

when they develop, procure, maintain or use electronic and information technology.

Section 508 is intended to create a marketplace for accessible electronic and information products.

Universal Design and Regulation of Technology

The international movement to develop and commercialize universally designed products also has some legal precedent in U.S. law and regulation. The Hearing Aid Compatibility Act of 1988 requires that all telephones manufactured or imported for use in the United States and all essential telephones be hearing aid compatible.

(<http://www.fcc.gov/egb/consumerfacts/hac.html>) Essential telephones might include coin telephones, workplace telephones and telephones in hospitals and nursing homes.

Wireless telephones were exempted. The Television Decoder Circuitry Act of 1990, which amended the Communications Act of 1934, requires that all television receivers with picture screens 13 inches or larger that are manufactured or imported for use in the United States have built-in decoder circuitry to display closed captions

(<http://www.ncicap.org/Docs/dcb.htm>).

Special Laws and Benefit and Service-Related Laws

The United States has also adopted a number of assistive technology policy strategies, including a stand-alone assistive technology law and the integration of assistive technology into laws involving health and welfare benefits, education and employment of people with disabilities. The Technology-related Assistance for Individuals with Disabilities Act of 1988 as amended is a stand-alone law that set down the definition of assistive technology routinely used in the United States

<http://128.104.192.129/taproject/library/laws/techact94.htm>). This law provides funding to develop statewide, consumer-responsive information and training programs designed to meet the assistive technology (AT) needs of individuals with disabilities of all ages. The Act defines an AT device as any item, piece of equipment, or product system (whether acquired commercially off the shelf, modified, or customized) that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. Assistive Technology service is defined as any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive device. The Act also defines an individual with a disability as any individual who is considered to have a disability or handicap for the purpose of any federal laws other than this Act. The Act is closely related to special educational and employment services for individuals with disabilities. Assistive technology definitions from this law have been harmonized with education and employment laws for children and adults with disabilities. Assistive technology funding opportunities are available in education, employment and health and welfare benefit programs.

Information and computer technology research and development in the United States has not routinely included people with disabilities in product design, nor considered them as part of the mainstream consumer market. This is not the case in certain sectors of the health products market. While assistive technology manufacturers target individuals with disabilities, these companies are not heavily invested in research (U.S. Department of Commerce, 2003).

Summary

In summary, participation in the Information Society has been supported by a number of traditions in U.S. law and policy. The U.S. civil rights tradition and the tradition of communications accessibility for all citizens with enforcement through regulation have driven private and public sector accessibility policies. Regulation of communications has also been an important strategy to bring about accessible, universally designed telephones and television. The use of the purchasing power of the United States government—procurement policy—has provided an important market incentive for the private sector to develop and sell accessible products. In the future, assistive technology policy will need to be more connected to information and communications accessibility policy in order to prevent lags in the development of interfaces between information and communication systems and special technology. Incorporating the disability market into research and development of mainstream information and communications technology will require incentives, regulation, and trained personnel.

THE CLINTON ADMINISTRATION (1993-2001) AND THE NATIONAL INSTITUTE ON DISABILITY AND REHABILITATION RESEARCH

The Clinton Administration's Science and Technology policy agenda included information and communications technology. This information and communications priority at the White House came to the attention of the Director of the National Institute on Disability and Rehabilitation Research (NIDRR) who set parallel objectives for the agency's research and development efforts (<http://www.itrd.gov/ac/pitac-18may00/accessibility/assess-seelman.pdf>, May 20, 2002). NIDRR is a small research

and development agency within the U.S. Department of Education (Seelman, 2000) (<http://www.ed.gov/about/offices/list/osers/nidrr/index.html>). NIDRR's mission is to support research and development to further the inclusion of people with disabilities in society.

NIDRR's Objectives

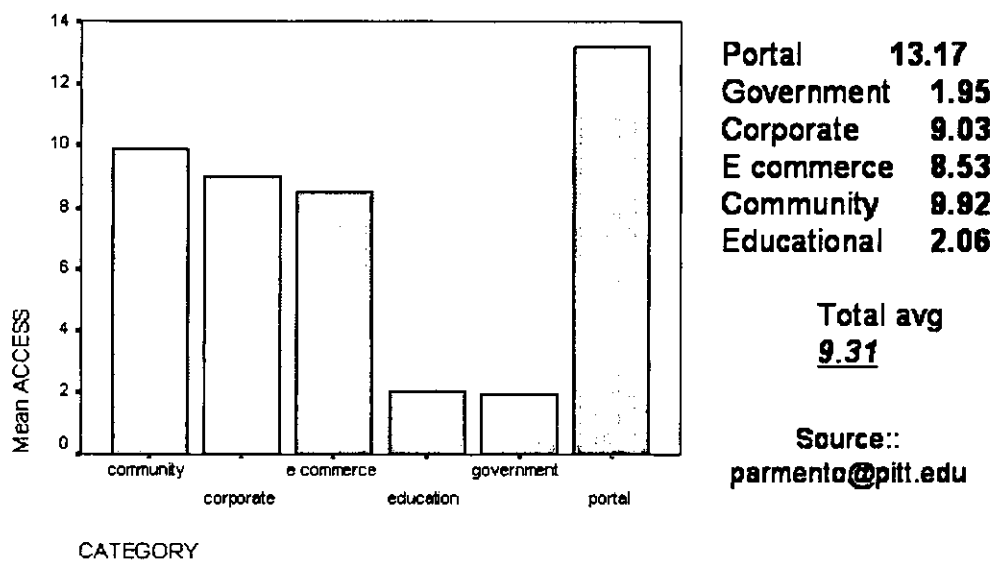
NIDRR set out to attain two primary objectives: further inclusion of people with disabilities in general science and technology policy, and further inclusion of people with disabilities in policies related to markets for information and communications technology. NIDRR worked closely with the White House on domestic and international research and development policies for information and communications technology. NIDRR also requested support from another branch of government, the U.S. Congress. It asked Congress for budget support for its objectives and also regularly provided information about the need for inclusion of people with disabilities in the Information Society.

Studies

NIDRR supported a series of studies to identify some of the challenges for participation in the Information Society. A report entitled *Computer and Internet Use Among People with Disabilities* indicated that "almost three times as many people without disabilities have the ability to connect to the Internet at home as those with disabilities (31.1 versus 11.4 percent)" (National Institute on Disability and Rehabilitation Research, 2000). The report also identified several reasons for decreased computer and internet use among people with disabilities, including poverty, special equipment needs, and lack of awareness of the benefit of usage. An ongoing NIDRR-

supported project by Dr. Bambang Parmanto (parmento@pitt.edu) shows that people with disabilities, especially those with visual impairments, encounter considerable challenges when attempting to access content on the web (Zeng & Parmanto, 2003).

Web Accessibility Barrier Scores (Ideal score = 0, Higher score=less)



CATEGORY

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Means of Web accessibility barrier (WAB) score among six categories.

Government and educational websites are more accessible, reflecting the influence and importance of government laws and policies. NIDRR also requested that the Department of Commerce conduct a study of the assistive technology industry (U.S. Department of Commerce, 2003). The study, entitled *Technology Assessment of the U.S. Assistive Technology Industry* reported that “an even lower priority for AT companies is basic research, which may not provide any near-term payoff in the form of cash-generating

product improvements or new products” (U.S. Department of Commerce, 2003).

Interagency Collaboration Across the Government

NIDRR increased its capacity to work across the government with many agencies. NIDRR is the lead agency for the Interagency Committee on Disability and Rehabilitation Research (ICDRR) (<http://www.icdr.us/>). The Interagency Committee on Disability and Rehabilitation Research was established to “to promote coordination and cooperation among Federal departments and agencies conducting rehabilitation research programs.” The scope of the ICDRR was increased to include a technology committee and to add related government technology agencies.

Agencies began to work together in advocacy, education and research. Along with a number of other Federal agencies and many consumer disability groups, NIDRR and the ICDRR worked for passage of the amendment to the Rehabilitation Act that broadened the scope and strengthened enforcement and implementation of Section 508. NIDRR, again along with other government agencies, established a technical assistance center to promote universal design to the IT industry and work with government procurement agencies (<http://www.itatc.org>).

Cross-Agency Government Efforts

NIDRR’s direct outreach to the information and communications technical community also began to receive some response. The U.S. National Telecommunications Information Administration called for disability-related research proposals and added disability questions to its survey (<http://www.cityofseattle.net/humanservices/ads/Technology/NTIA.htm>). The National

Science Foundation not only supported the World Wide Web Accessibility Initiative but also sponsored a number of workshops. In 2000, the White House Office of Science and Technology was a sponsor of an important conference on technologies and aging (<http://www.vard.org/register/register.htm>). In 1999, the United States Federal Laboratories Consortium issued a paper to the White House Office of Science and Technology Policy entitled "Availability and Accessibility of the Nation's Research Infrastructure Mechanism for Addressing the Elderly and People with Disabilities Needing Assistive Technology and Universal Design" (<http://www.ostp.gov/html/rand/summit/OSTPIssuePaper.doc>).

Web Accessibility Initiative and Other International Efforts

In order to incorporate the information and communications industry into the web accessibility effort for website content, browsers and media players, authoring tools and evolving web technologies, NIDRR and the National Science Foundation funded the Web Accessibility Initiative within the World Wide Web Consortium in 1997 (<http://www.w3.org/WAI>). The World Wide Web Consortium is an international, vendor-neutral consortium of over 400 members that promotes evolution and interoperability of the Web. W3C has a strong focus on the universality of the web. NIDRR also formed other relationships within the international sphere including presentations to the United Nations and the European Union, and has made inroads into recognition of the needs of people with disabilities through the U.S.-Europe Science and Technology Agreement. In an international collaborative meeting in Brazil in 2000, NIDRR and Japan's National Center for Persons with Disabilities met with rehabilitation research institutes from the European countries of Sweden, Finland, the Netherlands and Italy.

Education and Training of People with Disabilities in Science, Engineering and Technology

While NIDRR supported training of people with disabilities through many of its grants, it intensified this effort. The agency represented the disability community on the Commission on the Advancement of Women and Minorities in Science, Engineering and Technology, which added people with disabilities to its study (<http://www.nsf.gov/od/cawmset/>). The Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development was established by Congress on October 14, 1998, through legislation developed and sponsored by Congresswoman Constance A. Morella (R-MD). The mandate of the Commission is to research and recommend ways to improve the recruitment, retention, and representation of women, underrepresented minorities (namely, African Americans, Hispanic Americans, and American Indians), and persons with disabilities in science, engineering, and technology (SET) education and employment. The Commission's exploration of the status of these underrepresented populations in SET has reaffirmed the nation's absolute economic and social imperative to ensure that all U.S. citizens enjoy full participation at all levels of SET education and the SET workforce. The Commission found that people with disabilities were considerably underrepresented in the SET workforce. NIDRR also initiated a community technology program so that individuals with disabilities could be involved with research on the community level.

Working with Government and Industry and Research and Development

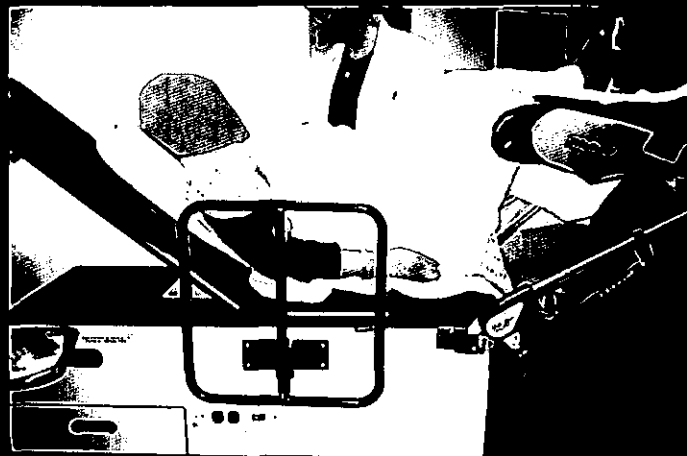
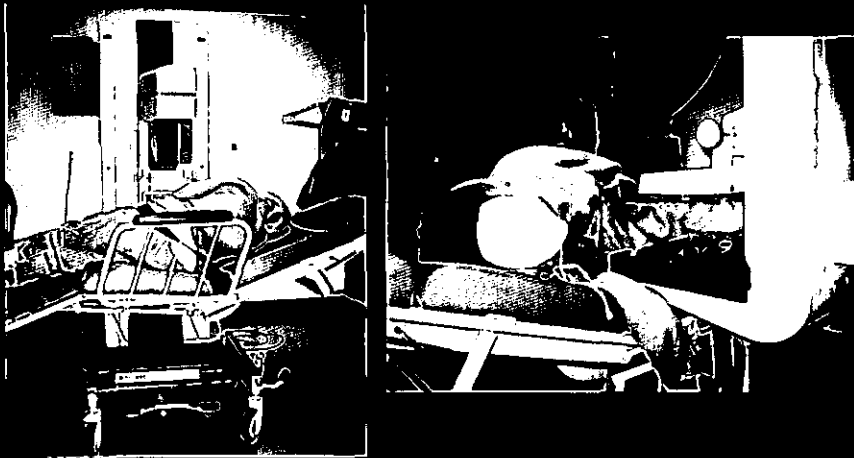
Organizations: Activity Examples

In 1999, President Clinton sponsored a large assistive technology exhibit in the White House which was attended by members of his government, Congress and the disability community. Featured in the exhibit was an accessible voting machine which was based on a kiosk developed to be used across a wide range of functional capacities (<http://www.quadmediacomp/p41800pressrelease.htm>). Later, the Vice President hosted a large tent of home and office technology set out by an interior designer so that the technology blended with the rooms. The CEO of Microsoft was among those who witnessed demonstrations of accessible information and communications technology. He noted: "Microsoft applauds the government to lead the way in requiring accessible technology to be the standard and not the exception" (<http://www.quadmediacomp/p41800pressrelease.htm>).

Examples of Research and Applications

There are many examples of universally designed products, interfaces between mainstream and specialized products, and specialized products. In an attempt to make primary care more accessible, NIDRR established a Rehabilitation Engineering Research Center on Accessible Medical Instrumentation (<http://www.lerc-ami.org/lerc-devel.htm>). Independent hospitals and clinics, like the Magee Women with Disabilities Clinic have also been pursuing accessible equipment for procedures such as mammography or simply weighing wheelchair users, as shown below:

Multi-purpose chair in reclined position,
used for a mammogram



The Table raises and lowers for easier/safer patient transfers

Examining table that moves up and down and has hydraulic stirrups

Wheelchair Accessible Scale

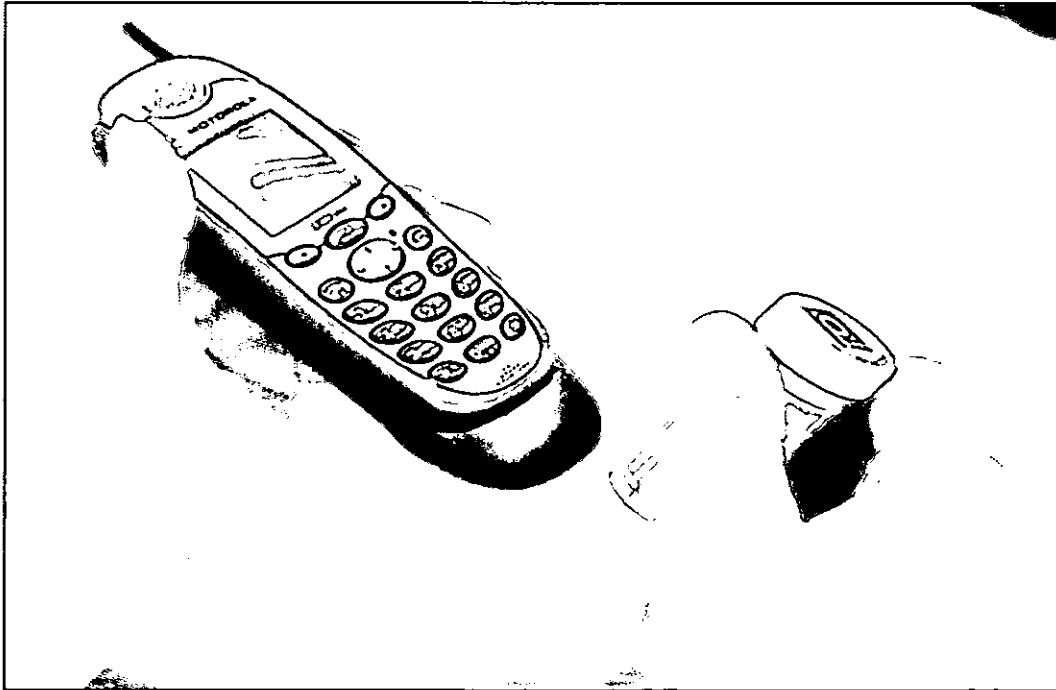


Photo used with permission, Center for Wellness, 2003



NIDRR's Rehabilitation Engineering Research Center on Aging has developed a number of applications such as the one below in which the cell phone reads and voices the information on a prescription label (<http://www.rerc.ufl.edu/cwabstract.html>).

Cell Phone with Bar Code Reader to Read Medication Instructions



Source: NIDRR Rehabilitation Engineering Research Center on Aging.

With an attached sleeve that provides a bar code reader, medication instructions can be “read” to a person using the smart phone.

Education and Training

While law and policy and research must continue, the rehabilitation and disability field must broaden its range of disciplines to include engineers and designers. At the University of Pittsburgh, the inclusive design course includes the following:

Use Inclusive Teaching Tools: Universal Design Methodology

<ul style="list-style-type: none"> • Analytical phase: <ul style="list-style-type: none"> - Observation - Measurement 	<ul style="list-style-type: none"> Who is the User? Surveys & Observations ← Standards Regulations
<ul style="list-style-type: none"> • Creative phase: <ul style="list-style-type: none"> - Evaluation - Judgment - Decision 	<ul style="list-style-type: none"> Sketching Ideas Drawing Concepts Building Models Ranking & Selecting Ideas ←
<ul style="list-style-type: none"> • Executive phase: <ul style="list-style-type: none"> - Description - Translation - Transmission 	<ul style="list-style-type: none"> Prototyping Details and Specifications Manufacturing Product Testing Usability Testing ← Compliance with Standards Marketing

← User Intervention

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[Van-Roosmalen: University of Pittsburgh, School of Health and Rehabilitation Science]

Universal Product Development

(continued)

<ul style="list-style-type: none"> • Problem Statement ← User Intervention • Define the User • Product Requirements ← User Intervention
<ul style="list-style-type: none"> • Idea Generation • Conceptual Designs ← User Intervention
<ul style="list-style-type: none"> • Product Selection ← User Intervention • Prototyping • Product Testing and Evaluation • Product Modifications • Manufacturing • Marketing

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[Van-Roosmalen: University of Pittsburgh, School of Health and Rehabilitation Science]

CONCLUSIONS

Challenges and Opportunities for Governments and Industry

There are a number of opportunities for action by governments and industry, including the following:

- Enlist the highest levels of government in broad policy for an accessible Information Society
- Adopt a civil rights approach to technology in basic and general law
- Adopt laws and policies that provide market incentives for information and communications industry and enforcement policies for regulating industry efforts
- Incorporate people with disabilities in planning for accessible information and communication society
- Connect general technology research and development agencies and institutes to special technology to prevent product lags for people with disabilities
- Plan for inclusive design at the earliest stages of product developments
- Support professional education of people with disabilities and designers and engineers working in the disability field
- Support international efforts to incorporate accessibility such as accessibility in the statement of principles of the World Summit on the Information Society and develop international standards for accessibility in information and communications technology

Governments and Industry: International

Governments and industry have many international opportunities to assure participation of people with disabilities in the Information Age. Domestic laws, such as Section 508 of the Rehabilitation Act and regulation of industry, must not jeopardize competition of products for companies adhering to these laws. Opportunities for action include:

- Implement UN Standard Rule #5

- Develop and implement WHO ICF concepts and support research and clinical applications
- Support inclusion of people with disabilities in WSIS
- Support the development of standards
- Support the transfer of Section 255 of the Telecommunications Act and Section 508 of the Rehabilitation Act into international conventions and the marketplace

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(別紙7)

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