of rapid, technological development, the community will be locked out

from participation on the basis of disability and the technological world will not be enriched by their diverse contributions.

The impact is systemic and reaches all sectors of our economy, whether or not the participant is a consumer, business owner, employee, educator, student, parent, child or citizen. Specific digital economy barriers need to be addressed in our research in order to inform our civil rights laws and public policy. As a person with a disability responsible for local government compliance with state and federal disability rights law, the author joins stakeholders in seeking a smart process that engages both individual differences and the collective community.[3]

This paper identifies some of the emerging digital economy barriers, current efforts to address these barriers and expresses the author's vision of the long-term policy research agenda. Because the benefits for overcoming these barriers extend beyond the community of people with disabilities, there are practical and significant business reasons for addressing this issue. Rather than creating a growing digital divide, emerging technology can enable full participation in the digital economy for everyone, regardless of age, disability or the limitations of the technology available.[4]

II. Multiple Methods for Access Benefit Everyone

As we examine the civil rights requirements for access and fairness, note the additional benefits that accrue: by mainstreaming the functionality found in the assistive computer arena into the architecture of our digital economy, we will expand technological innovations and develop creative solutions. By embracing our individual differences, the collective community receives greater benefits than that achieved through the segregation and isolation of people with disabilities.

Because the digital economy by definition requires a dynamic Internet environment, the very functionality required by the disability community can satisfy this dynamic requirement for web-based transactions. Accessible web design enables dynamic web sites- whether or not it is for business transactions, voting or long-distance learning. In addition, many benefits are emerging in the application of accessible web design. Accessible web design enables CD and videotapes to be archived through captioning. Accessible web design also enables electronic textbooks to be accessible. Even illiterate populations can access the Internet by listening to screenreaders audibly reading the web.

And lastly, web accessibility enables low technology to access high

technology. People with slow modems and low bandwidth can access the electronic content of the web. Even consumers without state of the art computer equipment or who only have a telephone, can participate in an accessible Internet environment using a telephone browser.

As Susan Brummel Turnbull pointed out in her white paper, "People with Disabilities and the NII: Breaking Down Barriers, Building Choice,[5] the public interest for investing in the National Information Infrastructure (NII) and people with disabilities is that it:

- Removes communications and information access barriers that restrict business and social interactions between people with and without disabilities
- Removes age-related barriers to participation in society
- Reduces language and literacy-related barriers to society
- Reduces risk of information worker injuries and
- Enhances global commerce opportunities.

III. Emerging Barriers in Web Page Transactions and the Internet Environment: The Problem

The more the marketplace is transformed into a digital economy, the more obvious it is to the community of people with disabilities that they cannot participate due to inaccessible web design.[6] It is true that on a case by case basis computer stations with assistive computer technology can be tailored to the particular needs of people with disabilities. But we have not fully addressed the linkage of the individual with the Internet community as a whole. Rapid changes in the Internet environment require that we examine not only the end-user workstation needs but also the technology barriers emerging beyond the computer workstation. End-users utilizing assistive computer technology cannot conduct web transactions if the Internet environment does not accommodate the functionality needs of accessible design. Unless this problem is addressed, expenditures on infrastructure and technology accommodations will be wasted if attention is not paid to the end-user locked out of the Internet due to inaccessible design.

According to the National Council on Disability[7], computers and the Internet are used by a significant number of people with disabilities in America.[8] But because the Internet environment is inaccessible, it is difficult to count the number of people with disabilities who would like to participate but cannot because of the barriers to access. Counting users on the Internet is like counting the number of people using wheelchairs who are inside an inaccessible building. It was once thought that since no wheelchair users were in the building, ramps were not needed.

The transformation of the Internet from a text-based medium to a robust multi-media environment has created a crisis – a growing digital divide in access for people with disabilities. Previously, people with visual disabilities were able to access the Internet with their screen readers audibly reading aloud the text on a web page. Today, graphical web pages are a barrier if they do not incorporate accessible web design.

This barrier is systemic and must be addressed in our policies as well as in our education and outreach. In their practical guide to the information economy for executives and policymakers, Information Rules: A Strategic Guide to the Network Economy, authors Shapiro and Varian point out that "[t]oday more than 60 percent of Internet traffic is to Web Sites, and of the Web traffic, almost three-fourths is images."[9]

The problem for screen readers is that inaccessible web page design either hides the text within images, frames, applets or animated gifs or renders the text unintelligently in table, columnar, or portable document format (pdf). Even on-line forms are inaccessible especially when designed to prevent keyboard navigation and input. Whether the form is posted for school or event registration or on-line banking or shopping transactions, people with visual and/or mobility disabilities are faced with a significant barrier to participation.

But the impact is not limited to people with visual and mobility disabilities. People with specific learning disabilities are also finding that they can no longer access web pages audibly with screen readers. Even people with cognitive disabilities are becoming lost due to the absence of navigation elements at web sites. Moreover, people with hearing disabilities cannot access the content of audiostreaming and videoclips posted on the Internet due to the absence of captioning.

The digital divide in web page transactions and the Internet environment has bred a host of additional problems for people with disabilities. For example, commercial web-authoring applications lack access tool kits for webmasters to correct accessible web design problems. In fact, many current web-authoring tools on the market make it extremely difficult to even design an accessible web page. The scarcity of tools also contributes to the lack of education among programmers and web authors on why and how to code an accessible web page. And if the webmaster herself is a person with a disability, she will also find a lack of web authoring applications that she can utilize. This is especially true for webmasters with mobility disabilities requiring voice, eye tracking or keyboard input/output features in web authoring applications.

Whether the digital barrier is the inaccessible design of Internet/Intranet web sites, Internet Service Provider "portals," incompatible browsers, or inaccessible web-based platforms for on-line business, the trend is growing and must be addressed at the infancy of the digital economy. Already, exciting electronic and information technology features are emerging in the areas of information appliances, real-time conference participation, audio-streaming, telephone voice browsers, search engines, news groups, chat rooms and 3-D imaging. Unless functionality solutions for accessibility are addressed today, the state of the digital divide tomorrow may be impossible to overcome.

IV. Disability Rights Law and Policy Impacting Web Page Transactions and the Internet Environment

Consider the comments of Lawrence Lessig in his article on "Cyber-Governance":

> We have no problem of governance in cyberspace. We have a problem with governance. There isn't a special set of dilemmas that cyberspace will present; there are just the familiar dilemmas that modern governance confronts- familiar problems in a new place . . . . Cyberspace is that space constituted by code- by software and hardware that together make up the architectures that cyberspace is . . . . These architectures are many; the values that they imbed- privacy, anonymity, access, control- are varied; and hence a choice about these architectures is a choice about these values. Yet we are at a time when we are strangely disabled from making choices about these architectures.[10]

If it is true that we are disabled from making smart choices about cyberspace architectures, then inaccessible web design is certainly evidence of this problem. Yet, the evolution of our disability rights laws have resulted in the understanding that access to information and communication is a civil right for people with disabilities. Some of the current federal statutes and their implementing regulations that protect this civil right include:

1. Section 504 of the Rehabilitation Act of 1973[11]
2. Section 508 of the Rehabilitation Act of 1973[12]
3. Rehabilitation Act Amendments of 1986[13]
4. Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act)[14]
5. Americans with Disabilities Act of 1990 (ADA)[15]
6. Education of the Handicapped Act Amendments of 1990[16]
7. Education for All Handicapped Children Act of 1975

(EAHCA)[17]
8. Handicapped Infants and Toddlers Act[18]
9. Telecommunications Act of 1996[19]
10. Section 121 of the U.S. Copyright Law[20]
11. Individuals with Disabilities Education Act[21]

Although each of these statutes, their amendments and regulations deserve an extended discussion as to the civil right protections impacting electronic and information technology, this paper is limited to highlighting some of the significant legal issues that can inform our policy impacting people with disabilities.

ADA Legal Challenges

First, as of this writing there have been no legal challenges under the Americans with Disabilities Act of 1990 (ADA) on the issue of inaccessible web pages and the Internet environment. Nevertheless, attention is being paid to the application of the ADA to inaccessible web design because of the scope and impact of this statute protecting people with disabilities from discrimination in their access to employment and commerce.

As discussed below, the ADA requirements for "effective communication" and the provision of "auxiliary aids and services" and "reasonable accommodations" apply to the computer and Internet environment. Because of the ongoing duty to remove barriers, it is not enough to respond on an ad-hoc basis to individual requests for accommodation. There is an affirmative duty to develop a comprehensive policy involving input from the community of people with disabilities. New technology must either improve accessibility or ensure compatibility with existing access design functions. In addition, the ADA also provides for a "new generation of civil rights laws in which Congress assigned Federal agencies not only the duty to enforce, but also to inform all parties (persons with disabilities and covered entities) of their responsibilities and rights under the law."[22]

Nevertheless, as discussed in this author's article "Applying the ADA to the Internet: A Web Accessibility Standard,"[23] the U.S. Department of Justice (USDOJ) has issued only one policy ruling letter concerning web site accessibility dated September 9, 1996 (hereinafter USDOJ Letter).[24] In fact, the USDOJ has been faulted for failing to provide proactive guidance on web site accessibility.[25] But the USDOJ Letter does reiterate the ADA requirement that covered entities must furnish appropriate auxiliary aids and services where necessary to ensure effective communication with individuals with disabilities, unless doing so would result in a fundamental alteration to

the program or service or in an undue burden.[26]

Under the rationale of "effective communication," the USDOJ Letter states that ADA Titles II and III require state and local governments and the business sector to provide effective communication whenever they communicate through the Internet. The effective communication rule applies to covered entities using the Internet for communication regarding their programs, goods or services since they must be prepared to offer those communications via an accessible medium.

Specifically addressing the needs of people with visual disabilities, the USDOJ Letter points out that providing a text format rather than a graphical format assures accessibility to the Internet for individuals using screenreaders. Without special coding a text browser will only display the word "image" when it reads a graphic image. Moreover, if the graphic is essential to navigating the site (such as a navigational button or arrow) or if it imparts vital information (such as a table or image map) the user can get stuck and not be able to move or understand the information provided.

Legal challenges are anticipated[27] amid the growing avalanche of ADA administrative complaint filings that have yet to reach the courts. In fact, a number of web site complaints have quietly settled with the covered entities promising to retrofit their web sites for accessible design. Examples of the types of ADA complaints anticipated include: employees requiring accessible intranet/internet environment as a reasonable accommodation under ADA Title I; employees and students requiring access to long-distance learning courses; citizens requiring access to internet kiosks for voting or participating in business or governmental transactions; or consumers requiring access to electronic textbooks and the web-based environment.

Emerging Legal Requirements for Internet Accessibility

Section 508: Electronic and Information Technology

The newly revised Section 508 of the Rehabilitation Act of 1973[28] now imposes strict accessibility requirements for electronic and information technology developed, maintained, procured, or used by federal agencies. As part of the Section 508 implementation effort, on April 2, 1999 Attorney General Janet Reno directed that all federal agencies conduct self-evaluations of their electronic and information technology and report by June 15, 1999 the extent to which their electronic and information technology is accessible to

people with disabilities.[29] This Section 508 compliance package includes a number of accessibility checklists for software, web page, information technology machines, (ITM) and information technology (IT) equipment as well as a Resource Guide.[30]

The definition of electronic and information technology under Section 508 includes: computers, hardware, software, web pages, facsimile machines, copiers, telephones and other equipment used for transmitting, receiving, using or storing information.[31] It is expected that by February 7, 2000 the Architectural and Transportation Barriers Compliance Board (Access Board) will issue standards that will define what is meant by electronic and information technology and will set forth the technical and functional performance criteria for accessibility implementation.[32]

U.S. Department of Education, Office for Civil Rights

Lastly, for the last four years there have been significant legal developments coming out of the U.S. Department of Education, Office for Civil Rights, in their OCR Letters of Resolution against higher education institutions in the State of California.

Access to the learning environment is a critical, front-line issue requiring an immediate resolution. For example, library reference services are being transformed by the efficiency of Internet access to information systems and search engines. Professors are teaching long-distance learning courses over the Internet and even if a student is physically in class, homework assignments and resources are being posted on classroom web pages. Yet, even if a library terminal has assistive computer technology installed for students or visitors with disabilities, Internet research is not possible with inaccessible web page design.

The following is a summary of four selected California OCR Letters of Resolution impacting Internet accessibility:

1. **OCR Letter Docket No. 09-95-2206 (January 25, 1996)**: Student complaint that a university failed to provide equivalent access to the Internet. Student with a visual disability was required to make appointments with personal reader attendants as the exclusive mechanism for access to the Internet. The University also failed to complete the "Self-Evaluation Plan" as required by ADA Title II. According to the finding:

The issue is not whether the student with the disability is merely provided

access, but the issue is rather the extent to which the communication is actually as effective as that provided to others. Title II [of the ADA] also strongly affirms the important role that computer technology is expected to play as an auxiliary aid by which communication is made effective for persons with disabilities. OCR notes that the "information superhighway" is fast becoming a fundamental tool in post-secondary research.[33]

2. **OCR Letter Docket No. 09-97-2002 (April 7, 1997)**: Student complaint that a university failed to provide access to library resources, campus publications, open computer laboratories, training on adaptive computer technology and computer test-taking. According to the finding:

Title II of the Americans with Disabilities Act (Title II) requires a public college to take appropriate steps to ensure that communications with persons with disabilities "are as effective as communications with others" [28 C.F.R. § 35.160(a)]. OCR has repeatedly held that the term "communication" in this context means the transfer of information, including (but not limited to) the verbal presentation of a lecturer, the printed text of a book, and the resources of the Internet. Title II further states that, in determining what type of auxiliary aid and service is necessary, a public college shall give primary consideration to the requests of the individual with a disability [28 C.F.R. § 35.160(b)(2)].[34]

In further clarifying what is meant by "effective communication," OCR held that the three basic components of effective communication are: "timeliness of delivery, accuracy of the translation, and provision in a manner and medium appropriate to the significance of the message and the abilities of the individual with the disability."[35]

OCR also points out that the courts have held that a public entity violates its obligations under the ADA when it only responds on an ad-hoc basis to individual requests for accommodation. There is an affirmative duty to develop a comprehensive policy in advance of any request for auxiliary aids or services. See Tyler v. City of Manhattan, 857 F. Supp. 800 (D.Kan. 1994)[36] Moreover, according to OCR "[a] recognized good practice in establishing such a comprehensive policy is to consult with the disability community, especially those members most likely to request accommodations."[37]

Of particular interest is the analogy OCR draws between the rationale for bringing an existing building up to code for access and the purchase of new technology for information systems. For example, buildings built prior to access laws are governed by "program access" requirements and remodeling

triggers the requirement to install certain accessible architectural features.

Similarly, the effective communication requirement according to OCR imposes a duty to solve barriers to information access that the entity's purchasing choices create. Whenever existing technology is "upgraded" by a new technology feature, it is important to ensure that the new technology either improves accessibility or is compatible with existing assistive computer technology.[38] For example, web-authoring software programs that erect barriers in their coding of web pages fall under this scrutiny.

Lastly, OCR states that when an entity selects software programs and/or hardware equipment not adaptable for people with disabilities, "the subsequent substantial expense of providing access is not generally regarded as an undue burden when such cost could have been significantly reduced by considering the issue of accessibility at the time of the initial selection."[39] Therefore all technology improvements must take into account the removal of barriers and ensure that new barriers to access do not occur. Covered entities preparing to retrofit their web sites need to be aware of this requirement.

3. **OCR Letter Docket No. 09-97-6001 (January 22, 1998)**: OCR Statewide compliance review under Title II of the ADA and Section 504 of the Rehabilitation Act. The purpose of the review and subsequent OCR Report was to assess how 106 California Community Colleges meet their obligations to students with visual disabilities in providing access to print and electronic information. In OCR's letter dated January 22, 1998,[40] the comprehensive review suggested nine strategies to address:

- Cost-effective approach to purchasing adaptive technology
- Adaptive technology training
- Access guidelines for distance learning and campus web pages as well as tools for training faculty and staff
- Inclusive language in the distribution of standard technology grants/funds addressing college responsibility to ensure technology access and compatible upgrades
- Print materials translated into alternate formats such as electronic text and Braille
- Central registry of textbooks in alternative formats
- Library technology initiatives for access to both students and patrons with disabilities
- Follow-up to OCR survey initiated in 9/18/96 to determine compliance progress
- Annual reviews of Disabled Student Programs and Services to include attention to the removal of barriers in electronic technology

The Community College Chancellor has agreed to implement OCR's recommendations to help the colleges meet their obligations under the ADA and Section 504 of the Rehabilitation Act.[41] Whereas the assistive computer technology training, support and services for students with disabilities was once limited to staff exclusively working with the Office of Disabled Student Programs, a systemic plan is now required for mainstreaming this knowledge campus-wide:

"Technology access, like architectural access, must be addressed institutionally as an integral part of the planning process." [42]

Just as the removal of architectural barriers requires a plan for implementation, the removal of technological or digital barriers in programs and services requires a comprehensive institutional plan impacting every campus office.

4. OCR Letter Docket No. 09-99-2041 (April 20, 1999): Student complaint that the university failed to provide access to the College of Business curriculum and other educational programs, including computer laboratories and classes in the College of Business. OCR noted that although the academic community has heavily relied upon centralized units on campus to house and maintain assistive computer technology:

[S]uch sole reliance upon a single centralized location (when not limited to adaptive technology training, but instead used for instructing disabled students in course subject matter) may run counter to the strong philosophy embodied in Title II and Section 504 regarding the importance of fully integrating students with disabilities into the mainstream educational program, unless such services cannot be otherwise effectively provided [see 34 C.F.R. § 104.4(b)(iv); 28 C.F.R. § 35.130(b)(iv)] . Thus, OCR assumes in most cases computer access will be effectively provided to the student with the disability in an educational setting with his or her nondisabled peers and classmates at the various computer laboratory sites scattered throughout the campus.[43]

As a result, the mainstreaming of students with disabilities has created the need for appropriate technology tools for access to the learning environment. And as students with disabilities move into the workforce as employees, employers or consumers, accessible web design and an accessible internet platform remains a significant issue to be addressed in the digital economy. In other words, overcoming barriers in the digital economy requires appropriate policies, technology tools and education for accessible system design and implementation.

V. Additional Problems Expanding the Digital Divide

We have seen how people with disabilities are locked out of the digital economy web environment due to the lack of accessible design. The digital divide will continue to expand if this issue is not addressed in our research, education and outreach. As the rapid development of new web applications continues, it is necessary to ensure that new barriers are not erected to effective communication and commerce.

This section briefly highlights some of the additional problems currently expanding the digital divide: Internet Services Providers, Internet voting, accessible system design, Internet kiosks, smart cards, electronic textbooks, long-distance learning, and consumer household appliances.

Internet Service Providers

According to a recent study by the American Foundation for the Blind, there are significant accessibility issues to consider when a consumer determines whether or not to utilize on-line services or Internet Service Providers. Although America Online is one of the most popular services for accessing the Internet, it is currently not a good choice for consumers who are blind. Expert screen reader users find it extremely difficult to navigate because of its nonstandard controls (buttons and icons) and lack of keyboard commands.

The study also examined CompuServe and concluded that although it was more usable than America Online, its forums and chat rooms present accessibility problems. The report concluded that the best solution for Internet access for people who are blind is an Internet service provider where the user can choose the most accessible E-mail program and Web browser for the screen reader being utilized.[44]

Internet Voting

As government agencies look to the Internet as an efficient way to conduct elections, it is important to ensure that web pages utilized for voting do not contain accessibility barriers. For example, currently a number of Fortune 500 companies provide Internet voting as an option for shareholder participation at

annual or special business meetings and are unaware that there are accessibility barriers at their web sites. This problem should be a reminder for governments that Internet voting for local, state or national elections requires accessible web design to prevent the disfranchisement of people with disabilities.

Accessible System Design

As governmental entities and businesses employ policies to satisfy ADA Title II or ADA Title I requirements, a systemic review similar to the Year 2K problem should be underway to remove accessible system design barriers impacting employees and consumers. For example, designers of statewide or agency computer systems should be addressing the impact of their design 'upgrade' on current employees using assistive computer technology. Employees with disabilities should not be suddenly losing their ability to do their job because of this lack of planning.

Even if a vendor has a package with built-in accessibility features, it is important that people with disabilities are involved in the development of the product as well as in the procurement of the product. By including this knowledge on the team, system planning can anticipate and address compatibility, accessibility and implementation issues. Examples of some of the problematic issues include: the transfer of human resources/payroll/product inventory databases to particular intranet environment formats not friendly to screenreader access or keyboard navigation; the intranet 'upgrade' to database search engine capability when the search engine itself is not accessible to screenreaders; or the inaccessible design of a web-based vendor platform for conducting on-line business. Research is needed on how to best incorporate difference and choice to address this growing problem. The author has received numerous calls from state and business entities across the nation seeking solutions after a system upgrade "bumped" an employee from the workplace.

Internet Kiosks

Internet kiosks and information technology machines (ITM) are appearing in the marketplace without ensuring accessibility for people with disabilities. Whether the barrier is a touch screen feature or other inaccessible element, specific guidelines are needed for the industry to address functional requirements. The Access Board has been researching the accessibility of ITM's and a draft copy of their final report can be accessed from their web site at http://www.access-board.gov .

Smart Cards

Smart cards, whether they are in the shape of credit cards, keys or rings, or demand vision to access digital displays of random password entry numbers for operation, require accessible design considerations. As businesses and governmental agencies increase their investment in these products for security or employee identification reasons, the number of consumers and employees impacted by the lack of accessible design will increase. Solutions are needed to address this problem.

Electronic Textbooks

Currently the State of Texas Education Code[45] requires the Texas Education Agency to develop a study project to determine the costs and benefits of using computer networks, including the Internet in public schools. The issues to be studied include electronic delivery of textbooks and supplement updates as well as the feasibility and cost-effectiveness of producing electronic textbooks for students with disabilities.

In response to this mandate, the Texas Education Agency issued their report in February 1999 entitled, Report on the Computer Network Study Project.[46] This comprehensive report includes the following recommendations:

· Establish an advisory committee to develop guidelines for designing accessible, interactive electronic instructional materials including simulations.

· Fund a study of the costs for developing accessible electronic textbooks[47] as well as two demonstration projects for developing two interactive electronic textbooks: one electronic textbook to be CD-ROM-based that students with disabilities can use without assistive technology devices; the other an interactive accessible Internet-based or Intranet-based textbook that students with disabilities can use without assistive technology devices

· Require beginning in the year 2003 all CD-ROM textbooks or materials adopted by the State Board of Education comply with the basic accessibility requirements contained in the report

· Require beginning in the year 2003 all Internet-based or Intranet-based textbooks adopted by the State Board of Education comply with the accessibility guidelines of the World Wide Web Consortium

· Require that all materials purchased by Texas public schools for preparing students to take standardized and college entrance examinations be accessible to students with disabilities.

Likewise, in the State of California, Assembly Bill 422[48] requires publishers of textbooks and instructional materials to provide an electronic version for people with disabilities if the material is required as part of a course or study in a community college, the California State University or the University of California. A second bill, Assembly Bill 609[49], addresses the needs of grades kindergarten through twelve and includes the requirement that publishers of instructional materials provide the state, at no cost, computer files or electronic versions of the instructional material. Lastly, a third bill, Assembly Bill 395[50], provides conformity with the IDEA for special education programs and requires publishers and manufacturers to provide instructional materials to the state in electronic format compatible with Braille translation and speech synthesis software.

The efforts in Texas and California are timely and if successful, then another barrier in the digital divide will fall.

Long Distance Learning

The growth of the Internet has created virtual universities and on-line courses that have not been designed to allow people with disabilities to participate. Whether or not these on-line courses are being taken by students or by employees, inaccessible design is a barrier. As mentioned earlier, the January 22, 1998 California Community OCR Findings identified this problem:

> California Community Colleges, individually and collectively as part of the California Virtual University, are rapidly developing their capacity to deliver educational programs to offsite students through technology. Little attention is being given to ensure that these distance learning programs are accessible to students with disabilities, especially students with visual impairments.[51]

The California Community Colleges currently have an enrollment of 4.1 million students and have responded by establishing a Distance Education Accessibility Work Group to develop Distance Education Accessibility Guidelines. The draft guidelines are currently under review by a variety of groups within the system including the Academic Senate for California Community Colleges, the general Distance Education Technology Advisory Committee, the Distance Education Accessibility Work Group, DSPS Regional Coordinators, and the High Tech Center Training Unit Advisory Committee. It is expected that once feedback is received and incorporated, the Chancellor of the California Community Colleges will issue final guidelines.[52]

As of the writing of this paper, the California Community College long distance learning guidelines will require all newly developed or acquired distance education curricula and instructional materials to be accessible for people with disabilities. In addition, as part of the six year curriculum review cycle for accreditation, all existing curricula and instructional materials are to be reviewed and revised, if necessary, to provide accessibility.[53]

Household Appliances

Digital components with touch screen or flat screen displays are bringing common household appliances into the digital age. Unfortunately, consumers with disabilities are finding they cannot use these appliances. Whereas household appliance switches and knob settings can be Brailled so that people with visual disabilities can operate the appliances, this solution is not available for appliances utilizing digital operational displays. Some of the common household appliances converting to a digital operation display include stoves, microwaves, dishwashing machines, and clothes washing/drying machines.

VI. Emerging Solutions to Overcoming the Digital Divide

This section highlights two particular efforts underway to address the problems of barriers in web page design and the Internet environment: City of San Jose, California, web accessibility effort and the World Wide Web Consortium Web Accessibility Initiative. It also highlights some of the emerging benefits that extend beyond the community of people with disabilities.

City of San Jose Web Page Disability Access Design Standard

As the ADA Compliance Officer for the City of San Jose, the author participated on an Internet Home Page Team from October 1995 through June 1996. Our team purpose statement was "to lay a foundation including the establishment of standards, goals and guidelines for the City of San Jose's Internet World Wide Web Pages." Of particular concern was the filing of an ADA administrative complaint against the City of San Jose by a blind City Commissioner. The Commissioner complained that she was unable to access City Council documents as part of her work in advising City Council because the documents were posted in an inaccessible format, ie. portable document format (pdf).

By June 1996, the City of San Jose Web Page Disability Access Design Standard was developed in response to the monitoring of ADA Internet complaints and the need to incorporate City ADA implementation policies.[54] By integrating the requirements of the ADA and applying Universal design principles, we have ensured the widest public access to City electronic government information and services.[55] Currently these standards are being incorporated into our web site and are subject to change as technology advances to solve digital barriers and integrate access tool kits in web-authoring tools.

Just as curbcuts enable people using wheelchairs to navigate our City streets, "electronic curbcuts"[56] enable people with disabilities to navigate the digital economy. There are seven basic requirements in the City of San Jose minimum accessible web design standard:[57]

1. Provide an Access Instruction Page for Visitors (includes email hyperlink for visitors to communicate problems with web page accessibility)[58]
2. Provide support for text browsers[59]
3. Attach "Alt" tags to graphic images so that screenreaders can identify the graphic[60]
4. Hyperlink photographs with descriptive text "D"[61]
5. Caption all audio and video clips by using "CC" hyperlinks[62]
6. Provide alternative mechanism for on-line forms (such as email or voice/TTY phone numbers)[63]
7. Avoid access barriers such as the posting of documents in PDF, table, newspaper or frame format or requiring visitors to download software. If posting in PDF, the HTML text or ASCII file must also be posted.[64]

As a result of our web accessibility effort,[65] the City of San Jose was awarded the League of California Cities Helen Putnam Grand Prize for Excellence[66] as well as recognition as a "best practices" model by the United States General Services Administration Center for Information Technology Accommodation.[67] The author's effort also led to being named to the "Top 25 Women on the Web" by Webgrrls International.[68]

World Wide Web Consortium Web Accessibility Initiative

On May 5, 1999 the World Wide Web Consortium (W3C) announced the release of the "Web Content Accessibility Guidelines 1.0"[69] specification as a W3C Recommendation. This significant development provides a stable specification that has been reviewed and recommended by the W3C Membership as a tool for making web sites accessible. As Tim Berners-Lee, W3C Director and inventor of the World Wide Web aptly states: "The power

of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."[70]

The W3C Recommendation is evidence of the W3C commitment to lead the way to full participation on the Web for everyone and is an important step since the launch of the Web Accessibility Initiative (WAI) April 1997 in the County of Santa Clara, California.[71]

The W3C Web Accessibility Initiative (WAI) recognizes the problem of barriers on the Web for people with disabilities and is committed to pursuing solutions through five primary activities:

- Ensuring that Web technologies support accessibility
- Developing guidelines for accessibility
- Developing tools to evaluate and facilitate accessibility
- Conducting education and outreach
- Monitoring and engaging in research and development[72]

The WAI technical activity addresses technology, guidelines and tools coordinated through the International Program Office. For example, in the technology arena, WAI has identified the following areas for accessibility needs: HTML, Style Sheets, Multimedia, MathML, DOM, XML, Graphics, Mobile Access, Internationalization. Currently there is a Protocols and Formats Working Group as well as an HTML/CSS Review Working Group.[73]

In the area of web accessibility guidelines critical for web site development and web application development, the WAI is coordinating page authoring guidelines[74] for accessible web sites; user agent guidelines,[75] such as browsers and multimedia players; and authoring tool guidelines,[76] such as editors and site management tools. Currently there is a Web Content Guidelines Working Group, a User Agent Guidelines Working Group and an Authoring Tools Guidelines Working Group.[77]

Lastly, in the area of tools to facilitate web accessibility, the WAI is coordinating an effort to develop tools for evaluation, repair and proxy conversions. Currently there is an Evaluation and Repair Interest Group and an Evaluation and Repair Working Group.[78]

The WAI International Program Office focuses on education and outreach and is separately funded by W3C Member activities, governments and corporations. For example, sponsors include the U.S. National Science Foundation, U.S. Department of Education National Institute on Disability and Rehabilitation Research, European Commission's TIDE Programme

under Directorate Generale XIII, Microsoft Corporation, IBM, Lotus Development Corporation and NCR.[79]

VII. Accessibility Rules and Research for the Digital Economy

As stated in a recent report by the President's Information Technology Advisory Committee:

As we have the opportunity to use information technology to strengthen our societal institutions, we must understand the potential pitfalls, and the safeguards we must put in place to achieve both a free and fair flow of information.[80]

Overcoming the digital divide for people with disabilities requires a "free and fair flow of information" safeguarded by civil rights. Civil rights principles should guide policymakers in the application of technology in the emerging digital economy. Although information technology changes; civil rights principles do not.[81]

Already our civil rights statutes require government to consult the community of people with disabilities whenever policies, services or programs impact their community. There has also been a significant shift to include people with disabilities in the design, research and development of assistive technology.[82]

In More Than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure,[83] three recommendations are offered for federal research that are supported by the author of this White Paper:

1. Break away from 1960s technologies and paradigms with a research agenda acknowledging that the "human-machine interface is more than screen deep and should consider every aspect of a person's experience in using computing and communications."[84]
2. Invest in the research required to provide the component subsystems needed for every-citizen interfaces with the highest priority being the determination of citizens' needs.[85]
3. Encourage research on systems-level design and development of human-machine interfaces that support multiperson, multimachine groups as well as individuals.[86]

In addition, overcoming the digital divide also requires collaboration in open

source technologies[87] because civil rights principles reinforce the greater value of the functionality returned through the collaboration.[88] Yet, according to Shapiro and Varian, there is the problem that

> Open standards are prone to "splintering," or "fragmentation." Splintering of a standard refers to the emergence of multiple, incompatible versions of a standardized technology. . . .Open standards can also be "hijacked" by companies seeking to extend them in proprietary directions, and thus in time gain control over the installed base. Microsoft has been accused of trying to extend both Java and HTML in proprietary directions.[89]

Perhaps research is needed on how to best manage open standards where civil right protections are afforded the community of people with disabilities in their access to technology. As suggested by O'Reilly, an area for future study is "where the ideal boundary ought to be between a core product controlled by a single individual or small team, and the input of the user community."[90]

Lastly, civil rights principles should guide researchers as the federal government addresses the ten critical "National Challenge Transformations" identified by the President's Information Technology Advisory Committee:

> These information technology transformations will affect how we communicate,[91] how we store and access information,[92] how we become healthier and receive proper medical care,[93] how we learn,[94] how we conduct business,[95] how we work,[96] how we design and build things,[97] how we conduct research,[98] how we sustain a livable environment,[99] and how we manage our government in the next millennium.[100]

As our national research agenda addresses these critical issues, this White Paper calls for fairness and equity and echoes the view of the National Council on Disability[101] that

> If equal access to multimedia for people with disabilities is to become a reality, knowledge and awareness will have to be developed across all areas.[102]

A robust and strong digital economy requires the removal of barriers through the deployment of accessible design elements in our computer, information technology and communications. By directing our research and policy directives to address these problems, we will overcome the digital divide and ensure full participation in the global digital economy.

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[1] "Understanding the Digital Economy" conference, May 25 and 25, 1999, http://www.digitaleconomy.gov/
[2] National Center for the Dissemination of Disability Research, "Who Needs Web Site Accessibility?" The Research Exchange 3, no. 3 (1998): 1-5. http://www.ncddr.org/researchexchange/ According to this article, estimates of the total number of Americans vary according to the criteria used. The figure of 43 million was stated in the Americans with Disabilities Act of 1990 (Public Law 101-336, 104 Stat. 327, codified as amended at 42 U.S.C. §§ 12101-12213 (1994)). Another figure of 36.1 million was proposed by the Disability Statistics Rehabilitation Research and Training Center based on data from the 1990 National Health Interview Survey and additional sources. The National Council on Disability Bulletin (September 1997) cited the figure of 54 million.
[3] See Susan Brummel and William E. Smith, "The Challenge Toward Science-Enabled Governance: Realizing Embedded Levels of Engagement in a Smart Process" http://www.isi.edu/nsf/papers/nsfsb.html See also Katherine Thornberry, "City Worker Ensures Web is Accessible to Everyone," Silicon Valley Business Journal, October 27, 1997 (hereinafter cited as Thornberry, "City Worker Ensures Web is Accessible") http://www.amcity.com/sanjose/stories/102797/focus3.html
[4] Cynthia D. Waddell, "Applying the ADA to the Internet: A Web Accessibility Standard," presented at the American Bar Association national summit on disability law and policy: In Pursuit-A Blueprint for Disability Law and Policy, June 17, 1998 (hereinafter cited as Waddell, "Applying the ADA to the Internet") http://www.rit.edu/~easi/law/weblaw1.htm
[5] Susan Brummel, "People with Disabilities and the NII: Breaking Down Barriers, Building Choice," September 1994 National Information Infrastructure White Paper, http://www.itpolicy.gsa.gov/coca/nii.htm
[6] See Leslie M. Campbell and Cynthia D. Waddell, "Electronic Curbcuts: How to Build an Accessible Web Site," CAPED Communiqué, (California Association on Postsecondary Education and Disability, Spring 1997) (hereinafter cited as Campbell and Waddell, "Electronic Curbcuts") http://www.prodworks.com/ilf/w5bcw.htm
[7] http://www.ncd.gov/
[8] National Council on Disability, "Access to Multimedia Technology by People with Sensory Disabilities," (Washington, DC: National Council on Disability, March 13, 1998), p. 52 (hereinafter cited as NCD, "Access to Multimedia Technology") http://www.ncd.gov/publications/sensory.html
[9] Carl Shapiro and Hal R. Varian, Information Rules: A Strategic Guide to the Network Economy, (Boston, Massachusetts: Harvard Business School Press, 1999), p. 6. (hereinafter cited as Shapiro and Varian, Information Rules) http://inforules.com
[10] Lessig, Lawrence, "Cyber-Governance," CPSR Newsletter - Computer Professionals for Social Responsibility 16, no. 4, (Fall, 1998) pp. 1,4.
[11] Pub. L. No. 93-112 § 504, 87 Stat. 355, 394 (codified as amended at 29 U.S.C. § 794 (1994). Rehabilitation Act of 1973 mandates reasonable accommodation and least restrictive environments in federally funded employment and higher education; requires assistive technology and services to people with disabilities.
[12] Section 508 was originally added to the Rehabilitation Act in 1986. In 1998 Section 508 was revised under the Workforce Investment Act of 1998, Pub. L. No. 105-220, 112 Stat. 936 (1998)(codified at 29 U.S.C. § 798). The revision expands and strengthens the technology access requirements in Section 508. Sec. 408(b), § 508, 112 Stat. at 1203-06. Section 508 applies to Federal departments and agencies and does not apply to recipients of Federal funds. However, states receiving Federal funds under the Tech Act are required to comply with Section 508. The text of Section 508 can be found at http://www.usdoj.gov/crt/508
[13] Pub. L. No. 99-506, 100 Stat. 1807 (codified as amended at 29 U.S.C. §§ 716-717, 794d, and 42 U.S.C. §§ 2000d-7 (1994) requiring states to include assistive technology services in plans for clients with disabilities and mandates equal access to all electronic equipment in federal workplaces.
[14] Pub. L. No. 100-407, 102 Stat. 1044 (codified as amended at 29 U.S.C. § 2201-2288 (Supp. 1996)) Congress amended this statute in 1994: Technology-related Assistance for Individuals with Disabilities Amerndments of 1994, Pub. L. No. 103-218, 108 Stat. 50 (Supp. II 1996)(codified in 29 U.S.C. § 2201 note and in various sections of 29 U. S.C.) It is interesting to note that the statute recognized a growing digital divide: "Many individuals with disabilities cannot access existing telecommunications and information technologies and are at risk of not being able to access developing technologies. The failure of Federal and State governments, hardware manufacturers, software designers, information systems managers, and telecommunications service providers to account for the specific needs of individuals with disabilities results in the exclusion of such individuals from the use of telecommunications and information technologies and results in unnecessary costs associated with the retrofitting of devices and product services." 29 U.S.C. § 2201(a)(7)(Supp.II 1996).
[15] Pub. L. No. 101-336, 104 Stat. 327 (codified as amended at 42 U.S.C. §§ 12101-12213 (1994). The ADA extends sections 503, 504 and 508 of the Rehabilitation Act to all qualified individuals with disabilities.
[16] Pub. L. No. 101-476, 104 Stat. 1103(codified as amended at 20 U.S.C. 1400 (1994)) extending assistive technology devices and services definition to education.
[17] Pub. L. No. 94-142, 89 Stat. 773 (codified as amended at 20 U.S.C. §§ 1401-1461 (1994)) extending reasonable accommodation and least restrictive environment provision of the Rehabilitation Act to ages five through twenty-one in education; provides for assistive technology to play a significant role in access to educational programs.
[18] Pub. L. No. 99-457, 100 Stat. 1145 (1986)(codified as amended at 20 U.S.C. §§ 1471-1485 (1994)) extending EAHC to infants and children up to five years and expanding provisions on education-related assistive technology.
[19] Pub. L. No. 104-104, 110 Stat. 56 (1996) Two provisions of the Telecommunications Act address specific access needs for people with disabilities: Sections 255 and 713. Section 255 requires all manufacturers of telecommunications equipment and providers of telecommunications services to ensure that equipment and services are accessible, if readily achievable. Section 713 seeks to ensure that video services are accessible to people with hearing and speech disabilities. For example, closed captioning and video description provisions are mechanisms for providing accessibility. The Access Board guidelines for compliance with the Telecommunications Act of 1996 are found at http://www.access-board.gov/rules/telfinl2.htm

[20] Pub. L. No. 104-107, 110 Stat. 2394, 2416 (Legislative Branch Appropriations Act, 1997, adding new section 121 to Title 17 U.S. Code) providing exemption from copyright infringement for an authorized entity to reproduce or to distribute copies or phonorecords in specialized formats exclusively for use by blind or other people with disabilities.
[21] Pub. L. No. 105-17 Recently re-authorized and strengthened as the Individuals with Disabilities Education Act Amendments of 1997.
[22] United States Commission on Civil Rights, Helping State and Local Governments Comply with the ADA: An Assessment of How the United States Department of Justice Is Enforcing Title II, Subpart A, of the Americans with Disabilities Act, (Washington, DC: U.S. Commission on Civil Rights, September 1998) pp. 10-11(hereinafter cited as U.S. Commission on Civil Rights, Helping State and Local Governments Comply with the ADA) http://www.usccr.gov/
[23] Waddell, "Applying the ADA to the Internet" http://www.rit.edu/~easi/law/weblaw1.htm
[24] Deval Patrick, Assistant Attorney General, Civil Rights Division, U. S. Department of Justice, letter to Tom Harkin, U. S. Senate, re application of the ADA to "web pages" on the Internet, September 9, 1996, 10 NDLR ¶ 240.
[25] U.S. Commission on Civil Rights, Helping State and Local Governments Comply with the ADA, p.111.
[26] See 28 C.F.R. § 36.303; 28 C.F.R. § 35.160.
[27] Waddell, Cynthia D. and Kevin Thomason, "Is Your Site ADA-Compliant? or a Lawsuit-in-Waiting?", The Internet Lawyer, (New York: GoAhead Productions, November 1998) no. 4.11 http://www.internetlawyer.com
[28] See Workforce Investment Act of 1998, Pub. L. No. 105-220, 112 Stat. 936 (1998).
[29] April 2, 1999 Memorandum from Attorney General Janet Reno to Heads of All Federal Agencies, Subject: Electronic and Information Technology (hereinafter cited as Attorney General Reno Memo) http://www.usdoj.gov/crt/508/memohead.html
[30] For checklists: http://www.usdoj.gov/crt/508/508docs.html and for Resource Guide: http://www.usdoj.gov/crt/508/508home.html
[31] Attorney General Reno Memo, http://www.usdoj.gov/crt/508/memohead.html
[32] As part of the rulemaking process, the Access Board has convened the EITAAC (Electronic and Information Technology Advisory Committee) to advise the Board as it develops the standards. http://www.access-board.gov/
[33] See OCR Letter Docket Number 09-95-2206, pp. 1-2; 28 C.F.R. § 35.160(a)) http://www.rit.edu/~easi/law/sjsu.html
[34] See OCR Letter Docket No. 09-97-2002, p. 1. http://www.rit.edu/~easi/law/csula.html
[35] Ibid.
[36] Ibid., p. 2.
[37] Ibid.
[38] Ibid.
[39] Ibid.
[40] January 22, 1998 letter from Stefan Rosenzweig, Regional Director, U.S. Department of Education, Office for Civil Rights to Thomas J. Naussbaum, Chancellor, California Community Colleges (hereinafter cited as OCR Letter dated 1/22/98) http://www.rit.edu/~easi/law/ocrsurltr.html
[41] See March 9, 1999 letter from Ralph Black, General Counsel for the California Community Colleges to Paul Grossman, Chief Regional Attorney, U.S. Department of Education, Office for Civil Rights re Case Docket No 09-97-6001 (hereinafter cited as OCR Letter dated 3/9/99).
[42] OCR Letter dated 1/22/98, p. 5. http://www.rit.edu/~easi/law/ocrsurltr.html
[43] OCR Letter Docket No. 09-99-2041 dated April 20, 1999 from Robert E. Scott, Team Leader, Office for Civil Rights, U.S. Department of Education, p. 2.
[44] Crista L. Carl and Jay D. Leventhal, "Accessing On-Line Services with Synthetic Speech: America Online, CompuServe, and Internet Service Providers," Journal of Visual Impairment & Blindness, (New York: American Foundation for the Blind,1998) 92, no. 8, pp. 545-551.
[45] Section 32.037 of the Texas Education Code was legislated by Senate Bill 294 and enacted by the 75th Texas Legislature.
[46] See http://www.tea.state.tx.us/Textbooks/cns/cnstemp.htm
[47] The Texas Education Code defines electronic textbook as "computer software, interactive videodisc, magnetic media, CD-ROM, computer courseware, online services, an electronic medium, or other means of conveying information to the student or otherwise contributing to the learning process through electronic means." Section 31.001(1). This definition does not address the accessibility issues of electronic textbook content and the method of presentation of that content.
[48] See http://www.leginfo.ca.gov/bilinfo.html for status of California Assembly Bill 422.
[49] See http://www.leginfo.ca.gov/bilinfo.html for status of California Assembly Bill 609.
[50] See http://www.leginfo.ca.gov/bilinfo.html for status of California Assembly Bill 395.
[51] OCR Letter dated 1/22/98, p. 4. See http://www.rit.edu/~easi/law/ocrsurltr.html . One particular distance education resource referenced in the OCR letter was the University of Toronto, Canada effort at http://www.utoronto.ca/atrc/rd/library/papers/accspe.html Recently, at a March 1999 California State University at Northridge (CSUN) "Technology of Persons with Disabilities" conference, an interesting project paper was presented entitled "Adding Feeling, Sound and Equal Access to Distance Education" by Jutta Treviranus of the Adaptive Technology Resource Centre, University of Toronto.
http://www.dinf.org/csun_99/session0112.html
[52] OCR Letter dated 3/9/99, p. 4.
[53] Ibid.
[54] See City of San Jose Web Page Disability Access Design Standard at http://www.ci.san-jose.ca.us/oaacc/disacces.html
[55] See Waddell, "Applying the ADA to the Internet" http://www.rit.edu/~easi/law/weblaw1.htm
[56] Campbell and Waddell, "Electronic Curbcuts" http://www.prodworks.com/ilf/w5bcw.htm For a definition of what is meant by accessible web design, see discussion by Chuck Letourneau, Starling Access Services at

http://www.starlingweb.com/webac.htm
[57] See http://www.ci.san-jose.ca.us/oaacc/disacces.html for further detail on these standards for City webmasters and consultants. These standards are derived from ADA policies and procedures found in the City of San Jose ADA Self-Evaluation and Transition Plan, the ADA statute itself, case law, regulations, ADA Technical Assistance Manuals and other agency interpretive tools. ADA policies include: 1) the ADA Alternate Document Format Notice 2) the ADA Public Notice for requesting accommodations for access to public meetings and events 3) the third party contractor ADA compliance requirement 4) the City of San Jose ADA Title II complaint process for citizens 4) the ongoing duty to remove barriers in access to our City programs, services and facilities and 5) the ADA requirement that people with disabilities, such as the City Disability Advisory Commission, are consulted when developing policies, programs or services impacting their community.
[58] The Access Instruction page publishes the contact name and email of the ADA Coordinator responsible for investigating and resolving ADA Title II complaints as required under the statute and facilities the internal resolution of complaints concerning inaccessible web design. http://www.ci.san-jose.ca.us/access.html
[59] Ideally, a web site should display the same information on the web page for all visitors and should not require the maintenance of a separate text-only site. Anecdotal evidence suggests that there is a higher cost for maintaining parallel web sites because webmasters tend to update the graphical version and not the text-only version.
[60]Screenreaders cannot audibly read out loud the text or links embedded within graphics. This is also true for screenreaders encountering a PDF document. Visitors to web sites with slow modems have also found that they can quickly download a web site utilizing Alt-tags by turning off their graphics.
[61] This feature was adopted from the Center for Accessible Media at http://www.wgbh.org/wgbh/pages/ncam/accessncam.html#visim
[62] Ibid.
[63] On-line forms that enable keyboard navigation and input are helpful but can be difficult to read by certain text browsers. A good customer service strategy is to provide an email or voice/TTY phone number as an alternative means of communication.
[64] See http://www.ci.san-jose.ca.us/oaacc/disacces.html as well as http://www.w3.org/TR/WAI-WEBCONTENT/
[65] For background article on web accessibility effort see Thornberry, "City Worker Ensures Web is Accessible." http://www.amcity.com/sanjose/stories/102797/focus3.html The author was also named to the "Top 25 Women on the Web" by Webgrrls International, San Francisco chapter. See http://www.webgrrls.com/sf/25women.htm
[66] See http://www.sjpl.lib.ca.us/Home/Archives/awards/hp_award.htm/
[67] See http://www.itpolicy.gsa.gov/mkm/gsaepp/top.htm/
[68] See http://www.webgrrls.com/sf/25women.htm
[69] See http://www.w3.org/TR/WAI-WEBCONTENT/
[70] See http://www.w3.org/WAI/
[71] Only by coincidence was the WAI launch made in the only local governmental jurisdiction that had adopted minimal web accessibility standards. In fact, the Board of Supervisors for the County of Santa Clara had adopted the City of San Jose web accessibility standard the previous month in March, 1997.
[72] See http://www.w3.org/WAI/
[73] Ibid.
[74] For Web Content Accessibility Guidelines, see http://www.w3.org/tr/wd-wai-pageauth/
[75] For User Agent Accessibility Guidelines, see http://www.w3.org/TR/WAI-USERAGENT
[76] For Authoring Tool Accessibility Guidelines, see http://www.w3.org/tr/wd-wai-autools/
[77] See http://www.w3.org/WAI
[78] Ibid.
[79] Ibid
[80] President's Information Technology Advisory Committee Report to the President, "Information Technology Research: Investing in Our Future" February 1999 http://www.ccic.gov/ac/report
[81] This thesis is analogous to that expressed by Shapiro and Varian, Information Rules, p. 2; in their discussion concerning the information economy, the authors point out that "[t]echnology changes. Economic laws do not."
[82] Berven, Heidi M. & Peter David Blanck, "The Economics of the Americans with Disabilities Act Part II: Patents and Innovations in Assistive Technology," Notre Dame Journal of Law, Ethics & Public Policy, 12 ND J.L. Ethics & Pub Pol'y 9, 1998. According to this resource, historically there was a clear distinction between normal and abnormal; technology justified by disability stereotyping include life-ending technology, restraining technology, punishing technology, cure technology, medical technology and simple and safe technology. As a result, "[I]ndividuals with disabilities were excluded from the assistive technology design process and found themselves dependent on public programs for decisions regarding technology. Dominant models and definitions of disability, based on medical, economic and minority paradigms characterized disability in the context of particular institutional systems. Each provided an incomplete picture of the meaning and consequences of disability."
[83] Computer Science and Telecommunications Board, Commission on Physical Sciences, Mathematics, and Applications, National Research Council, More Than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure (Washington D.C: National Academy Press 1997) http://www.nap.edu/readingroom/books/screen
[84] Ibid., p. 193.
[85] Ibid., p. 195.
[86] Ibid., p. 196.
[87] O'Reilly, Tim, "Lessons from Open-Source Software Development," Communications of the ACM, 42, no. 4, April 1999, p. 34 (hereinafter cited as O'Reilly) "Officially, open source (which is a trademark of the Open Source Initiative – see http://www.opensource.org) means more than the source code is available. The source must be available for redistribution without restriction and without charge; and the license must permit the creation of modifications and derivative works, and must allow those derivatives to be redistributed under the same terms as the original work."

[88] According to O'Reilly, "whether or not open-source technologies succeed as packaged products, their greatest economic contribution may be the new services that they enable." Ibid., p 34.
[89] Shapiro and Varian, Information Rules, pp. 256, 257.
[90] O'Reilly, p. 37.
[91] President's Information Technology Advisory Committee Report to the President, "Information Technology Research: Investing in Our Future, February 1999, p. 12, http://www.ccic.gov/ac/report Communication can occur "regardless of physical limitations of the individual, because devices can accept and provide input and output in many different ways."
[92] Ibid, p. 13. "Systems will require interfaces accessible both to experts and novice or infrequent users regardless of physical ability, education or culture."
[93] Ibid, p. 14. "Patients are empowered in making decisions about their own care through new models of interaction with their physicians and ever-increasing access to biomedical information via digital medical libraries and the Internet."
[94] Ibid. "We know too little about the best ways to use computing and communications technology for effective teaching and learning, in particular, how to effectively use multimedia capabilities to crate a richer, and more appealing learning experience."
[95] Ibid. "Any company can be easily reached by its customers, regardless of location. . . . Consumers can shop for the best products, services and prices from the convenience of their hotel room, home or office."
[96] Ibid, p. 15 "A highly flexible workplace is able to accommodate each individual's needs, from working parents to workers with disabilities."
[97] Ibid. "Designers, manufacturers/builders, suppliers, and end-users participate in the design process, providing one another immediate feedback."
[98] Ibid, p. 16. "Research problems are becoming more complex and interdisciplinary in nature. As a result, researchers are finding innovative ways to collaborate with their colleagues across the globe."
[99] Ibid. "Fully integrated models allow scientists and policy makers to consider information on climate trends, populations trends, resource utilization, and the value of natural and economic resources when making decisions regarding technically feasible and cost-effective options to reduce environmental impacts or adapt to climate change."
[100] Ibid, p. 17. "Government services and information are easily accessible to citizens, regardless of their physical location, level of computer literacy, or physical capacity. . . . . It is imperative that improvements in government be available to all citizens, so we must understand and surmount barriers to access."
[101]http://www.ncd.gov
[102] NCD, "Access to Multimedia Technology" http://www.ncd.gov/publications/sensory.html

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THE NEW WORKFORCE



A tight labor market gives the disabled the chance to make permanent inroads

Special Report

The Gap's emporium of affordable chic in midtown Manhattan throbs with New Economy action. Salesclerks sporting headsets race across the store to wait on tourists and time-starved New Yorkers. Stockboys heave huge boxes overflowing with clothes. At the center of this retail hubbub is Gap's "wild man in a wheelchair," supersalesman Wilfredo "Freddy" Laboy, a fast-talking, goateed 36-year-old who lost his legs when he fell off a freight train at age 9. Freddy dances across the store, popping wheelies and spinning himself around to the bouncy pop music. Little kids stare as he hops off his chair and onto the floor to grab a tangerine-colored T-shirt and then pulls himself up on his stump to reach for another pair of khakis. Instead of using the elevator, he prefers to horrify colleagues by scooting himself down the stairs. "It's faster," he says.

Freddy loves the Gap, and the Gap loves Freddy. But just six months ago, the story was altogether different. An amateur wheelchair basketball star who pulled himself through the New York City Marathon, Freddy was used to letting nothing stand in his way. But even with New York City's unemployment level at record lows, he couldn't find a job. Once prospective employers caught sight of his legless torso, they lost interest. Still, on a whim, Freddy wheeled himself into the Gap last October. To his astonishment, they hired him. "I finally got accepted somewhere because they didn't just see the wheelchair," says the married father of three. "They saw me."

Freddy may well be at the cusp of a huge change rocking the world of the workplace, marking the first time in history that people with disabilities have been poised to enter Corporate America en masse—many of them with the help of wheelchairs and seeing-eye dogs.

Facing the worst labor shortage in modern history, recruiters are tapping the kinds of workers they would have easily blown off just 10 years ago: prepubescent wireheads, grandmothers—even convicted murderers. Next up are the disabled, who may prove to be the last great hope—if only because they're the only labor pool that hasn't been completely drained. At the same time, gr breaking technology is creating for people with disabilities to b perform jobs, helping to erase the divisions that once existed bet them and everybody else (page 68

HELPFUL COMPUTERS. Sure, a few panies have a long record of h workers with disabilities. In the 19 still the Dark Ages of the movem Marriott International Inc. was the unheard-of: paying adults Down's Syndrome $7 an hour to 40 hours a week cleaning rooms sweeping floors. But that was th

RELATED STORIES

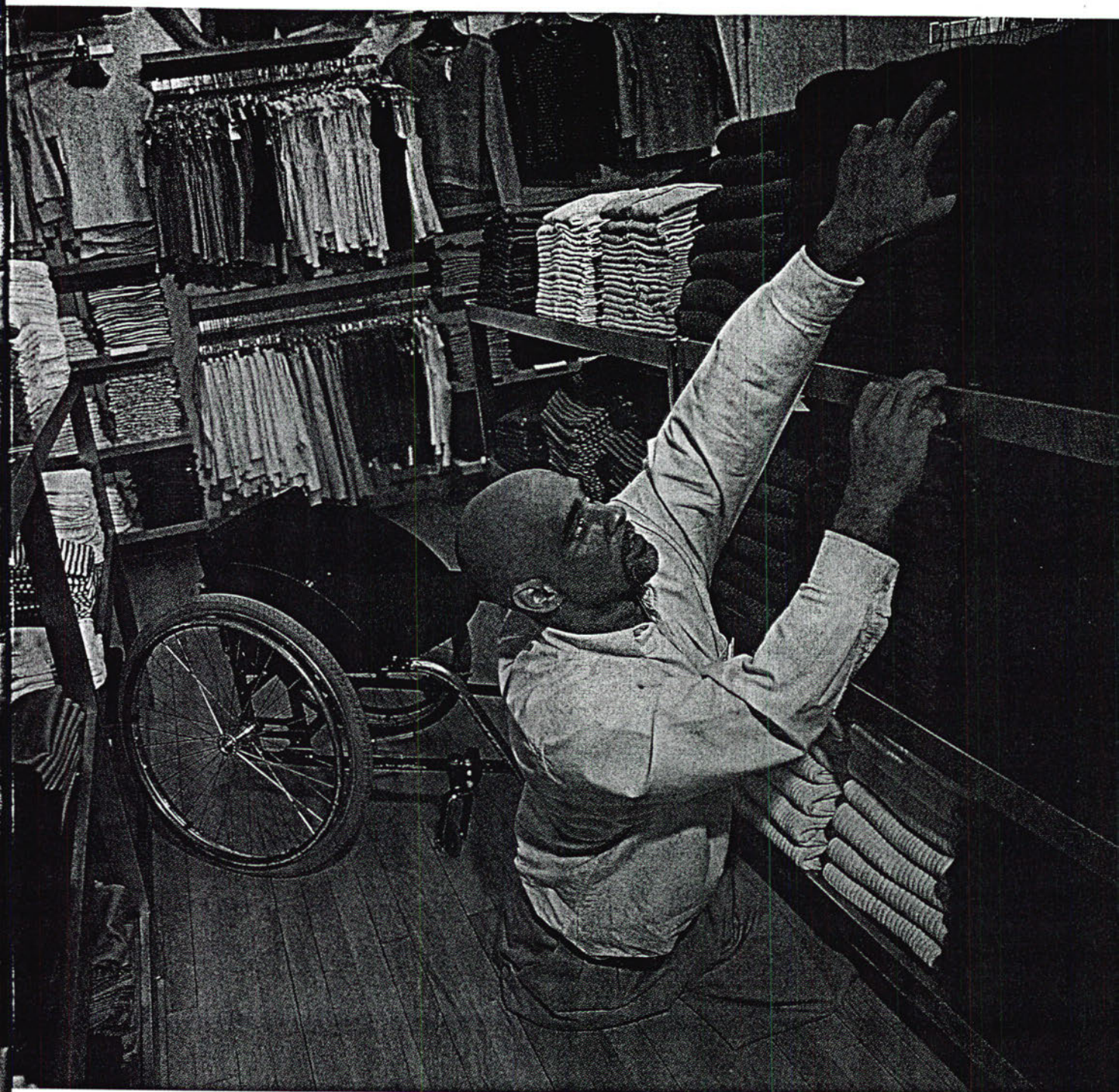
Technologies that enable the disabled **Page 68**

Mechanical devices make bodies whole **Page 72**

The law that opened up the workplace **Page 74**

ALSO

For more on equipment and services designed to help the disabled in the workplace, see our Assistive Technology column at www.businessweek.com/today.htm



ception. Despite the Americans With Disabilities Act (ADA), passed a decade ago this July, only 25% of the country's 15 million disabled who are also of working age are employed. Of the 75% who aren't working, Harris Polls indicate that two-thirds of them wish they could be. Says Paul H. Wehman, director of the rehabilitation research center at Virginia Commonwealth University: "The dirty little secret of the welfare-to-work movement is that people with disabilities got left out."

That may be about to change. Never before has it been so easy and made so much economic sense for companies to invest in workers with disabilities by making accommodations for them. "We can use new technologies to contribute to society in ways that weren't really possible when I started 25 years ago," says Michael Coleman, IBM's vice-president for global operations. Coleman, who lost both his hands in Vietnam when he was trying to defuse a bomb, is IBM's top-ranking disabled worker. He is also chairing the company's task force to find ways to employ more workers with disabilities.

Crestar Bank has already found ways to make that happen. New-fangled voice-activated technology means that callers to the bank never know that customer-service representative Chris Harmon is a quadriplegic. He is so disabled that the recruiter who hired him had to stick a pen in his mouth so he

SALESMAN EXTRAORDINAIRE

Freddy Laboy couldn't find a job until he wheeled himself into a Gap in midtown Manhattan last fall

could sign the employment application. At the company's Richmond (Va.) call center, he simply tells his computer what to do and the information appears on the screen in a flash.

Crestar is one of a growing list of businesses that is mining the ranks of the disabled to solve labor crises they say would otherwise have been catastrophic. Turns out that what began as a last-ditch maneuver to stem this worker draught has yielded an unexpected boon that veteran employers of people with disabilities have long known about: The disabled are often more proficient, productive, and efficient than "normies," according to researchers.

A 30-year study by DuPont revealed that job performance by workers with disabilities was equal to or better than fully functioning peers. The disabled had a 90% above-average job performance, with safety and attendance records that were far above the norm, too. Perhaps most enticing to human-resource heads pulling their hair out over the dot-com-induced worker exodus is the fact that people with disabilities can often be far more loyal to the employers who gave them a break and are therefore less likely to be lured away by a boss dangling a bigger paycheck.

"AT A LOSS." But until recently, the disabled were actually penalized for finding a job because even a minimum-wage gig flipping burgers or mopping floors meant the automatic loss of Medicaid benefits. That huge barrier to employment fell in December when President Clinton signed the Workers Incentives Improvement Act, clearing the path for states to change Medicaid laws to let the disabled hang on to much-needed benefits while entering the workforce.

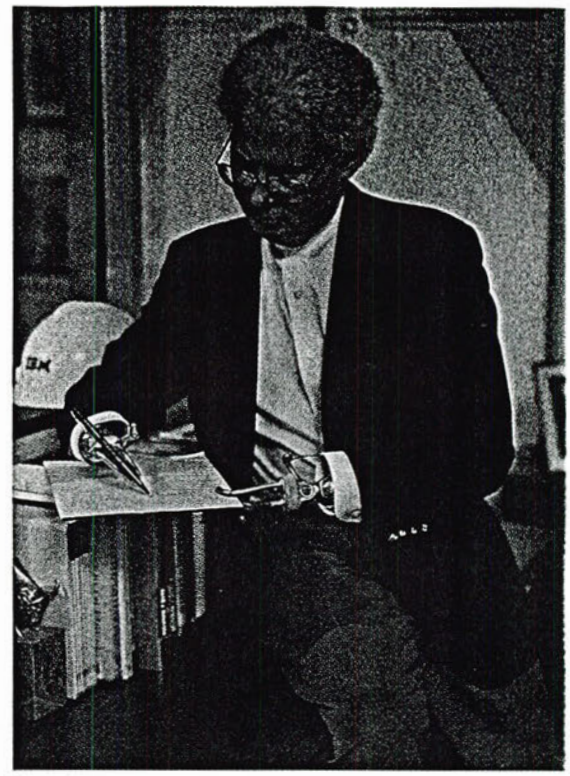
The move comes none too soon. Already, temporary agency Manpower Inc. is raiding the ranks of the disabled to fill its employee rolls. The National Disability Council reports a 50% jump in requests for workers with disabilities from companies as diverse as Merrill Lynch & Co. and Microsoft Corp.

In fact, Microsoft is so eager to hire such workers that the software company is spearheading the Able to Work program, a consortium of 22 businesses scrambling to find the best ways to place disabled people in jobs. Says Microsoft's director of diversity, Santiago Rodriguez: "Until now, the whole country has been at a loss as to how to do this."

To many advocates for the disabled, this confusion is a disappointment. The ADA was passed with great hopes of creating jobs and access for America's disabled population of 54 million. It prohibited employers from refusing to hire qualified applicants who also had disabilities. It also mandated that the disabled have access to telecommunications equipment and public transportation.

But the barriers standing between most people with disabilities and a good, solid job haven't exactly been wiped out by employee sensitivity training courses and curb-cut accessible sidewalks. Those and other strides have helped, but problems still abound. Cities such as Chicago and New Orleans face lawsuits for failing to bring their public transportation systems into compliance.

There are also, disability advocates say, still too many lawsuits like the one brought on behalf of a mentally retarded janitor, Don Perkl, who loved scrubbing toilets for Chuck E. Cheese in Madison, Wis. A district manager, a lawsuit alleges, fired him after saying "we don't hire people like that." The pizza parlor's local manager and two



BIG BLUE WANTS YOU

IBM Vice-President Michael Coleman, a Vietnam vet, is in charge of a task force looking for ways to recruit disabled workers

WHERE THE DOOR IS OPEN

Some companies that offer job opportunities for the disabled

BOOZ, ALLEN & HAMILTON Advanced policies for employees with AIDS. Has National Task Force on Disability.

CATERPILLAR Sponsors Special Olympics and is considered a model of high-tech accessibility.

CHARLES SCHWAB Founder Charles Schwab has dyslexia, and his sensitivity to the issue pervades the organization.

CRESTAR BANK Offers disabled customers special services and recruits disabled workers through partnerships with the Virginia Rehabilitative Services Dept. and the National Association of the Deaf.

FORD MOTOR Stated commitment to including people with disabilities—Special efforts to recruit people with disabilities, especially the blind.

HONEYWELL Participant in Able to Work program, a consortium of 22 companies that finds ways to employ the disabled. Good track record on turning its own high-tech innovations into perks for employees with disabilities.

IBM Aggressive recruiter of disabled workers, including students. works with more than 100 local diversity councils.

JOHNSON & JOHNSON Runs a comprehensive disability management program that helps employees return to work after they have been disabled.

MICROSOFT Took the lead in establishing Able to Work program last year.

WELLS FARGO Long legacy of hiring and training disabled workers.

other employees quit in protest because they claimed the perennially upbeat Perkl was doing such a stellar job. Last year, a jury in federal court in the Western District of Wisconsin agreed with them, slapping the company with $13 million in punitive damages—the largest ADA award ever for a single plaintiff. A judge is still reviewing the jury's verdict. Chuck E. Cheese claims that Perkl "wasn't dismissed due to his disability but because he couldn't perform the job," says company spokesman Jon Rice.

LAWSUITS ON THE FRINGE. Plenty of other lawsuits brought under the ADA have caused critics to question its scope. Some worry that the act is not broad enough, pointing to a recent Supreme Court ruling that established that people with treatable disabilities don't qualify for protection. Others say the ADA is straying into the realm of the absurd, noting such cases as the employee with bad body odor who argued she should be protected from getting fired because her glandular problem qualified her as disabled.

But most of the country's workers with disabilities face challenges that are far more clear-cut: They are deaf, blind, paralyzed, or emotionally impaired. Some have been burdened with disabilities since they were born. Others, like Booz, Allen & Hamilton Inc. principal Jeffrey Schaffer, are new to the minority—a group that one in three people will be a part of during their lives. Three years ago, Schaffer's car was in a head-on collision with another vehicle that swerved into his lane on a windy back road in West Virginia. It took paramedics an hour to cut him from the wreckage.

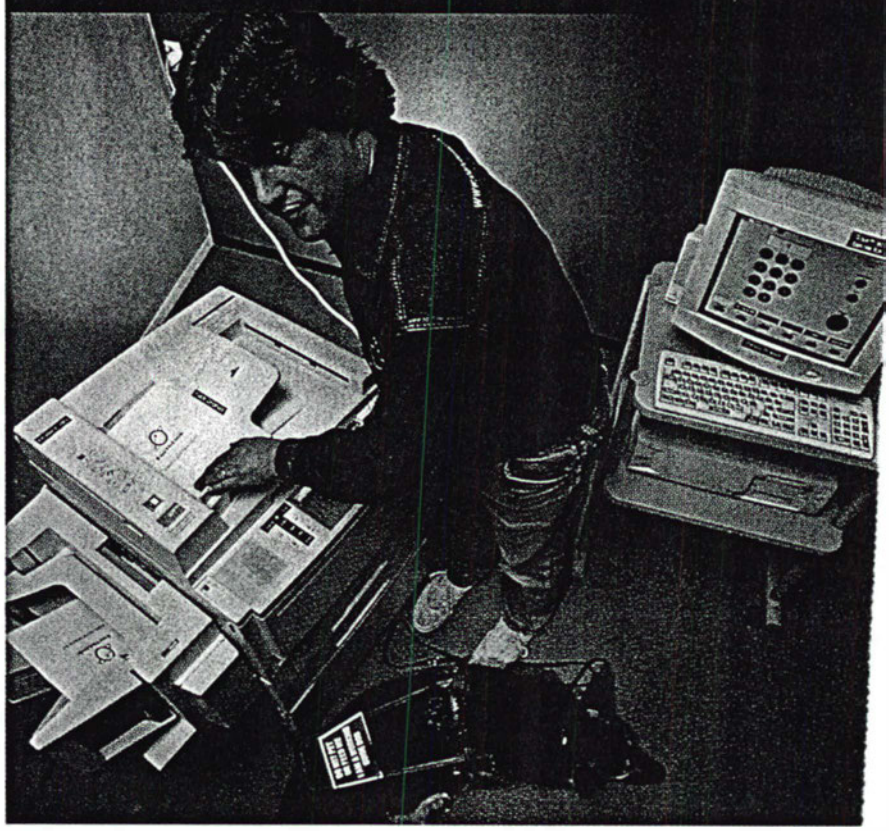
After learning he would be confined to a wheelchair, Schaffer says, the thought of returning to work was the thing that kept him going. "Getting back to work was critical to my sense of well-being," says Schaffer from the bed of a hospital where he has just undergone his sixth operation since the accident. "Work ends up being a defining characteristic for self-worth."

For worker-starved companies, spreading that kind of self-worth around is looking more and more like the only answer to today's labor-shortage woes. Still, the real test will be when the economy cools and companies can afford to get picky about choosing between applicants with disabilities and everyone else. By then, though, it may be a lot harder to tell the difference.

By Michelle Conlin in New York

Special Report

ENABLING TECHNOLOGIES



A quarter of a century ago, only the exceptional employer hired a person with a disability. Most execs felt the disabled worker would flounder at even the simplest of tasks. And change has been slow. Even today, only 1 in 4 disabled adults have jobs—despite strong laws prohibiting employment discrimination and the tightest job market in modern history.

But a revolution in the development of specially adapted machines—known as assistive technology—is creating some dramatic changes. Spearheaded by the likes of Microsoft, Intel, Pitney Bowes, Toshiba, IBM, and Apple Computer, as well as niche players such as HumanWare and Dragon Dictate, this effort includes new products that can help disabled people better see a computer screen, hear a telephone call, talk to others when they lack speech, and do word processing when they cannot type. "Accessibility is a fundamental part of our software design process," says Microsoft Corp. Chief Executive Steven A. Ballr

These breakthroughs expand the u verse of opportunity for the 54 mil disabled people in the U.S.—a group Americans with Disabilities Act def as having a physical or mental imp ment that limits life's major activi Companies that make these products banking not only on an exploding ma for the disabled but also on an a workforce. As baby boomers grow o they are discovering that one-third Americans will have a disability at s point in their adult lives. As they main in the workforce longer, they will benefit from the innovations cranked out today. Over time, the technologies could make the workpl

THE RIGHT FEEL

David Redman, a blind office wor er, uses a Pitney Bowes braille-labeled copy machine

the 21st century a lot more diverse.

Assistive-technology gadgets range from the most basic to machines worthy of a William Gibson sci-fi novel. Among them: computers displaying information in extremely large print for the sight-impaired or in braille formats for the blind; software that converts text into computer-synthesized speech; telecommunications relay products for the deaf that allow them to read what is spoken on the other end of the phone; improved prosthetics that replace a lost limb; and eye-gaze programs that allow paralyzed individuals to type on a computer screen simply by gazing at different points on the monitor.

All this hasn't been lost on companies looking to find fresh talent and keep the people they already have. After Joseph Martin, special counsel to Bank of America, was diagnosed with Lou Gehrig's disease in 1994, the company purchased the $16,000 Eyegaze System made by LC Technologies Inc. to enable him to keep working even though he had lost control of his arms and legs.

Simply by looking at control keys displayed on a computer monitor, Martin is able to direct a laser beam to various points on the screen. The laser prompts commands, whether to type a letter or a number. This enables him to dial a phone number, operate a PC, or log on to the Internet. All he needs is control of one of his eyes and the ability to keep his head still. For giving speeches, Martin downloads what he has written to a portable voice synthesizer made by Sentient Systems. He operates the voice synthesizer with a simple click-switch with the help of the one finger on his hand that he can still move around.

Phone services are also taking on new dimensions. Deaf author Frank Bowe, who writes about the disability movement, does his research and interviews with a telecommunications device for the deaf (TDD). These kinds of interpretive and speech-to-speech services that enable communication between a deaf and hearing person now offer special operators who will read the message typed by a deaf person to a hearing person who doesn't have a TDD. Bowe uses coded signals transmitted through a wire or radio communications systems to type in a telephone number. The message is relayed by liquid-crystal display to the operator. Bowe then types in his message, and the operator makes the call. TDDs can now store messages, record them, and leave them. There are even wireless TDDs that perform like cell phones.

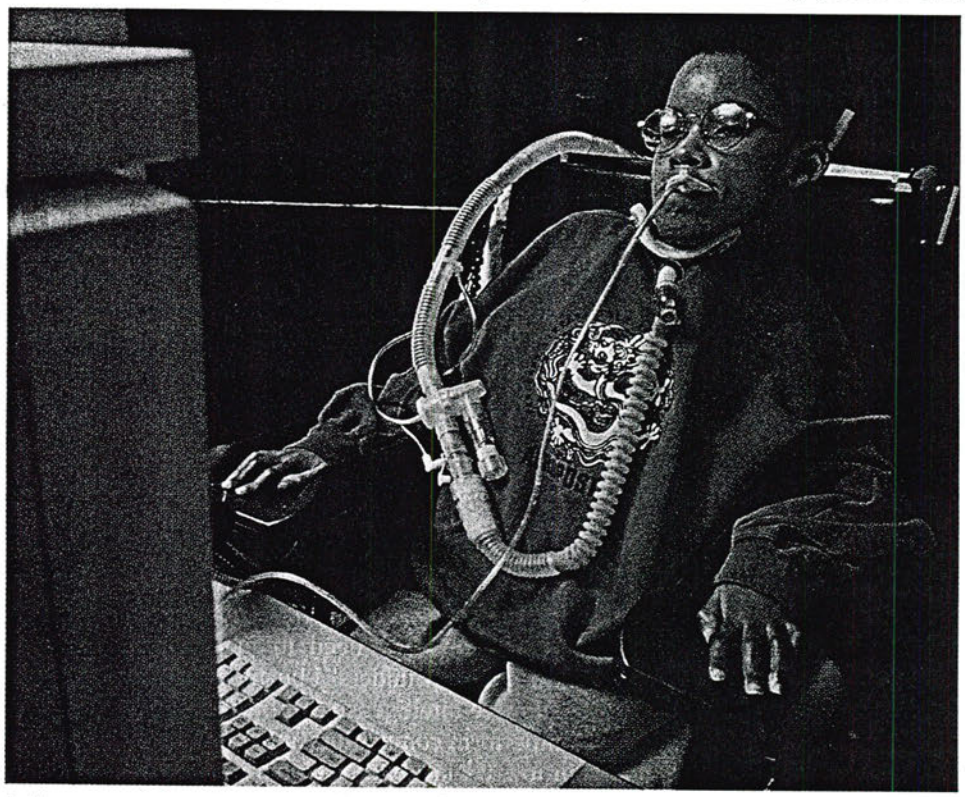
Then there's voice recognition technology, which is still plagued with glitches, though systems are improving every year. When it's running smoothly and widely available, this innovation will go a long way toward empowering those with disabilities to compose on a PC using their own voices.

Even the good old photocopying machine is getting a disability face-lift. One of the most versatile products in years is Pitney Bowes Inc.'s Universal Access Copier System. The sleek, braille-labeled machine is outfitted with speech recognition and has oversize graphic-user interface and copy selector buttons that can be controlled with a mouse, fingers, or pointing stick. For wheelchair users, the copier is lower to the ground than conventional machines, making it a cinch to wheel right up to.

NET POWER. Of all the new technologies, though, it's the Internet that has the greatest potential for empowering the disabled in ways never before imagined. MCI WorldCom Inc. Senior Vice-President Vinton Cerf, who is partially deaf and is one of the founding fathers of the Net, anticipates the day when people with poor sight will be able to navigate an audio page that in some respects will be better than today's visual page. "The potential is there," says Cerf. For people with cognitive impairments, such as learning disabilities, the Net will soon offer simpler appliances that require less technical knowhow than what's required today to boot up a typical PC.

The bottom line: The Internet and other technologies are removing many of the can'ts that kept disabled people out of the office for so long. For worker-starved companies, the breakthroughs come not a moment too soon.

By John Williams in Washington





WHERE THERE'S A WILL... Student David Womack works on his PC using a breath-activated Head Mouse. Above, words are spelled out on a Vision Key device operated by eye movement

BusinessWeek ONLINE

For an interview with Vinton Cerf, see the March 20 issue at www.businessweek.com.

PRIVATE SECTOR HIRING — EMPLOYMENT (K) ISSUE
LEARN FROM GOVT
COST OF TECH DROPPING
HIRE 100, ETC, PEOPLE W/ DISABILITIES AT ONCE

DATA COLLECTION
HELPFUL TO INDUSTRY DEFINE PROBLEM, OPPORTUNITIES

FL ANNOUNCEMENT — YOUNG PEOPLE & IT INDUSTRY

ABLE TO WORK CONSORTIA
ADOPT FCA'S HIRING TARGET
DOUBLE NO. OF MEMBERS

CAPACITY BLDG @ ENGINEERING SCHOOLS IN UNIVERSAL DESIGN
TRAINING @ COMPANIES
CURRICULA?
SCI & ENGINEERING SOCIETIES ACTIVE?
GRASS COMMUNITY

TECHNICAL TRAINING DISABLED ADS
TELE-REHAB

INTL COMPETITION — JAPAN
REPORT — CASE STUDY?
WIRED COMPUTER IN EVERY HOME

Agency Involvement in President's Initiative on IT and People with Disabilities

1. Suggestions for concrete government deliverables that President could announce

2. Suggestions for steps that we could be challenging the private sector to do

3. Ideas for agenda-setting -- things that may not get done in Clinton Administration but we should put on the agenda

4. Event ideas (location, format, etc.) BOSTON?

5. Help with speeches and background material

- Compelling stories about people whose lives have been changed as a result of universal design and assistive technology

- Studies, facts, statistics

- Clinton-Gore accomplishments

6. Examples of specific technologies that could be used as examples or demos

7. Suggestions of companies, foundations that might want to get involved

Please e-mail and fax material by August 8th to:

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e-mail: thomas_kalil@opd.eop.gov
phone: (202) 456-5366
fax: (202) 456-2223

9/21

STRONG PRIVATE SECTOR FOCUS – COMMITMENTS
TASK FORCE
WEB ACCESSIBILITY
MESSAGE TO R&D
POWS EXEC MEMO – LAST ONE
AGENCY DELIVERABLES
NEW POLICIES

OVERLAP w/ ELDER CARE
EXPENSIVE TECH – FCC HELP BRING TO SCALE

Speeches and Testimony

Statement by

Judith E. Heumann
Assistant Secretary for Special Education and Rehabilitative Services

Before the

U.S. House of Representatives Subcommittee on Labor, Health and Human Services, and Education Appropriations

On the

Fiscal Year 2001 Request for Special Education and Rehabilitation Services and Disability Research

March 16, 2000

Good morning Mr. Chairman and members of the Committee:

I thank you for the opportunity to present and discuss the President's fiscal year 2001 budget request for the Office of Special Education and Rehabilitative Services. This budget proposal, which includes increases for formula grant programs and targeted increases for discretionary programs, represents a significant national investment directed at enhancing education, employment, and independent living opportunities for millions of America's individuals with disabilities.

Over the past several years, with your help and that of the entire Congress, we have made great strides in the education and employment of people with disabilities. Together we have reauthorized the Individuals with Disabilities Education Act (IDEA), we have reauthorized the Rehabilitation Act as part of the Workforce Investment Act, and we have reauthorized the Assistive Technology Act. We have made important investments in the Special Education Grants to States program, the Vocational Rehabilitation State Grants program, and in other important areas such as early intervention, positive behavioral research, independent living, and assistive technology. Our investments are

paying off. Our GPRA measures, which we have developed and refined over the past several years, are beginning to show positive trends. We know, for example, that more children with disabilities are being served in regular classrooms. We also know that the percentage of children with disabilities dropping out of school is decreasing while the percentage of those graduating with regular diplomas is increasing. In the Vocational Rehabilitation State Grants program, we have increased the number of individuals achieving employment outcomes by 15 percent over 5 years and have increased the employment outcomes for individuals with significant disabilities as a proportion of all individuals achieving employment outcomes.

Yet, as I appear before you today and look to the future, I know that there is much more to be done. We have recognized the need, but not entirely fulfilled the promise. Despite the unparalleled growth in the economy over the last several years, there has been relatively minor progress in reducing the unemployment rate of persons with disabilities. We know that children with disabilities still need more help than they currently receive during their early childhood and preschool years. Many students arrive at elementary school with developmental delays and behavioral difficulties that will greatly impede their chances for future academic success. Often their parents find it difficult to get the help they need to face these challenges, particularly in the early years of school. We also are aware that for many disabled individuals, independent living is still not a reality, but a distant dream because they lack the resources and supports they need to live fulfilling and successful lives in their communities. Finally, it is imperative that children and adults with disabilities share in the benefits of the exciting new technologies emerging from the current information technology revolution. If children and adults with disabilities do not have access to this emerging technology, they will be more likely to perform poorly in school, be unemployed or underemployed, and be more isolated in their communities.

The 2001 Budget Request

The budget that I present today focuses much-needed resources in many of these areas. Overall, the proposed budget of $9.3 billion represents an increase of $430 million, or 4.8 percent, over the fiscal year 2000 budget for the Office of Special Education and Rehabilitative Services. The request proposes significant increases in funding for Special Education and supports specific efforts to promote compliance with the Individuals with Disabilities Education Act. The proposed budget also includes increases for vocational rehabilitation as well as technology, research, and independent living activities.

Special Education

The Administration's fiscal year 2001 request for Special Education is $6.37 billion or a 5.5 percent increase over the 2000 appropriation. The request includes a significant increase in

funding for the Part B Grants to States program as well as increases for Grants for Infants and Families, State Improvement, Research and Innovation, Technical Assistance, and Parent Information Centers. We believe that the requested increases for these programs will greatly assist States in the delivery of early intervention, special education, and related services to children with disabilities.

Grants to States: The Administration is requesting $5.28 billion, a $290 million or 5.8 percent increase, for Special Education Grants to States. At the requested level, the program will provide an average of $827 per child, an increase of 4 percent over the 2000 level. If approved, States will receive 13 percent of the national average per-pupil expenditure, or 11 percent of the excess cost of serving children with disabilities, from the Federal Government for educating children with disabilities. The increase provides additional resources to State and local educational agencies that they can use to improve services for children with disabilities by addressing deficiencies in such areas as placing children in the least restrictive environment and providing appropriate support services, qualified personnel, transition services, and related services such as speech, physical, and occupational therapy. These are all areas that our monitoring program indicates need improvement.

Grants for Infants and Families: The request includes an increase of $8.6 million for Grants for Infants and Families to help State and local agencies provide early intervention services to infants and toddlers birth through age 2, when intervention can be critical to improving results.

State Improvement: We are requesting $45.2 million for State Improvement grants, an increase of $10 million, or 28.4 percent, over the 2000 level. This request includes funds for new awards to an estimated 15 States and territories as well as sufficient funding to continue 28 existing awards to States. Resources made available through this program have the potential to make a significant positive difference in the education of children with disabilities. It is well-documented that teacher shortages and inadequately trained regular and special education teachers are among the most pressing and chronic problems facing the field. The State Improvement program is an excellent vehicle for addressing a States' needs in these important areas. With the requested increase, we would expand efforts to reform and improve State systems for providing educational, early intervention, and transition services to improve results for children with disabilities.

Research and Innovation: The President's 2001 budget includes a $10 million increase for Research and Innovation to support projects that demonstrate how effective interventions, coupled with early identification, can improve results for children with developmental delays in learning to read and who exhibit behaviors that have been found to lead to significant discipline problems or emotional disturbance as they get older. Research shows that early intervention is particularly effective for improving

educational results for those children.

Technical Assistance and Dissemination: We know that helping States achieve compliance with the IDEA is critically important. Based on our monitoring efforts, and reports such as the recent National Council on Disability report on enforcement of IDEA, we believe that additional technical assistance resources are needed to help States achieve the goals of the program. The President's 2001 budget includes an $8 million increase for State Technical Assistance and Dissemination awards that will provide assistance to States in addressing their compliance deficiencies.

Parent Information Centers: We are asking for a much-needed increase for the Parent Information Centers program. As I have traveled the country and met with parents, I have become increasingly aware of the need for a greater commitment of resources in our Parent Information Centers program. Parents repeatedly tell me of the many problems and challenges they face in getting services for their children. These centers are a critical resource for them. They assist parents to become active participants in their children's education. Therefore, for fiscal year 2001, we are requesting $26 million, an increase of $7.5 million above the 2000 appropriation. The $7.5 million increase would be used to expand the size of the awards to existing parent information centers and establish new centers.

Rehabilitation Services and Disability Research

The Administration is requesting $2.8 billion, a $91.7 million increase, for the Rehabilitation Services and Disability Research account to increase employment and independent living opportunities for individuals with disabilities. The request includes funds to expand access to independent living centers and provides funds to support new initiatives focusing on information technology.

Vocational Rehabilitation: The Administration is requesting $2.4 billion for Vocational Rehabilitation (VR) State Grants to assist State VR agencies to improve the employment outcomes of individuals with disabilities. The increase of $60.8 million, or 2.6 percent, is the amount needed to satisfy the statutory requirement to increase funding by at least the percentage change in the Consumer Price Index.

The Vocational Rehabilitation program has undergone significant changes that have presented new challenges to State VR agencies. Changes in the eligibility process have increased the number of eligible individuals in the VR system -- 1.2 million -- and the percentage of individuals with significant disabilities served by the system -- 82 percent. Despite this challenge, the program is assisting greater numbers of individuals to achieve their employment goals. In 1998, VR agencies assisted 223,668 individuals to achieve an employment outcome, 83 percent of whom were individuals with significant disabilities. This number represents 62 percent of all individuals exiting the program after

receiving VR services. Our goal is to continue to improve both the number and quality of these outcomes. The longitudinal study we have been conducting is providing very useful information that will help us work toward achieve these goals.

In addition, the Workforce Investment Act and the Work Incentive Improvement Act present new opportunities that challenge VR programs, other employment and training programs, and disability beneficiary programs to develop strategies to more effectively serve all individuals with disabilities and remove barriers to employment.

Independent Living: Independent living programs facilitate the integration and participation of individuals with significant disabilities in all aspects of our society. Centers for Independent Living (CILs) assist these individuals to achieve consumer-determined independent living goals that allow them to remain in their own communities and to pursue education and employment opportunities. The budget includes a request of $58 million for the CILs, a 20.8 percent or $10 million increase over the 2000 level. This increase would provide support for the establishment of 56 new CILs in 23 States and would bring us closer to our goal of providing access to independent living services to all areas of the country. Currently, residents of 40 percent of the Nation's counties, particularly those in rural areas, lack basic access to CILs.

Disability Research and Assistive Technology: Our request in the areas of Disability Research and Assistive Technology includes funds to support new initiatives that improve access to assistive technology, including information and communication technology, that can increase education and employment opportunities for individuals with disabilities. The $100 million request for the National Institute on Disability and Rehabilitation Research (NIDRR), $13.5 million above the 2000 level, will enable NIDRR to launch new initiatives that will improve access to information and communication technology in the areas of education, employment, and community independence. These new initiatives include the following: (1) $5 million to provide technical assistance and training to schools and colleges serving students with disabilities; (2) $3.1 million to carry out research, training, and technical assistance to enhance the access and use of technology to increase employment opportunities, including self-employment; and (3) $5.4 million to examine how information and assistive technology can be used to enhance community integration and participation by individuals with disabilities across the lifespan.

For ***Assistive Technology***, the Department requests $41.1 million, an increase of $7.1 million above the 2000 appropriation. This request includes $15 million for grants to States to establish or maintain alternative loan financing programs. Currently, major service programs such as Medicaid, Medicare, special education, and vocational rehabilitation cannot meet the growing demand for assistive technology. Loan programs offer individuals with disabilities attractive options that significantly enhance their

access to assistive technology.

Conclusion

Mr. Chairman and members of the committee, we believe that this budget request is an important step forward in our continuing efforts to improve the lives of millions of Americans with disabilities and their families. The President has often spoken about the need for our Nation to invest in its people. Investing in our Nation's disabled children and adults is vital. We must all work together to support programs and services that will enable people with disabilities to obtain an education, to find meaningful work, and to lead fulfilling and independent lives -- in short, to share in the American dream.

I ask your support for this budget proposal. My colleagues and I will be happy to answer any questions you may have.

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